

EVALUATION OF THE PROMOTION OF FREE
SCHOOL BREAKFAST ON PARTICIPATION
RATES, CONSUMPTION, AND
PERCEPTIONS OF SCHOOL
BREAKFASTS IN RURAL
SCHOOLS

By

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Abstract:

Nationally, participation in School Breakfast Program (SBP) is much lower than National School Lunch Program, with research showing that barriers and stigmas associated with SBP have an influence on lower participation. Consuming breakfast may improve nutrient intakes, cognitive function, classroom behavior, and risk of overweight. The objectives of this study were to assess the effectiveness of universal free breakfast, breakfast in the classroom (BIC), and a small promotion on participation in and perceptions of SBP, and to assess the impact of BIC and grade-level on nutrient intakes in a rural school district in Oklahoma. Repeated measures ANOVA were used to compare differences in breakfast participation before and after implementation of universal free breakfast, BIC, grade level, and a breakfast promotion. There were 5987 students enrolled in school year 2012-2013, and 6047 students enrolled in 2013-2014. A convenience sample of 288 students participated in plate waste surveys at three schools at the beginning, middle, and end of school year 2013-2014 and analyses included ANOVA and Student's t-tests. All elementary and secondary students (n=747) and their parents (n=828) in the district were invited to provide their perceptions using online surveys at the beginning and end of school year 2013-2014 with Student's t-tests, ANOVA, and Chi-square analyses. Significantly higher breakfast participation rates were seen after implementation of universal free breakfast, and in elementary children, especially those participating in BIC. Students eligible for full-price meals had the greatest increase in participation. For consumption, although selection of most nutrients was higher in traditional breakfast, only consumption of total and saturated fat were higher in traditional breakfast and calcium consumption was higher for BIC. For perceptions, lower overall survey responses were found at the conclusion of the year, in elementary students who participated in BIC, and for older students and their parents. Targeting interventions on those groups with low SBP perceptions by addressing specific barriers and stigmas may have a positive impact on perceptions and in turn, increase participation in the program. In addition, by promoting healthy foods in SBP, districts may increase participation in SBP as well as improve nutrition of participating children.

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CHAPTER I

INTRODUCTION

Children's Food Intake Behavior

Consuming a healthful diet supports optimal growth and development in children (USDA Advisory Committee, 2010A), however most United States (US) youth are not following dietary recommendations from the Dietary Guidelines for Americans (USDA Advisory Committee, 2010A; Briefel & Johnson, 2004; Reedy, Krebs-Smith, 2010; Forshee, Anderson & Storey, 2006; USDA, 2010B). Promoting good nutrition, regular physical activity, and achieving and maintaining a healthy body weight across the lifespan is a goal of Healthy People 2020 (Healthy People 2020, 2014). Children and adolescents who are overweight or obese are at an elevated risk of developing type 2 diabetes mellitus and heart disease; overweight or obese children are also more likely to be overweight or obese into adulthood, further increasing their risk of certain chronic diseases (Healthy People 2020, 2014). In the 1980s and 1990s, childhood obesity increased dramatically in the US, but National Health and Examination Survey (NHANES) data has shown that childhood obesity rates have stabilized in recent years (Ogata & Hayes, 2014). In addition, a recent Centers for Disease Control and Prevention (CDC) study showed decreasing obesity levels among US preschoolers, with small but significant decreases in low-income preschoolers in about half of states examined (May et al., 2013).

Results from the 2003-2006 NHANES showed that a large proportion of children's nutrient intakes were from energy-dense, low-nutrient food groups including cake, cookies, and soft drinks (Keast, Fulgoni III, Nicklas & O'Neil, 2013). Research has shown that over the past 30 years, children aged 2-18 increased their daily caloric intakes by 179 kcals/day, with a major increase in calories consumed away from the home (+255 kcals/day) (Poti & Popkin, 2011). Between 1977 and 1996, the main sources of away-from-home foods shifted from school meals to fast food consumption (Guthrie, Lin, & Frazao, 2002). In addition, NHANES 1999-2002 data indicated that males 12-19 years old drank approximately 22 ounces of sugar-sweetened soda per day, which is over twice their daily intake of milk (10 ounces), and females consumed on average 14 ounces of sugar-sweetened soda and only six ounces of milk per day (Forshee, Anderson & Storey, 2006).

Much research has shown that American children are not consuming a diet consistent with dietary recommendations (Ogata & Hayes, 2014). According to the CDC, most US youth do not consume recommended levels of fruits and vegetables (2.5-6.5 cups per day), or whole grains (2-3 ounces per day), and eat higher levels of sodium than recommended (1500-2300 mg per day) (USDA Advisory Committee, 2010A & USDA, 2010B).

Breakfast Skipping

Another nutrition-related issue affecting US children and adolescents is breakfast skipping. Breakfast consumption in children and adolescents has decreased over time (Rampersaud et al., 2005). In 1965, a nationally representative sample of US children and adolescents showed that approximately 5% of children and 12% of adolescents regularly skipped breakfast (Siega-Riz, Popkin & Carson, 1998), whereas the 1999-2000 NHANES indicated a breakfast skipping rate of 20.5% of 9-13 year olds and 36.1% among 14-18 year olds (Song et al., 2006). A study utilizing data from the 1999-2006 NHANES found that children from single parent or low-income families were more likely to skip breakfast than children from families with two parents or with a higher socioeconomic status

(Deshmukh-Taskar et al., 2010). In general, breakfast skipping is more prevalent in girls, those of a lower SES, and increases with age (Rampersaud et al., 2005).

Breakfast consumption frequency can have an impact on a number of factors including appetite control, diet quality, and chronic disease risk (Timlin & Pereira, 2007). Although NHANES data has shown that children who skip breakfast have lower total energy intakes compared to children who consume breakfast, children who skipped breakfast had higher BMI z scores for age and larger waist circumferences than children consuming ready to eat cereal for breakfast (Deshmukh-Taskar et al., 2010). A review of literature found that children consistently consuming breakfast had improved nutritional outcomes compared to breakfast-skipping children (Rampersaud et al., 2005). A study assessing the diet quality of ninth-graders in Louisiana found that the percentage of children consuming at least two-thirds of their Recommended Daily Allowance for nearly all nutrients was significantly lower for adolescents who skipped breakfast compared to adolescents who regularly consumed the breakfast meal (Nicklas, Reger, Myers, & O'Neil, 2000).

In addition, studies have shown that skipping breakfast and experiencing hunger can have significantly negative effects on a child's ability to learn (FRAC, 2014A). Undernourished children have decreased cognitive functioning when they skip breakfast (Taras, 2005), and children who skip breakfast show greater numbers of errors and have slower memory recall compared to children who do not skip breakfast (Pollit, Cueto & Jacoby, 1998). Breakfast quality may also contribute to outcomes—those children who consume a complete breakfast are better able to complete math tasks than those children consuming an incomplete breakfast (Wyon, Abrahamsson, Jartellius & Fletcher, 1997) and research has shown that children who consume school breakfast improve their concentration, alertness, and learning ability (Grantham-McGregor, Chang, & Walker, 1998; Brown, Beardslee, & Prothrow-Stith, 2008; Morris, Courtney, Bryant, & McDermott, 2010).

A Solution to Breakfast Skipping

A solution to breakfast skipping may be the School Breakfast Program (SBP). The SBP is administered by the US Department of Agriculture (USDA) on a national level, and the Department of Education at the Oklahoma state level (USDA, 2012). Researchers found that children's access to the program led to a significant reduction in the probability of skipping at least one meal per week, and that providing breakfast at school moderated the risk of breakfast-skipping associated with lower SES (Bartfeld, Kim, Ryu & Ahn, 2009). Access to school breakfast decreases the risk of food insecurity for children (FRAC, 2014B).

Although 96.9% of schools serve both lunch and breakfast in Oklahoma, the comparison of free or reduced breakfast participation to free or reduced lunch participation in 2012-2013 was only 59.8:100 (FRAC, 2013). A number of barriers regarding SBP can influence the lower rates of participation in the program. Barriers include lack of time, school bus schedules, lack of parental awareness of benefits of the program, and stigma associated with the program (McDonnell et al., 2004).

By providing breakfast free to all students (universal free breakfast) at a school regardless of financial status, stigma associated with the program may be reduced and participation in the program may increase (FRAC, 2009). Research shows that children who participated in universal free breakfast had lower rates of absence and tardiness compared to children who did not (Cook, Ohri-Vachaspati & Kelly, 1996). By increasing convenience of school breakfast for children, participation also increases. Breakfast in the classroom, in which children are permitted to eat a school meal during the first 10-15 minutes of class time, may alleviate barriers to participation including bus schedule difficulties and a lack of time (USDA, 2014A). Children consuming breakfast in the classroom had higher math and reading scores compared to children who did not consume breakfast in the classroom (Imberman & Kugler, 2014). Promotion of school breakfast to children and their families can also be an effective strategy to improve participation in the program (Lambert et al., 2007; Greves et al., 2007; Bartfeld et al., 2009; Young, 2003).

Goal and Objectives

The goal of this project was to assess the impact of universal free breakfast and an intervention on participation in and perceptions of SBP and consumption of breakfast in a rural school district in Oklahoma.

Objective 1 was to assess the impact of an intervention using a marketing approach on participation in and perceptions of SBP and consumption of breakfasts in a rural school district in Oklahoma.

Objective 2 was to assess the impact of breakfast in the classroom on participation in and perceptions of SBP and consumption of breakfasts in a rural school district in Oklahoma.

Objective 3 was to assess differences in participation in and perceptions of SBP and consumption of breakfasts between elementary- and secondary-aged children.

Assumptions

- The nutrient database used provided accurate nutritional information about meals served/consumed
- The meals served were an accurate representation of typical meals served on a daily basis
- The meals consumed were an accurate representation of typical meals consumed on a daily basis
- The questions asked in the perceptions surveys were indicative of parent/child opinions in the district
- The data recorded by the district about participation rates in SBP in the district were accurate

Limitations

- Perceptions of SBP were measured using a convenience sample, and those who agreed to participate may not have been representative of children/parents of the entire district

- Consumption of school breakfasts were measured on three occasions at three different schools, which may not have been representative of all days or schools within the district
- Because children gave assent for their consumption to be analyzed, they may have been more likely to alter their intakes compared to if they were not being analyzed

Abbreviations

- **BIC**- breakfast in the classroom
- **BMI**- body mass index
- **CDC**- Centers for Disease Control and Prevention
- **FDPIR**- Food Distribution Program on Indian Reservations
- **FRAC**- Food Research & Action Center
- **NHANES**- National Health and Examination Survey
- **NSLP**- National School Lunch Program
- **SBP**- School Breakfast Program
- **SNAP**- Supplemental Nutrition Assistance Program
- **SND**- School Nutrition Director
- **TANF**- Temporary Assistance for needy Families
- **USDA**- United States Department of Agriculture

CHAPTER II

REVIEW OF LITERATURE

School Breakfast Program

Since 1966, the School Breakfast Program (SBP) has provided federally assisted meals in public and nonprofit private schools; those districts that participate in the program receive cash subsidies for served meals through the United States Department of Agriculture (USDA). Schools must meet nutrition standards to receive this government funding (USDA, 2012). All schools that participate in the SBP or the National School Lunch Program (NSLP) are required to make free and reduced priced meals available to eligible participants (USDA Eligibility Manual, 2013). Meals served are required to provide about a quarter of the recommended amounts for specific nutrients; no more than 30% of calories may come from fat and less than 10% of calories served may be from saturated fat (FRAC, 2012). The SBP nutrient requirements were recently updated in accordance with the 2010 Dietary Guidelines for Americans, and meal pattern changes to the program began gradually in school year 2013-2014 and are listed in the table below. An increase in whole grains was required, sodium levels were decreased, more fruit was served, and adequate caloric levels were served for three grade levels: K-5, 6-8, and 9-12 (USDA, 2012).

Table1: SBP meal requirements and nutrient specifications

School Breakfast Program meal requirements: 2013-2014 (USDA, 2012)			
Meal Pattern	Grades K-5	Grades 6-8	Grades 9-12
	Amount of food per week (minimums per day)		
Fruit (cups)*	5(1)	5(1)	5(1)
Vegetables (cups)	0	0	0
Grains (oz eq)**	7-10(1)	8-10(1)	9-10(1)
Meat/alternatives (oz eq)***	0	0	0
Fluid milk (cups)****	5(1)	5(1)	5(1)
Nutrient specifications: Daily amount based on 5-day average			
Nutrients	Grades K-5	Grades 6-8	Grades 9-12
Minimum-maximum kilocalories	350-500	400-500	450-600
Saturated fat (% of total kcals)	<10	<10	<10
Sodium (mg)	≤430	≤470	≤500
Trans fat	Label must indicate 0 g trans fat per serving		

*No limitations on juice in 2013-2014

**For 2013-2014, half of served grains must be whole; for 2014-2015, all served grains must be whole

***May serve a meat/alternative in place of some of grain component after minimum daily grain component is met; a school may serve a meat/alternative as an extra food without crediting it toward any nutrient component

****Only fat-free (flavored or unflavored) or low-fat (unflavored) may be served

Free or reduced price school meal eligibility is determined in one of four ways: categorical eligibility, direct certification, community eligibility, or income-based eligibility (FRAC, 2014E). All children who fall into the categorical eligibility group are qualified for free school meals and include children who are in foster care, Head Start, are homeless, migrant, or living in a household receiving Supplemental Nutrition Assistance Program (SNAP) benefits, Food Distribution Program on Indian Reservations (FDPIR) benefits, or Temporary Assistance for Needy Families (TANF) benefits. Nationally all districts must directly certify all children living in households receiving SNAP benefits for free meals under the “direct certification” eligibility. Direct certification is a process utilized by local educational agencies and States which certifies eligible children for free meals without having to complete an individual application

(USDA, 2013A). Schools with high percentages of low-income children (greater than 40% of students directly certified for free meals) are eligible for community eligibility beginning in school year 2014-2015; collecting school meal applications will not be required, and all children in the school will be provided free breakfast and lunch. If a child is not categorically eligible for free meals, he/she may still qualify under the income-based eligibility option. To qualify for free meals, a child must come from a family with an income at or below 130 percent of the Federal poverty level; to qualify for a reduced price meal, a child must come from a family between 130 percent and 185 percent of the poverty level (FRAC, 2014C).

Participation in SBP

Participation in SBP is voluntary, and unfortunately, rates of participation are drastically lower than those in the NSLP (FRAC, 2012). According to the Food Research and Action Center's (FRAC) annual School Breakfast Scorecard, the ratio of Oklahoma children participating in free or reduced price breakfast in school year 2012-2013 in comparison to free or reduced price lunch was 59.8:100, with a national average of 51.9:100, which ranks Oklahoma 9th out of 51 states/the District of Columbia for participation in SBP. In Oklahoma, 96.9% of schools serving lunch also served breakfast, and the state has seen a 2.6% growth in free or reduced price breakfast participation over the past five years (FRAC, 2013). In one national survey, researchers found participation in the SBP to be much lower than in the School Lunch Program (SLP); out of 10,350 total children, 35% of the third-graders usually ate school breakfast whereas 84% usually ate school lunch (Bartfeld, Kim, Ryu & Ahn, 2009).

Impact of Universal Free Breakfast

One way to increase participation in the program is to offer free meals to all children, often called "universal free breakfast" (FRAC, 2009). One recent study measured the effects of the implementation of universal free school breakfast on meal program participation, attendance,

and academic achievement in New York City Public Schools (Leos-Urbel, Schwartz, Weinstein & Corcoran, 2013). Data were collected from 2001-2002 to 2007-2008, with universal free breakfasts beginning in the 2003-2004 school year. Participation was measured by dividing the total number of served breakfasts by the total number of eligible students in each category (full price, reduced price, free). Results of the study found increases in participation of breakfast for all eligibility groups, with the highest increases seen in those children not eligible for free or reduced priced meals (full-price students had an increase of 35% in participation, reduced price students had an increased participation rate of 20%, and those children receiving free meals had a 5% increase in participation over the study period). Although breakfast participation increased over the study period, 80% of participants were children eligible for free meals, and participation was much lower overall compared to participation in the NSLP (Leos-Urbel et al., 2013).

In another study, researchers evaluated the success of a national universal free breakfast in Wales, UK (Murphy et al., 2010). A cluster randomized controlled trial with a repeated cross-section design of 9-11 year old children from 111 schools was implemented. Pre-intervention domains and those measured post-intervention (12 months later) included breakfast eating behavior and attitudes, cognitive performance, classroom behavior, and dietary habits. Intervention schools were asked to set up a “breakfast scheme” with the help of the Welsh Assembly Government whereas the control schools were asked to withhold participating in the breakfast scheme until the year-long intervention was over. Results of the study indicated that students attending intervention schools consumed significantly higher numbers of healthy foods at breakfast compared to the children attending control schools, but there were no differences in breakfast skipping, unhealthy food items consumed, or episodic memory. However, there were significant declines in breakfast skipping in schools serving more low-income children (Moore, Murphy, Chaplin, Lyons, Atkinson & Moore, 2014). In addition, researchers indicated that those children attending intervention schools had more positive attitudes about the breakfast meal. Parents of children attending the intervention schools indicated higher rates of breakfast

participation at school and a lower number of children eating breakfast at home. No differences were seen between children attending intervention or control schools on their food intakes throughout the rest of the day (Murphy et al., 2010).

In one study, researchers aimed to determine the effects of free school breakfast on New Zealand children's school attendance, academic achievement, breakfast habits and food security (Mhurchu et al., 2013). A one-year stepped-wedge, cluster randomized controlled trial was implemented in 14 low-income schools and there were 424 participants in the study. Results of the study found no effect of free breakfast on school attendance levels, and there were no significant effects of the intervention on academic outcomes. A significant reduction in self-reported short-term hunger after implementation of free breakfast was seen, however ($p=0.001$). It was found that with the introduction of the free breakfasts, the number of children consuming breakfast at home decreased and the number consuming breakfast at school increased, although there were no differences in the proportion of children consuming breakfast each day (Mhurchu et al., 2013).

One study looked at the effects of universal breakfast on elementary school children's breakfast consumption and food and nutrient intake (Crepinsek, Singh, Bernstein, McLaughlin, 2006). Elementary school students from 153 schools in six districts participated in the three year study; intervention schools offered breakfast free to all students whereas control schools continued to serve traditional breakfast through the SBP. Results of the study indicated a statistically significant increase in participation rates (16% to 40%) compared to the control group's increase in participation rates (16% to 22%). Participation rates were measured by meal eligibility status (free or reduced eligibility versus full-price meals). Researchers also found that children who attended schools providing free breakfast were significantly more likely to have consumed a nutritionally substantive breakfast compared to control school children, but no significant differences were seen between the groups on dietary intakes over a 24-hour period.

Researchers indicated that by ensuring children have access to breakfast at school or at home, children's diets may improve overall (Crepinsek, et al., 2006).

In another study, researchers investigated the relationship between nutrient intakes, academic performances and psychological functioning after a universal school-breakfast program (USPB) was implemented into the inner-city Boston, Massachusetts school district (Kleinman, et al., 2002). Greater than 70% of children were eligible for free or reduced lunch, and over 70% of participating children were of African-American or Hispanic descent. At baseline and six-months after adoption of the USPB, 97 children and their parents were interviewed and information collected included 24-hour food recalls, participation rates in the breakfast program, as well as validated tests to measure food insufficiency and hunger. It was determined at baseline that 33% of children were at nutritional risk. Researchers found that children found to be at nutritional risk were significantly more likely to have lower attendance records for school, significantly lower grade point averages, and were less likely to eat breakfast at school than those children not indicated to be at nutritional risk. At the conclusion of the study, about half the children showed an increase in school breakfast participation, and 14 participants had an increase in nutritional status. Changes were seen in lower levels of tardiness among those with increased breakfast participation (Kleinman, et al., 2002).

One study looked at the effects of reverting back to eligibility-priced meals after previously having served universal free breakfasts the year before in a school district in North Carolina (Ribar & Haldeman, 2013). Meal participation was measured by dividing meals served by the number of students in daily attendance multiplied by the school days in a period; thus providing the approximate daily proportion of children in a given eligibility group consuming a meal over the specified period. Results of the study indicated that breakfast participation decreased once meals were no longer universally free for all students, with the largest decreases in participation seen in those children who were not eligible for free- or reduced-price meals.

Although critics of universal free breakfast may bring up the cost associated with serving free breakfasts, one study increased school lunch prices slightly to account for some of the associated costs. Researchers of that study indicated that lost revenue was more than accounted for by reduced administrative costs associated with breakfast, as well as increasing the price of the school lunches (Leos-Urbel et al., 2013).

In summary, universal free breakfast increased participation significantly (Crepinsek et al., 2006; Kleinman et al., 2002, Leos-Urbel et al., 2013; Ribar and Haldeman, 2013) and increased the quality of breakfast consumed by children participating (Crepinsek et al., 2006). In a school serving universal free breakfast, nutritional status of at-risk children was improved (Kleinman et al., 2002; Murphy et al., 2010), and Mhurchu et al. (2013) saw a decrease in short-term hunger levels of participating children. In addition, one study concluded that universal free breakfast may have had an impact on lowering stigma levels, because increases in School Breakfast Program participation were seen even in children previously eligible for free meals (Leos-Urbel et al., 2013).

Breakfast in the Classroom

Offering “breakfast in the classroom” (BIC) has been implemented in districts across the nation in an effort to improve SBP participation (FRAC, 2014D). In this program, breakfasts are packed into coolers which are transported to individual classrooms each morning. Breakfast may be served by the individual teacher, or a student may be allowed to select his/her own food choices; participation is then recorded by the teacher or a nutrition staff member. Breakfast is then consumed by the children during the first 10-15 minutes of class, which often takes place during morning announcements or while the teacher takes attendance or checks homework. After the meal, children generally throw their trash away in designated trashcans in the hallways and wipe down their own desks. Leftover food and coolers are collected by custodial workers or

kitchen staff to be returned to the school cafeteria (FRAC, 2014D). The following studies evaluated the effectiveness of BIC.

One study investigated the impact of BIC on the percentage of children going without breakfast, the number of locations that children consumed the meal, and estimated caloric intakes of children (Van Wye, Seoh, Adjoian, & Dowell, 2013). A cross-sectional survey of elementary school aged children was conducted in the inner-city of New York City, with nine schools serving BIC and seven matched schools serving traditional breakfast. All schools participating in the study served universal free breakfast. Data were collected by questionnaires, which were completed by children attending the participating schools. There were 2289 participating children (1044 children attended a school serving BIC and 1245 children attending a school that served traditional breakfast). Researchers found that children attending a school that served BIC were less likely to skip breakfast compared to children at schools serving traditional breakfast (8.7% versus 15%; $p < 0.01$). Those children attending schools that served BIC were more likely to eat breakfast at multiple locations (such as at home and at school) (51.1% of BIC children versus 30% of traditional breakfast children; $p < .001$). Researchers also found that BIC children were less likely to eat breakfast at home compared to traditional breakfast children (59.9% versus 69.7%; $p < .001$). It was determined that children in BIC classrooms were much more likely to consume cereal (60.1% versus 34.2%), milk (54.3% versus 32.0%) or juice (48.7% versus 21.2%; $p < .001$). Researchers also found that students in BIC schools consumed, on average, 95 more kilocalories for breakfast compared to children in traditional breakfast schools (376 kcals versus 276 kcals; $p < .001$). Researchers concluded that all children should have the opportunity to consume a healthy meal, but that it is important to not “exacerbate one problem (childhood obesity) while attempting to solve another (child hunger)” (Van Wye et al., p. e63, 2013).

Another study attempted to answer a similar question about breakfast consumption; researchers evaluated the concern that if breakfast was served in the classroom, students would be more likely to consume breakfast both at home and at school (Rosen, Ritchie, Fenton, &

Shimada, 2014). The researchers conducted nearly 4000 24-hour recalls on fourth and fifth grade students and collected school breakfast cafeteria data from participating schools. It was found that those students consuming breakfast in the classroom were significantly less likely to skip breakfast; in addition, they were more likely to consume higher quality foods throughout the day. The researchers indicated that although serving breakfast in the classroom did lead to more children consuming breakfast at both home and school, there were no differences in total energy intakes at breakfast or for the day compared to those children not consuming breakfast in the classroom (Rosen et al., 2014).

A study conducted by Imberman & Kugler (2014) aimed to measure whether BIC had an impact on achievement, grades, and attendance rates of participating children. Data were collected from elementary school students attending a large school district in the southwest United States, and participating schools provided universal free breakfast to all children. The researchers implemented a quasi-random timing strategy for implementation of BIC within the district. Results of the study found increases in test scores for mathematics and reading with BIC, and the effects were largest in low-performing, low-income, Hispanic children with low BMIs. The researchers concluded that their study results suggest that providing breakfast to children had an impact on achievement scores, which may be independent of learning; higher-income schools may be more likely to have children eating breakfast whereas lower-income schools may have lower breakfast consumption rates (Imberman & Kugler, 2014).

Overall, these studies show that BIC had positive effects. Researchers in one study found that children attending a school that served BIC were less likely to skip breakfast compared to children at schools serving traditional breakfast, but were more likely to eat breakfast at multiple locations and consumed more breakfast calories per day than those children not served BIC (Van Wye et al., 2013), whereas Rosen et al. (2014) found no differences in total breakfast calories or daily caloric intakes in children participating in BIC versus traditional breakfast. Imberman & Kugler (2014) found increases in test scores for mathematics and reading in children participating

in BIC, and the effects were largest in low-performing, low-income, Hispanic children with low BMIs. These results show the positive impact that BIC may have on children's performance indicators, and may indicate the importance of educating participants and their families about consuming healthy choices for breakfast.

Perceptions of SBP

Studies have been conducted to help determine why the SBP has lower participation rates than the SLP. The purpose of one such study was to identify "perceived advantages, disadvantages, and barriers to participation by elementary students in the SBP held by school nutrition directors (SNDs) and teachers" (Lambert, Raidl, Carr, Safaii & Tidwell, p. 1, 2007). Focus groups were conducted in three states with low rates of SBP participation, and participants included 24 SNDs and 31 teachers. Benefits indicated by study participants for children participating in the SBP included children's ability to have a more substantial meal than they would receive at home as well as the ability to interact in a pleasant environment with school nutrition staff and their peers. Another perceived benefit was that children would be in a safe environment during the breakfast period. Perceived disadvantages for children participating in the SBP included the early scheduling of the breakfast meal (those schools participating in the study all served breakfast before the school day began), and limited time for children to eat, and teachers indicated that children who participated in the SBP sometimes were tardy for class. A barrier to participation viewed by SNDs and teachers was that children perceived the SBP to be for low-income children, and so may not want to participate due to the social stigma, and even that children preferred to associate with children who did not participate in the program. Another identified barrier was that teachers perceived foods to be of low-quality whereas school directors stated that although foods may lack variety, they did not lack nutrient quality, but parents had contacted the school staff to state that they believed they could serve more nutritious foods at home than those served as part of the SBP (Lambert, et al., 2007).

Another study also looked at school employee perceptions of the SBP (Chopade, et al., 2007). Principals, teachers, foodservice directors and school nurses at 44 schools were provided a 22-question survey. Of the 1167 participants, 18% of respondents indicated staffing issues and 14.5% of respondents indicated bus schedules as major barriers for SBP initiation. The researchers found that employees were highly satisfied with the program and were aware of its benefits, and about 86% believed that the SBP should be integrated into their district's local wellness policies (Chopade et al., 2007).

In a study looking at the ecological factors that influence middle-school students' SBP participation rates, focus groups were conducted with middle school children, parents, teachers and child nutrition managers in Houston, Texas (Cullen, Thompson & Watson, 2012). Two schools within one district participated in the program with one labeled as low-income and one indicated as middle-income (75% and 49% of children were eligible for free or reduced priced meals at each school). Student perceived barriers to participating in the SBP were related to long-lines in the cafeteria in the mornings, their friends not participating in the program and that it was "uncool" to eat the school breakfast, low preference to some food items, and the program is too expensive. Parent-perceived issues included a lack of time, their children disliking the foods served, and a lack of hunger by their children in the mornings. Teachers indicated similar barriers, but also stated that some children may skip breakfast to lose weight, and that parents may not be a positive role model to their children about healthy eating. Parents and teachers indicated that education about the program was needed for students and parents (Cullen et al., 2012).

One study also identified and compared benefits and barriers to breakfast consumption among children in fourth- fifth- and sixth-grades (Reddan, Wahlstrom, & Reicks, 2002). Focus groups were used to analyze perceptions of children in schools implementing a universal school breakfast program and children in schools with no universal breakfast program according to the framework of the Social Learning Theory. Results of the focus groups indicated that children believed that breakfast provides them increased energy and helped them to better pay attention

during class. Children stated that barriers included not being hungry for breakfast and not having enough time to eat. Unlike perceptions of teachers in the study by Cullen et al. (2012), children did not perceive breakfast making them fat or others seeing them eat in the cafeteria to be major barriers, although girls were more likely to report that they skipped breakfast because of increased risk of weight gain compared to boys (Reddan et al., 2002).

A qualitative study was conducted with six focus groups (n=53) of immigrant caregivers of grade school children in low-income areas of Seattle, Washington to determine beliefs, barriers and behaviors about school breakfast participation (Greves et al., 2007). Two separate meetings were held with each group and were conducted in one of three languages: Vietnamese, Spanish, and Somali. Beliefs about breakfast by focus group participants were that it was good for school performance (for example, it helps children “wake up” and provides “brain fuel”) and that it is culturally relevant (Spanish speaking and Vietnamese speaking participants indicated breakfast is usually consumed as a part of their culture). However, participants also indicated several barriers to eating school breakfast. Some of the indicated barriers included not enough culturally-appropriate hot foods served, foods that were too processed, expired or not enough fruits or vegetables served, a lack of adequate time to eat food because of the school bus arriving too late, and a lack of supervision of children during the breakfast meal to ensure adequate monitoring. Participants believed school breakfast participation could increase if food quality and content were improved, supervision was adequate from school staff, and children received adequate time to consume breakfast (Greves et al., 2007).

Another study conducted by Sabol, Struempfer, & Zizza (2011) aimed to examine the factors impacting participation in the SBP in elementary school children residing in Alabama. Researchers conducted a total of nine focus group interviews with parents/guardians and children from five schools; questions were tailored to either the parent/guardian group or the student group. A total of 78 individuals participated in the research, 49 students and 29 parents/guardians; focus groups consisted of five to 12 individuals each. Parents and children alike indicated that

breakfast was “brain food” and understood that it could negatively impact them in school if they did not eat it. Another common theme in the focus groups was that the foods served in the SBP were those that were generally disliked, and most of the foods were not hot foods. Also, a number of parents indicated that the foods did not provide adequate nutritional value and was “junk food,” and that portion sizes were too small. One of the most common barriers discussed by parents and children alike was that of timing. Because breakfast is generally consumed before school starts, children arriving late to school due to a late bus, sleeping in, or other delays were either not given enough time to eat, or missed the meal altogether. Several of the groups also indicated a stigma associated with SBP participation that the program was provided for families that could not afford to eat at home. Researchers indicated that although both students and parents agreed that breakfast was the “most important meal of the day,” much dissatisfaction was found with the SBP. Children in each focus group indicated that the served milk tasted spoiled and food was undercooked, and because parents indicated the belief that food was unhealthy, education of federal nutrition standards for parents may be necessary (Sabol, Struempler, & Zizza, 2011).

Another study used student and parent focus groups in a low-income urban school district to help explain the discrepancy between access and participation in SBP (Bailey-Davis, Virus, McCoy, Wojtanowski, Vander Veur, & Foster, 2013). Three K-8 schools in Philadelphia, Pennsylvania participated, and each had at least half of enrolled children eligible for free or reduced school meals. Six focus groups were conducted—two with parents and four with students in grades sixth through eighth. Themes were consistent across all focus groups and consisted of sociocultural beliefs about breakfast, physical availability of food, economic access to food, social stigma, and consumption practices. According to the participants, consuming breakfast is an important factor to enable learning, having energy/being alert, being able to focus, and avoiding physical symptoms of hunger. Parents perceived cold convenience foods, such as cereal, to also be appropriate for the breakfast meal. A common theme among most participants was a preference for children to consume breakfast at home. Both parents and children also preferred

the children to eat a meal at a friend or cousin's house or even a fast-food restaurant before consuming a school breakfast, in part due to social stigma and the necessity of arriving to school early to participate in the program. Parents indicated that "life happens" which sometimes made it difficult to provide their child with breakfast, and oversleeping was a major cause of being unable to get to school in time for a breakfast meal. Although the parents indicated that they appreciated that school breakfast was available, children and parents indicated a general dislike of served foods. In addition, children did not like prepackaged foods and wished for an ability to have an impact on served foods—for example, comment boxes, preference surveys, and taste tests. Parents who worked in the school kitchens indicated a social stigma associated with consuming school breakfast, and children stated that fellow students would call them names if they participated in SBP, thus causing them to either eat at home or not eat breakfast at all. In conclusion, the researchers believed that menu sharing between children and parents and student taste testing would be ways to help increase SBP participation, and universal free breakfasts would be a way to help overcome associated social stigmas (Bailey-Davis et al., 2013).

In one study, researchers administered surveys to determine if parental perceptions of SBP were associated with SBP participation among low-income children (Sampson, Meyers, Rogers & Weitzman, 1991). There were 761 participants in the study, and inclusion criteria included eligibility for free- or reduced-price meals and having a child enrolled in a specific school district. A portion of the survey provided space for parents to write any comments that they had about the program—About one third of the comments left were positive, one third neutral, and one third negative. A common theme among positive comments was that providing a school breakfast allowed for children to consume a meal when their parents may not be able to afford to feed their children. Most criticisms were related to the content of the meals such as that they were unhealthy, provided too little food, and had a lack of variety. In addition, negative parental attitudes about the SBP were associated with non-participation among children (Sampson et al., 1991).

After an intervention called Project BREAK! was implemented to increase student participation in SBP, researchers aimed to gain insight of school faculty and staff of how the changes that were implemented in the intervention had impacted the schools (Haesly, Nanney, Coulter, Fong, & Pratt, 2014). The original intervention was a six-month pilot project conducted in two intervention high schools located in Minneapolis, MN. The project was designed to increase participation in the SBP by improving and expanding the program in the schools; creating convenient serving lines (“grab-n-go”) in the school atriums, and allowing students to consume their meals in the hallways. Telephone interviews were conducted with school administrators at each school (principal, assistant principal, foodservice managers, head maintenance and school nurses), and focus groups were conducted with teachers from each school to gain information about perceptions of the program. Perceived advantages indicated by a majority of the participants were an increased awareness of SBP as well as increased visibility of the program. In addition, focus group participants believed that the program had brought increased relationships between students, staff, faculty, and the community, and they believed that other districts had expressed interest in conducting similar changes to their SBP after seeing the successes in the schools. A major perceived challenge was that of a lack of communication at the onset of the implementation of the program. In addition, “maintenance and foodservice respondents found that having the right equipment for serving breakfast, such as food warmers and coolers, and having to move equipment to the new location each day was a challenge,” (Haesly et al., p. 271, 2014).

In a pilot study, researchers implemented various methods including breakfast in the classroom and grab-n-go to sixth-graders in Minneapolis, Minnesota to determine the feasibility of expanding SBP to increase participation in the program (Nanney, Olaleye, Wang, Motyka, & Klund-Schubert, 2011). After a six-week intervention, 239 students were asked to rate their satisfaction of the program; 64.5% of students indicated that they were very satisfied/satisfied

with eating in the classroom, 78.1% strongly agreed/ agreed that breakfast helped them focus in their classes, and 43.5% of participants had a preference for hot foods (Nanney et al., 2011).

By addressing perceptions of SBP by a variety of people affected by the program, researchers can identify those areas where education of the program may be most beneficial. Much stigma is perceived regarding SBP, and a common theme is a preference for children to consume breakfast at home compared to consuming it at school, due in part to the lack of time to consume the meal once at school (Bailey-Davis et al., 2013; Sabol, Struempler, & Zizza, 2011); foods served in SBP are often disliked with small portions served, and many children would prefer a hot breakfast option. Also, another common complaint is a lack of healthy foods being served (Sabol, Struempler, & Zizza, 2011; Sampson et al., 2011; Nanney et al., 2011).

SBP, Family Income and Food Insecurity

The SBP was originally established to provide grants for schools to provide meals for nutritionally at-risk students (USDA, 2013B), and studies today have evaluated the impact of family income, as well as food insecurity on SBP participation.

A study conducted by Bartfeld, Kim, Ryu and Ahn (2009) used the third-grade wave of the Early Childhood Longitudinal Survey Kindergarten Cohort (ECLS-K) to estimate children's participation in the SBP, in addition to assessing food security of households. Researchers found that participation in the SBP was closely related to income; approximately 75% of children in the lowest-income group participated but fewer than 10% of the highest income group participated in the program. It was also indicated that 80% of all children participating in the SBP received their meals at the free or reduced price. Analyses of the data also measured food security. The researchers found 62% of food insecure children participated in the SBP while 35% of food secure children participated, indicating an association between food insecurity and SBP participation. Unfortunately, more than a third of food insecure children did not participate in the program, despite having access to the program (Bartfeld, Kim, Ryu & Ahn, 2009).

A recent study examined the relationship between the availability of access to SBP and breakfast-skipping among elementary school children in Wisconsin (Bartfeld & Ryu, 2011). Data were collected from a self-administered questionnaire called the Wisconsin Schools Food Security Survey from children attending elementary schools in 26 counties. In this sample, data were collected from over 7500 students, with over 2000 of these children lacking access to the SBP. Researchers found that of the 61 sampled schools, 46 schools served breakfast, and those schools serving breakfast had a disproportionately lower-income population. In addition, those children attending the breakfast schools had greater rates of reported food insecurity, food pantry use, and food stamp use (Bartfeld & Ryu, 2011).

In one study, researchers used NHANES data (2003-2008) to estimate relationships between school meal participation and diet quality (Hanson & Olson, 2013). Diet quality was measured using the Healthy Eating Index-2005 (HEI), a measure of diet quality compared to the Dietary Guidelines for Americans, and caloric intake was measured as a percentage of estimated energy requirements (%EER). Researchers found that the interaction between participation in school meal programs and family income showed that consumption of school meals was associated with a higher HEI score for children from lower-income families. In addition, participation in school meals was associated with higher HEI scores for total vegetables (Hanson & Olson, 2013).

In another study researchers examined food insecurity in children by investigating the association between food insecurity and participation in SBP (Khan, Pinckney, Keeney, Frankowski, & Carney, 2011). About 400 children enrolled in sixth, seventh, and eighth grades in Vermont filled out a 23-item questionnaire. Approximately 40% of children enrolled at the participating school were eligible for free or reduced price school meals, and universal free breakfast was served in the participating school. Results of the survey indicated that 79.6% of participating children were food secure, 15.8% were food insecure without hunger, and 4.6% were food insecure with hunger. Researchers found no significant relation between age, sex or

BMI percentile and food security status. They did however find statistically significant differences in consumption of breakfast at home by food security status; those children who were food insecure were less likely to consume the meal at home compared to those children who were food secure (67% vs 81%). No differences were seen in breakfast consumption at school between food secure and food insecure children. Out of the entire survey, only one child who was food insecure did not consume breakfast at either home or at school, suggesting to the researchers that SBP was helping to eliminate differences between food secure and insecure children for the breakfast meal (Khan et al., 2011).

Bartfeld and Ahn (2011) studied the relationship between household food security status and of low-income elementary school children and access to the School Breakfast Program. Data were collected using the Early Childhood Longitudinal Survey-Kindergarten Cohort and included 3010 children. Food security status was measured via parents using the standard 18-item food security scale, and families were classified as food insecure if they answered “yes” to three of the 18 items; researchers characterized families as marginally food insecure if they answered “yes” to any of the 18 items on the scale. It was found that food security status was closely associated to income with 16.6% of low-income children considered food insecure and 30.1% of low-income children considered marginally food insecure. For low-income children with access to the SBP, the rate of marginal food insecurity was lower than those low-income children without access to the program (29.2% compared to 42.2%) ($p=0.05$), however. There was not a difference in availability of the SBP and food insecurity status at the standard threshold (answering “yes” to at least three of the 18 items on the scale). The researchers indicated that the SBP may be effective at reducing the concerns of families at-risk for food insecurity, but not necessarily once a family was already experiencing food insecurity (Barteld & Ahn, 2011).

In summary, schools serving breakfast had a disproportionately greater lower-income population than those not serving breakfast (Bartfeld & Ryu, 2011), and participation in SBP was closely related to family income with higher rates of participation seen in lower-income children

(Bartfeld et al., 2009). One study examining the relationship between food insecurity and SBP participation found greater participation by food insecure students (Bartfeld et al., 2009), while another study found no differences by food security in rates of breakfast consumption at school (Khan et al., 2011). In those children at-risk for food insecurity, participation in SBP may prevent development of full-blown food insecurity (Bartfeld & Ahn, 2011).

Breakfast, Health and School Performance

Breakfast is often considered the most important meal of the day, and a number of researchers have investigated this claim in children by measuring breakfast consumption and health outcomes and school performances.

In a systematic review, researchers looked at the association of breakfast intakes with nutritional adequacy, body weight and academic performance in children and adolescents from 47 studies and found that those children who typically ate breakfast had higher nutrition and higher daily caloric intakes but were less likely to be overweight, and have higher cognitive functioning than those not consuming the meal (Rampersaud, Pereira, Girard, Adams & Metzl, 2005). Fiber intakes were significantly higher among children who consumed breakfast than among those children who did not consume breakfast on a regular basis (Nicklas, Regar, Myers & O'Neil, 2000). Mean plasma cholesterol levels were significantly higher among breakfast skippers than children who consumed breakfast on a regular basis (Resnicow, 1991). In addition, children who ate breakfast had higher micronutrient intake levels and were more likely to reach recommended dietary intake levels than children who did not consume breakfast (Nicklas, et al., 2000). Another study found that a one unit increase in body mass index (BMI) was associated with decreased levels of breakfast consumption among adolescents (Siega-Riz, et al., 1998). Another study found that eating breakfast was associated with a 30 percent lower odds of overweight and obesity in boys and of obesity in girls (Boutelle, Neumark-Sztainer, Story & Resnick, 2002).

In a recent systematic review, researchers looked at the effects of breakfast on behavior in children (Adolphus, Lawton & Dye, 2013). Classroom behavior was measured directly in these studies, and researchers found a mostly positive association between breakfast consumption and behavior in the classroom, regardless of nourishment status or SES. In two studies where participating children were considered undernourished (Chang, Walker, Himes & Grantham-McGregor, 1996; Richter, Rose & Griesel, 1997), and three studies where children were from low-SES families (Bro, Shank, Williams & McLaughlin, 1994, Bro, Shank, McLaughlin, & Williams 1996; Benton, Maconie & Williams, 2007) on-task behaviors were improved after consuming a breakfast meal.

In one study, researchers created a controlled intervention with 54 tenth grade students enrolled at a rural high school in Norway to see what impact serving breakfast had on dietary habits and school performance (Ask, Hernes, Aarek, Johannessen, & Haugen, 2006). Students were randomly assigned to either a control group or an intervention group; in the intervention group, participants were served breakfast each day for four months. In addition, they were also provided a daily multi-vitamin including omega-3 fatty acids. The control group received no breakfast, but both the control and intervention groups were provided information about the importance of consuming a healthy diet. At the end of the study, weight and BMI had increased significantly in both males and females in the control group. A significant increase in weight was seen in males in the intervention group. Before the intervention, 54% of students in the intervention group and 43% in the control group consumed breakfast daily, and during the intervention, nearly all students in the intervention consumed breakfast daily. However, one week after the intervention ended, intervention participants went back to their pre-study breakfast patterns, while 10% of control participants indicated an increase in breakfast participation after the study. Male students in the intervention group reported increased school satisfaction after the study, and although teachers reported improved attendance and social behavior in the intervention group, the results were not significant for girls. Researchers concluded that the four month

intervention improved dietary habits and reduced weight gain in those participating in the intervention (Ask et al., 2006).

Recently researchers examined the association of breakfast intake frequency with incidence of metabolic conditions (Odegaard et al., 2013). An analysis of breakfast frequency and the dietary habits of 3,598 young adult participants from a community-based program called Coronary Artery Risk Development in Young Adults (CARDIA) was performed with data collected from 1992-2011. Although over the 18 years there was a significant weight gain in all participants, those who consumed breakfast at least 4 days per week gained on average 1.91 kg less than participants reporting infrequent breakfast consumption. In addition, according to the researchers, there was a stepwise decrease in crude incidence rates of metabolic outcomes with the incidence rate halved in those consuming breakfast daily compared to those infrequent breakfast consumers; increased breakfast consumption was associated with a decreased risk of developing abdominal obesity, obesity, metabolic syndrome, hypertension, and type 2 diabetes compared to participants consuming breakfast 0-3 days per week (Odegaard et al., 2013).

In one study, researchers investigated breakfast consumption patterns among low-income urban youth (Lawman et al., 2014). Participants were 678 fourth through sixth graders recruited from three low-income schools in Philadelphia participating in universal free breakfast. Breakfast patterns were measured using a questionnaire developed by NYC Department of Health and Mental Hygiene, and anthropometric data were collected by trained research staff. Results of the study indicated that on the day data were collected, 49.8% of children reported eating one breakfast meal, 25.5% reported eating two breakfasts, 12.3% reported eating greater than two breakfasts, and 12.4% reported not eating any breakfast. It was found that children who were obese consumed significantly fewer breakfasts than non-obese children ($p < 0.01$) (Lawman et al., 2014).

Another study examined the relationship between participation in SBP and a child's BMI and his/her likelihood of being overweight or obese (Gleason & Dodd, 2009). Data from the

School Nutrition Dietary Assessment Survey-III, a nationally represented sample of 2314 children in first through 12th grades were used. Researchers found a negative association with BMI and usual SBP participation, and a decline in BMI by 0.15 points ($P<0.05$) for every additional breakfast consumed per week (Gleason & Dodd, 2009).

In one recent study, researchers looked at the association between the frequency of family breakfast consumption with diet quality and weight status (Larson, MacLehose, Fulkerson, Berge, Story & Neumark-Sztainer, 2013). There were 2793 adolescents who completed a questionnaire assessing diet quality and sociodemographic characteristics. Eating the breakfast meal with family was positively associated with fruit, vegetables, whole grain consumption. Researchers also found that there was a lower prevalence of overweight/obesity in participants reporting eating with their families (Larson et al., 2013).

Researchers observed SBP participants' and nonparticipants' ready-to-eat cereal consumption in relation to their nutrient intakes and weight status in another study (Affenito, Thompson, Dorazio, Albertson, Loew, & Holschuh, 2013). There were 398 schools in 130 School Food Authorities that participated in the study, with 2314 students completing 24-hour food recalls and their parents completing interviews; in addition, 666 of those students participated in a second 24-hour recall to help estimate daily average intakes. In addition to measuring nutrient intakes, researchers analyzed BMI, BMI-for-age z-scores, and levels of overweight/obesity in the children. Results of the analyses indicated that among children consuming breakfast, 34% of the SBP participants consumed cereal, and 37% of the non-SBP participants consumed cereal. Researchers also found that those children who ate cereal consumed significantly higher levels of vitamin A, iron, fiber, and whole grains, regardless of whether they participated in SBP or not. Higher calcium intakes were seen in SBP nonparticipant children consuming cereal compared to children not consuming cereal. Among SBP participants, adiposity measures were lower for cereal consumers, although these results were not statistically significant. Researchers also found that students consuming noncereal breakfasts, regardless of

SBP participation, had higher intakes of protein, total sugars and cholesterol compared to children consuming cereal. The researchers indicated that schools should offer whole grain ready-to-eat cereals as a part of their SBP to help provide an opportunity for improved nutrition of participants (Affenito et al., 2013).

The impact of free breakfast on school outcome measures has been measured in other studies. Leos-Urbel et al. (2013) looked at the effects of universal free breakfast on academic achievement and found increases in SBP participation, with no changes in reading or math scores in children consuming universal free breakfast. Murphy et al. (2010) evaluated the impact of universal free breakfast in Wales, UK and found increases in perceptions of eating school breakfast, but no differences in episodic memory or hyperactivity/inattention. Kleinman et al. (2002) evaluated whether academic performance increased after implementation of universal free breakfast, and found that after six months of intervention, those children who improved their nutritional status showed significant improvements in attendance and SBP participation, and improvements in math scores and overall behavior compared to those children who did not improve their nutritional status.

In summary, the importance of consuming breakfast was evident in these studies. Several researchers found that children frequently consuming breakfast were more likely to have better overall nutrition profiles (Rampersaud et al., 2005; Ask et al., 2006; Odegaard et al., 2013) and were less likely to be overweight (Rampersaud, et al., 2005) and have lower BMIs (Ask et al., 2006; Gleason & Dodd, 2009; Odegaard et al., 2013). In addition, those frequently consuming breakfast were more likely to have improved cognitive performance in school compared to those infrequently consuming the meal (Kleinman et al., 2002; Rampersaud et al., 2005; Odegaard et al., 2013). Leos-Urbel et al. (2013) however, found no significant differences in attendance, math, or reading scores for children consuming free breakfast and no differences in memory or inattention were seen in another study (Murphy et al., 2010). Improvements in overall behavior were seen in children who increased their nutritional status (Kleinman et al., 2002). Consuming

breakfast with family was associated with better nutrition and weight outcomes (Larson et al., 2013).

Marketing to Improve Children's Food Choices

Several ideas have been presented in an effort to improve participation rates in SBP. Lambert, et al. (2007) has suggested that because teachers often perceive foods to be of a poor-quality, creative marketing strategies need to be implemented to improve awareness and nutritional content of meal's served (Lambert, et al., 2007). The results from the study conducted by Greves, et al. (2007) on immigrant families' perceptions of school breakfast indicated the importance of improving dialogue about the SBP and what foods were actually served. By doing so, families would be more likely to gain a better understanding of the program which could increase participation rates. Bartfeld, et al. (2009) suggested that marketing the SBP as a part of the SLP would be an effective way to help children connect with the program, and indicated that expanding the program to a broader cross-section of children, while focusing on the convenience and other benefits would make the program desirable to groups other than just those eligible for free and reduced meals. Bartfeld et al. (2009) goes on to state that if social marketing were used to show the program as normative, much of the stigma associated could be lessened.

Some studies have looked at ways to improve child nutrition intakes through advertising and peer influences (Young, 2003). Birch (1980) found that peer influence is strong in young children; three to four year olds were able to be persuaded to change their fruit and vegetable intakes in groups of peers who preferred different foods. Although it is parents who are making food purchasing decisions, children have great influence on these decisions (Young, 2003).

Similarly, The Institute of Medicine (2005) indicates that dietary and health patterns of children are influenced by a variety of issues including commercial and media environments, and among those issues, the media has a key role in food and beverage promotion. Exposure to marketing occurs via the internet, television, magazines, music, and the radio and in a variety of

settings including home, schools, childcare settings, sports events, and movie theaters. Hastings et al. (2003) indicated in a review that adequate evidence is present to indicate a casual relationship between promotional activity and children's food knowledge, selection, preferences, and behaviors. Schmitt et al. (2007) indicated that a multifaceted approach is essential in order to improve diet-related health of children. Different types of marketing strategies are necessary to promote more healthful foods and drinks. In addition, schools need to promote healthy diets through integrating education about healthy diets (IOM, 2005). As noted previously, Cullen et al. (2012) found that children believed their friends not participating in SBP to be a barrier and that the program was "uncool," and so if SBP were adequately promoted in a way to encourage increased participation, these barriers may be decreased.

In a study to determine whether advertising affects food choices for children, 75 children between the ages of three and eight from a south Texas community were randomly selected to watch one of two commercials advertising food items (Ferguson, Munoz & Medrano, 2012). The commercials were imbedded into cartoon programs and advertised items from the same popular fast-food restaurant; approximately half of the children were exposed to an advertisement for a healthier food item, Apple Dippers (apple slices with caramel sauce), and half the children were exposed to a less healthy food item, french fries. In addition to children being randomized into groups, parents were randomly assigned to a brief script to recite to their child once the child was to make his or her food choice selection. Half of the parents' scripts were to encourage the child to make the healthier food selection whereas the other half of the parents were told to encourage their child to make whichever food selection that they would like. Researchers determined that the effects for the commercial were significant (effect size $r=0.41$) and the effects for the parental influence were not (effect size $r=0.20$). The researchers state that while advertising impacts can often be significant, the parental influence had only a small moderating influence on the advertisements. Media education to parents and children, as well as partnering with fast food or media outlets to promote healthy eating may be helpful (Ferguson, et al., 2012). The results of

this study could be applied to the use of promoting SBP; in this study advertisements were found to be effective at promoting food intake, and by implementing a multifaceted approach to promotion, SBP participation may increase.

Results of these articles indicate that promoting SBP to children should be a multifaceted undertaking; peer influence is a key factor in their participation (Birch, 1980) as well as advertising (Ferguson et al., 2012; Hastings et al., 2003).

Interventions to Improve Children's Food Choices

Interventions to promote healthy eating and school meal participation may be effective strategies to create an environment conducive to a healthy lifestyle. The following articles summarize the results of interventions designed to change children's food choices.

In a systematic review of literature, researchers identified specific interventions promoting increases in children's dairy and calcium intakes and evaluated the effectiveness of the programs (Hendrie, Brindal, Baird & Gardner, 2013). There were 14 studies included in the analysis that measured dietary intake behavior in 5-12 year old children in a variety of ways ranging from self- or parent-reported intakes to USDA multiple pass 24-hour recalls. The authors of the review created a method to assess intervention including duration of intervention, frequency of contact during the intervention, type of contact or level of contact during the intervention, and the number of settings utilized during the interventions to reach the target audience. Those considered "high intensity" had a longer duration of intervention and a higher frequency of contact with participants compared with lower intensity studies. Analyses indicated that 71% of studies (11 out of 14) significantly increased dairy consumption in study participants, and of those studies that focused solely on dairy intakes, 100% were effective, whereas only 55% of those promoting dairy as a part of a healthy diet were effective. In addition, 80% of the higher intensity programs achieved their aims while 67% of lower-medium intensity programs saw increases in dairy consumption: 60% of effective studies provided dairy free to participating

children whereas none of the ineffective studies provided dairy. They also indicated that a familial component was associated with studies that were effective (Hendrie et al., 2013). These studies provide information on the effectiveness of altering food intake behaviors in children, and much of this information can apply for the SBP. Focusing on specific food items as a part of SBP may be more effective than promoting the program as a whole, increasing the intensity of the program, and including a familial component may further increase participation.

In another study, researchers aimed to address lack of time, a common barrier of participation in SBP, by extending cafeteria hours and providing a mobile cart serving school breakfast during study hall (Olsta, 2013). A needs assessment was completed asking students at a large Midwestern high school about their breakfast habits. Results of the needs assessment indicated lack of time being a major barrier to consuming breakfast, and so the goal of the research study was to increase availability of breakfast to increase participation in SBP. A year after implementation of the breakfast cart and the extended breakfast hours, the school had an increase of over 400% in participation in the breakfast program (Olsta, 2013).

In one study, researchers evaluated the effects of a school-based nutrition intervention on 7-9 year old children's adherence to dietary guidelines and nutrient intakes (Kristjansdottir, Johannsson & Thorsdottir, 2010). Three-day weighted dietary intakes of children were measured in 106 second graders living in Iceland in one of six elementary schools with follow-up evaluations two years later. Researchers created an intervention promoting increased fruit and vegetable intakes in children attending experimental schools and included training for teachers to implement the program; the intervention lasted 18 months and included an education component at school and a workbook for children for home use that was graded by the students' teachers, as well as a small familial component promoting the program. Results of the study found that at the conclusion of the study, fruit and vegetable intakes had increased in intervention school children by 47% and decreased by 27% in control school children, although intakes were still below national dietary guidelines at conclusion. Significant increases in fiber, potassium, magnesium,

beta-carotene and vitamin C were also seen in intervention school children at the conclusion of the study (Kristjansdottir et al., 2010). Although this study promoted fruit and vegetable intakes in children, it may be effective to apply similar strategies to promote breakfast eating in those children frequently skipping breakfast.

In an effort to increase fruit and vegetable consumption among fourth graders, researchers implemented a school-based dietary intervention, which included a classroom, parent, and cafeteria component, in twenty-eight elementary schools (Reynolds, et al., 2000). A total of 1698 families of fourth graders agreed to participate. The classroom component of the intervention consisted of modeling, self-monitoring, problem-solving, reinforcing, and taste testing as a part of a 14-lesson program. The parent component of the program included a Kick-Off Night, and parents received brochures, recipes, and refrigerator magnets, and were encouraged to have their children complete seven homework assignments. The food service component of the intervention included training for food service workers on purchasing, preparing and promoting fruits and vegetables. On intervention days of the program, 56% of children reported eating at least five servings of fruits and vegetables; 81% of parents reported reading newsletters and 86% reported reading brochures, with 53% of parents reported using shopping lists provided by the program. In the cafeteria, 3.6 posters were exhibited and 4.4 food labels were displayed on average per center. At baseline, no differences were seen between control or intervention children on consumed servings of fruits and vegetables. Significant increases in fruit and vegetable consumption were seen following intervention. In addition, parents in the intervention group consumed more fruits and vegetables post-intervention compared to the control parents, but no long-term effects were seen in this group. Researchers indicate that although strong effects were seen for fruit and vegetable consumption, work needs to be done to improve intervention effects on parents' consumption levels (Reynolds et al., 2000).

In another study, researchers used school public address (PA) systems to deliver nutrition messages to children to promote legume dishes which had been added to the school lunch menu

(Folta, Goldberg, Economos, Bell, Landers & Hyatt, 2006). At the start of the 2003-2004 school year, six elementary schools were pair matched based on size, racial/ethnic background and percentage of low-income children; one school from each pair was randomly selected to be given a series of nutrition lessons over the morning PA system for about two and a half months, while the control school received no nutritional messages over the PA system. Direct observation was used to determine choice of beans during the lunch period. Results of the study indicated that overall for all schools, no significant impacts were seen, however, for those schools receiving the highest dose of messages (receiving messages daily), children were 2.5 times more likely to choose the bean dish than those children attending the control. Researchers indicate that their results suggest, in those schools able to play messages daily, they were an effective nutrition education communication channel (Folta, et al., 2006). Using PA system announcements on a regular basis may be an effective way to promote SBP and breakfast eating.

Researchers aimed to compare fruit and vegetable intakes in middle school-aged children after implementation of either no intervention, a social marketing campaign, or a curriculum-only intervention in three schools located in a large metropolitan inner-city school district (Thackeray, Neiger, Leonard, Ware & Stoddard, 2002). Prior to implementation of an eight week social marketing campaign, researchers conducted 100 one-on-one interviews with children and six focus groups with students, parents, faculty and staff of a target school. The social marketing campaign consisted of specific school-wide events, communications and food service modifications in the school cafeteria. School-wide events included a month-long contest for children to record the numbers of fruits and vegetables that they consumed, weekly fruit and vegetable snack breaks in school, a “kick-off” assembly which introduced children to key messages of the program, and a cafeteria celebration at the end of the program. The ‘communications’ portion of the program consisted of educational posters promoting fruit and vegetable consumption in the classrooms, a banner in the cafeteria, electronic messages on a scrolling marquee, PA system announcements, and a display in a major hall in the school. ‘Food

service modifications' included increasing the number of servings and varieties of fruits and vegetables offered during meals, modifying the display of the items served, and offering disposable food trays which allowed students to carry multiple food items. Interventions targeting parents occurred only at the school with the social marketing campaign and consisted of four newsletters that were mailed home, and a series of four 1-hour cooking classes held at the school once per week for a month. At the curriculum-only school, children enrolled in a seventh grade health class were exposed to a series of four 5-a-day lessons taught by the regular instructor of the course. Lesson content included information on serving sizes, benefits of consuming fruits and vegetables, goal setting, personal assessment of consumption, comparing current intakes to recommendations, barriers, and strategies to incorporate more fruits and vegetables into the diet. The control school received no intervention. A pretest survey was collected two weeks prior to implementation and posttest surveys were collected one month after completion of the interventions. Consumption was measured from the Youth/Adolescent Food Frequency Questionnaire, self-efficacy was measured using a four-item scale, parent and faculty consumption were measured using instruments developed by the National Cancer Institute. Results of the study indicated that the effect of the interventions were minimal on fruit and vegetable consumption in middle school-aged children, although significant changes were seen in parents of children attending the social marketing school; parents reported an increase in fruit and vegetable intakes, self-efficacy for consuming fruits and vegetables, and knowledge about recommended servings of fruits and vegetables to be consumed daily. No increases in fruit and vegetable consumption were seen in faculty at any of the three schools. The researchers indicate the need of a multicomponent intervention for changes in behavior and knowledge, as well as the importance of including secondary schools in interventions targeted at children and adolescents. They conclude that although social marketing may be an effective approach to design environmental changes, it may be lacking to sustain significant behavioral change "independent of cognitive or traditional curricular components" (Thackeray et al., p. 52, 2002).

Another study evaluated the effectiveness of an intervention where elementary school students created a media campaign promoting fruit and vegetable intakes as part of an after-school program (Tanner, Duhe, Evans, & Condrasky, 2008). In the intervention, children were taught about nutrition, media literacy, and basic marketing and advertising. Using this information, the children created a media campaign for their parents; in the control group, children did not participate in an after-school program, but were invited to two family-fun nights. At both events, children completed questionnaires about self-efficacy, motivation and perceived parental social support, and parents completed questionnaires about their children's dietary habits and fruit and vegetable availability. Results indicate that the children stated they learned about the importance of eating fruits and vegetables and that the program had encouraged them to try new fruits and vegetables, and indicated that the program had helped their parents to begin purchasing more fruits and vegetables. Researchers state that by allowing children to use media in a positive way, obesity may be battled in an innovative way, and that the intervention was able to involve parents indirectly to change the food environment at home (Tanner, et al., 2008).

A number of studies have been conducted to promote changes in food intakes in children or school nutrition program participation. Utilizing specific strategies that have been shown to be effective in promoting other healthy foods such as parent involvement (Reynolds et al., 2000; Thackeray et al., 2002), PA system announcements (Folta, et al., 2006), or social media (Tanner et al., 2008) may be effective ways to promote SBP. By extending school breakfast hours and providing a mobile cart, Olsta (2013) saw a large increase in SBP participation. Those studies which had longer interventions and increased frequency of contact had greater success in altering children's food intakes (Hendrie et al., 2013).

Conclusion

Recently SBP meal patterns have been updated to promote a healthier diet in children, and so participating in the program may be an effective way to promote a healthier diet. Children

who consume breakfast have been shown to have healthier nutrition profiles than those children who do not consume breakfast, and are at lower risk for becoming overweight or obese.

Unfortunately, SBP participation remains drastically lower than participation in SLP. Some of the reasons for low rates of participation can include overall poor perceptions of the program, including social stigma, as well as a lack of time to participate in the mornings. Providing universal free breakfast to all students can help alleviate some of the social stigma attached to the program, and serving alternative breakfast delivery systems including breakfast in the classroom can help overcome the issue of a lack of time to eat the meal. Specific strategies including marketing the program as well as utilizing interventions may be effective to further promote and encourage breakfast consumption.

CHAPTER III

METHODS

Research Design and Subject Selection

A convenience sample of students attending school in a rural district in north central Oklahoma and their parents were recruited for this study. The study was reviewed and approved by Oklahoma State University's Institutional Review Board (see Appendix A) and Stillwater Public Schools' (SPS) Institutional Review Board (Appendix B) prior to participant recruitment and data collection.

There were three portions to the study. The first portion of the study involved measuring differences in participation in the School Breakfast Program a year prior to implementation of universal free breakfast and the school year following implementation of universal free breakfast in the district. The second portion of the study involved measuring differences in school breakfast consumption at baseline, midpoint, and conclusion in three schools in the district. The third portion of the study involved measuring child and adult perceptions of SBP; perception surveys were conducted at baseline and conclusion of the study.

Participation in SBP was measured via data collected by SPS for each of the schools in the district. Data were compared from school year 2012-2013 prior to the implementation of universal free breakfast, and from school year 2013-2014 after the implementation of universal free breakfast at three periods: September 2012 and September 2013, December 2012 and

December 2013, and April 2013 and April 2014. Each month included approximately 20-days of breakfast participation.

Plate waste surveys were conducted in October 2013, December 2013, and April 2014 at Skyline Elementary, Westwood Elementary, and Stillwater Middle School. Approximately four researchers helped with data collection at each collection period. For meals served in the cafeteria, as a student exited the serving line, a researcher asked if the student would allow the researcher to take a photo of his/her meal. For the children consuming meals in the classroom, a researcher asked the students if they were willing to participate as they served themselves their meal. If a student agreed to participate, the researcher placed a numbered index card on the tray and took a photo of the contents of the tray. The participating students were then asked to bring their trays to a designated area when they were done with their meal. At that time, the researchers weighed any liquids on the tray (such as milk or juice) and recorded the remaining amounts on the index card. A photograph was then taken of the tray showing all remaining food items. After data were collected, the PI used ESHA's Food Processor Nutrition Analysis Software (version 10.12, 2013, ESHA Research) to analyze foods selected and consumed by participating children. Analyses consisted of all foods selected and consumed, the average percent of the meal consumed, and specific nutrients selected and consumed including kilocalories, protein, carbohydrates, total fat, saturated fat, fiber, vitamin C, and calcium.

Participants for the perceptions survey portion of the study were recruited with assistance from the district's Director of Nutrition Services (DNS). An email inviting parents and their children to participate in an online survey was sent to all parents in Stillwater Public Schools (SPS) using the email address on file with the district. Emails were sent on October 22, 2013 and April 15, 2014 and a follow-up email further seeking recruitment was sent one week after each invitation to participate (Appendix C). The emails provided information about the purpose of the surveys and details about the study, and potential participants were encouraged to contact the IRBs, the DNS, or the primary investigator (PI) for any questions or concerns. Potential

participants were informed that by participating in the surveys, they were providing consent for participation. Children were recruited for participation with the same emails sent to parents, and parents were encouraged to assist their children in completing the child survey after they had completed a parent survey.

Procedures

Beginning in school year 2013-2014 SPS provided breakfast free to all children in the district regardless of their eligibility status for free- or reduced-price meals in an effort to increase participation in the School Breakfast Program. In addition, of the six elementary schools in the district, three schools implemented breakfast in the classroom (BIC) (Highland Park Elementary, Will Rogers Elementary, and Skyline Elementary). Children in grades 3-5 consumed BIC in their classrooms at Skyline, whereas younger children were served breakfast in the cafeteria by teaching assistants while seated at tables with their classmates.

Three schools (Skyline Elementary, Stillwater Middle School and Westwood Elementary) participated in a small breakfast promotion beginning in September 2013 and concluding in April 2014. The principals of each school provided information to parents via the schools' websites about the research (Appendix D). The promotion included colorful, age-appropriate posters hung throughout each school to promote breakfast consumption. There were five posters (36x24") hung in each elementary school, and four posters (24x36") hung throughout the middle school (Appendix E). The elementary school posters were modified by the PI from resources provided by Massachusetts Department of Elementary and Secondary Education's Child Nutrition Outreach Program after receiving permission from the organization. The middle school posters promoted school breakfast by addressing some stigmas associated with SBP, and were created by the PI with a cartoon character of the school mascot designed by a freelance graphic artist, Tadd Galusha. The posters were hung by the principal investigator in October 2013 and were removed by the schools in May 2014.

Another portion of the intervention included sending one text message per week to parents of children attending SPS (Appendix F). Recruitment for those wishing to receive text messages was provided through the baseline parent survey, and 75 parents provided their contact information to receive the messages. The text messages were sent on Friday afternoons beginning in October 2013 and concluding in December 2013. The messages were as follows.

- **Week one**—“Parents, remember School Breakfast is free in Stillwater! Have your kids check it out each morning to start their day right.”
- **Week two**—“Research shows that kids who eat School Breakfast miss less school each year than kids who don't. Remember, breakfast is free in SPS!”
- **Week three**—“Parents, did you know that kids who eat school breakfast score 17.5% higher on math tests than kids who don't?”
- **Week four**—“Hungry kids: can't concentrate, lack energy, don't do well in school, and can cause disruption. Don't forget: SPS serves free breakfast!”
- **Week five**—“Kids who eat school breakfast are more likely to: have higher levels of achievement in reading & math and retain more of what they learn.”
- **Week six**—“School breakfast is associated with reduced tardiness and fewer nurse visits. Start your kids' day right with free breakfast at SPS!”
- **Week seven**—School breakfast is associated with more positive learning environments for kids; help them succeed with free breakfast!
- **Week eight**—“Research shows that a healthy breakfast can reduce obesity risk; Remember SPS serves healthy breakfasts free each morning to students!”

The last portion of the intervention included public address (PA) system announcements and took place at Skyline Elementary and Stillwater Middle School and the messages were modified slightly to best accommodate the schools (Appendix G). PA system messages were read over the intercom once per week during the regularly scheduled morning announcements for

seven weeks. PA system messages began in October 2013 and concluded in December 2013. The format for the messages included an introduction, reminder about school breakfast being free, a benefit of consuming breakfast, and the upcoming week's menu. The messages were as follows.

- **Week one**—"Hi Pioneers (or other mascot)! Don't forget that school breakfast is completely free! You and your friends should check it out. This upcoming week we're serving (list entrees). We hope to see you in the cafeteria/eating in the classroom!"
- **Week two**—"Hi Pioneers! As always, breakfast is free in Stillwater Schools. Did you know that kids who eat school breakfast miss less school and are sick less often than kids who don't? Make sure you're helping to keep yourself healthy by eating breakfast. This week, we're serving (entrees)."
- **Week three**—"Hi Pioneers! Did you know that eating free school breakfast can help you do better in math and reading? You should check out if this works for you by eating breakfast at school! This week we're serving (entrees).
- **Week four**—"Pioneers, do you feel exhausted when you get to school and find it hard to pay attention in the mornings? We recommend you eat free school breakfast; it can give you the energy you need to do your best in school! This week we're serving (entrees)."
- **Week five**—"Pioneers, do you sometimes have trouble remembering what you learned at school? Sometimes this problem can be caused by feeling hungry. A good solution to this would be to start your day off right with school breakfast! It's free, and this week we are serving (entrees)."
- **Week six**—"Pioneers, do you feel like a lot of people around you are getting sick? By eating free school breakfast, you can help make sure that your body stays strong and healthy. This week we are serving (entrees)."
- **Week seven**—"Hi Pioneers! A healthy breakfast in the morning can help you have a great day! Remember, it's always free, and this week we are serving (entrees)."

Rather than use PA system announcements, Westwood Elementary elected to have the PI come to one morning assembly in October 2013 to promote school breakfast. At the assembly, the PI interacted with the students and shared information provided in the PA system announcements at the other schools.

Research Instruments and Data Collection

Breakfast participation data were provided by Stillwater Public Schools for each of the 10 schools in the district. Data were provided for all days when breakfast was served at schools in September 2012, December 2012, April 2013, September 2013, December 2013, and April 2014. Data included participation by eligibility status (including full price meals, reduced price meals, and free meals) as well as overall enrollment data for each school.

Participants for the consumption portion of the study were recruited with assistance from the principals in three schools within the district, two elementary schools (Skyline Elementary and Westwood Elementary) and one secondary school (Stillwater Middle School). Convenience sampling was used to select approximately 30 students at each school at baseline (October 2013), midpoint (December 2013) and conclusion (April 2014) for the plate waste surveys. Researchers received verbal assent from children for the plate waste surveys, and parents were instructed to tell their child to say “no” if they did not want their child to participate in this portion of the study. Data were collected from the children in the cafeterias at each school, and since Skyline Elementary also participated in breakfast in the classroom, data were collected from children in a third grade class that provided BIC for each data collection period.

To conduct the plate waste surveys, the researcher and research assistants placed a numbered index card on a child’s meal tray and took a photo of the contents of the tray after they had agreed to participate. Participating students were directed to bring their breakfast trays and index card to a designated area after they had consumed their meal. The research assistants first weighed and recorded the weight of a full and empty carton of each item (white milk, chocolate

milk, and juice) and subtracted the empty container weight from the full container weight to determine the total ounces of beverage each carton contained. After the participants brought their trays to the research assistants, the researchers weighed the remaining milk or juice on the tray and subtracted this amount from the weight of a full container and recorded the remaining amounts on the index card to determine fluid ounces consumed by each participant. A second photograph was then taken of the tray and the numbered index card showing all remaining food items. After data were collected, the researcher used ESHA's Food Processor Nutrition Analysis Software (version 10.12, 2013, ESHA Research) to analyze foods selected and consumed by participating children, including kilocalories, protein, carbohydrates, total fat, saturated fat, fiber, vitamin C, and calcium. The amounts consumed were calculated by multiplying the percent of each food item consumed by the nutrient composition of the served item.

Those parents and children who agreed to participate in the perceptions surveys were directed to a survey link on the solicitation emails. Surveys were conducted using the program Qualtrics (Qualtrics, 2013, 37892) and participation took less than five minutes. The purpose of the baseline surveys was to measure perceptions of SBP (Appendix H) and the purposes of the conclusion surveys were to measure changes in perceptions of SBP and collect information about children's usual breakfast consumption (Appendix I). Parents were asked what school their child attended and what grade he/she was in, and other questions on the baseline survey concerned: size, variety of foods, appeal, how they felt about their child consuming school breakfast, food safety and sanitation, how often their child consumed school breakfast, and if their opinions of the program had improved after implementation of universal free breakfast. Parents were also asked the same questions on the conclusion survey and additional questions included whether their child regularly ate breakfast (either at school or at home) and how many days per week their child ate breakfast at school, and in addition, parents were given space to provide any recommendations for improving the breakfasts served at their child's school.

After completing the parent survey, parents were brought to a screen which allowed them to complete the student survey with their child (Appendix J). Similar questions to the parent survey were asked, and children were asked to provide their grade and the school that they attend at the baseline and conclusion surveys. Additional questions concerned: if they liked the program, served foods, taste of foods, freshness of foods, size of foods, whether they had enough time to eat, if their friends consumed the meal, the effect of breakfast on concentration, and if they were hungry for breakfast in the mornings. The conclusion survey included the questions from the baseline survey as well as providing additional space for children to provide any feedback they had about the program (Appendix K). One question was changed from the baseline to the conclusion survey due to confusing wording; the baseline survey question asked if children were not usually hungry for breakfast in the mornings, and the conclusion survey question was changed to ask if children were usually hungry for breakfast in the mornings.

Research Questions

1. What is the effect of the implementation of free breakfasts on participation rates of SBP and perceptions of SBP?
2. What is the effect of the implementation of a promotion on SBP participation rates, perceptions of the program, and consumption of school breakfast by elementary children in a district serving universal free breakfast?
3. What is the effect of breakfast in the classroom on participation rates of SBP, perceptions of SBP, and consumption of school breakfast in a district serving universal free breakfast?
4. What is the effect of grade category on participation rates of SBP, perceptions of SBP, and consumption of school breakfast in a district serving universal free breakfast?

Statistical Analysis

The statistical analyses conducted in this study were performed using the Statistical Package for Social Sciences (SPSS 20.0) and SAS statistical software, version 9.4 (SAS Institute Inc). The level of significance was set at $p < 0.05$ for all tests.

Breakfast participation analyses were conducted with SAS statistical software, version 9.4 (SAS Institute Inc). Analyses of variance were used assuming a repeated measures model, blocking for school. The comparisons of treatment were the simple effects for a given month, elementary versus secondary student participation, BIC versus traditional breakfast participation for elementary students, and promotion versus non-promotion breakfast participation and year one (school year 2012-2013 with no universal free breakfast) versus year two (school year 2013-2014 with universal free breakfast). Breakfast participation was calculated using three methods: breakfast as a percentage of total enrollment, breakfast participation as a percentage of students enrolled eligible for each category, and breakfast participation as a percentage of total breakfast participants (for example, the number of students eligible for free-meals who participated in school breakfast divided by the total number of students who participated in the program overall).

The statistical analyses conducted in the consumption portion of the study were performed using the Statistical Package for Social Sciences (SPSS 20.0). Descriptive statistics provided data about the numbers of meals observed at each school, the numbers of meals collected at each time period, and the location of observed meals. Differences by month and school in nutrients selected, nutrients consumed, and food consumed were analyzed using univariate analyses of variance with significant differences (LSD) post hoc tests. The percentages of nutrients selected and consumed and percentage of food items consumed by location (breakfast in the classroom or traditional breakfast in the cafeteria) where elementary school students consumed the meal were analyzed using Student's t-tests.

The statistical analyses for the perceptions portion of the study were performed using the Statistical Package for Social Sciences (SPSS 20.0). Descriptive statistics provided information

about the study samples including attended schools, grade category, and breakfast delivery method for elementary school children. The potential differences in overall scores in parent and child perceptions of school breakfast by time, grade category, and breakfast delivery method were conducted using Student's t-tests. Differences in parent and child perceptions of school breakfast by time, grade category, delivery method, and intervention for each survey question were conducted using Chi-square tests. Differences in child and parent overall perceptions scores by time and grade level, delivery method, and intervention were conducted using ANOVA.

CHAPTER IV

IMPACT OF UNIVERSAL FREE BREAKFAST, BREAKFAST IN THE CLASSROOM, AND A BREAKFAST PROMOTION ON PARTICIPATION IN THE SCHOOL BREAKFAST PROGRAM

Abstract

Nationally, School Breakfast Program (SBP) participation is much lower than participation in National School Lunch Program, with research showing that barriers and stigmas associated with SBP have an influence on lower participation rates. The objective of this study was to assess the effectiveness of universal free breakfast, breakfast in the classroom (BIC), and a small promotion on participation in SBP in a rural school district in Oklahoma. The district had a total of 10 schools with an enrollment of 5987 students in 2012-2013 and 6049 students in 2013-2014. Repeated measures analyses of variance were used to compare differences in breakfast participation before and after implementation of universal free breakfast, BIC, grade level, and a breakfast promotion. Results of the study found significantly higher breakfast participation rates after implementation of universal free breakfast, and significantly higher participation in elementary children, especially those participating in BIC. Overall, students eligible for full-price meals had the greatest increase in participation. There were no differences in participation after the promotion. By exploring various methods to make breakfast available and more desirable to children in schools, participation in the program and overall nutrition can improve.

Introduction

Breakfast consumption in children and adolescents has decreased over time (Rampersaud et al., 2005). In 1965, a nationally representative survey of US children and adolescents showed that approximately 5% of children and 12% of adolescents regularly skipped breakfast (Siega-Riz, Popkin & Parson, 1998), but in 2013, 61.9% of adolescents reported skipping breakfast at least once during the previous week (CDC, 2014). A study utilizing data from the 1999-2006 NHANES found that children from single parent or low-income families were more likely to skip breakfast than children from families with two parents or with a higher socioeconomic status (Deshmukh-Taskar et al., 2010). In general, breakfast skipping is more prevalent in girls and increases with age (Rampersaud et al., 2005).

Breakfast consumption frequency can have an impact on a number of factors including appetite control, diet quality, and chronic disease risk (Timlin & Pereira, 2007). Several researchers found that children who frequently consumed breakfast were more likely to have better overall nutrition profiles, were less likely to be overweight, and have lower BMIs (Ask et al., 2006, Gleason & Dodd, 2009, Odegaard et al., 2013, Rampersaud et al., 2005). One study found that the percentage of children consuming at least two-thirds of their Recommended Daily Allowance for nearly all nutrients was significantly lower for adolescents who skipped breakfast compared to adolescents who regularly consumed the breakfast meal (Nicklas, Reger, Myers, & O'Neil, 2000). In addition, those frequently consuming breakfast were more likely to have improved cognitive performance in school compared to those infrequently consuming the meal (Kleinman et al., 2002, Rampersaud et al., 2005, Odegaard et al., 2013). In addition, studies have shown that skipping breakfast and experiencing hunger can have significantly negative effects on a child's ability to learn (FRAC, 2014B).

A solution to breakfast skipping may be the School Breakfast Program (SBP). Participation in SBP is voluntary, and unfortunately, rates of participation are drastically lower than those in the National School Lunch Program (NSLP) (FRAC, 2012). According to the Food

Research and Action Center's (FRAC) annual School Breakfast Scorecard, the ratio of American children participating in free or reduced price breakfast in school year 2012-2013 in comparison to free or reduced price lunch was 51.9:100 (FRAC, 2013). In one national survey, researchers found participation in the SBP to be much lower than in NSLP; out of 10,350 third-graders, 35% usually ate school breakfast whereas 84% usually ate school lunch (Bartfeld, Kim, Ryu & Ahn, 2009). Researchers found that children's access to the SBP led to a significant reduction in the probability of skipping at least one meal per week, and that providing breakfast at school moderated the risk of breakfast-skipping associated with lower SES (Bartfeld, Kim, Ryu & Ahn, 2009). Access to school breakfast decreases the risk of food insecurity for children (FRAC, 2014B).

Researchers found that participation in the SBP was closely related to income; approximately 75% of children in the lowest-income group participated but fewer than 10% of the highest income group participated in the program (Bartfeld, Kim, Ryu & Ahn, 2009). Most (80%) children participating in the SBP received their meals at the free or reduced price (Bartfeld et al., 2009).

By providing breakfast free to all students (universal free breakfast) at a school regardless of financial status, stigma associated with the program may be reduced and participation in the SBP may increase (FRAC, 2009). Studies showed that universal free breakfast significantly increased participation (Crepinsek et al., 2006, Kleinman et al., 2002, Leos-Urbel et al., 2013, Ribar & Haldeman, 2013) and increased the quality of breakfast consumed (Crepinsek et al., 2006). Once universal free breakfast was implemented, one study saw increases in participation for all eligibility groups, with the highest increases seen in those children not eligible for free- or reduced-price meals. Although breakfast participation increased over the study period, 80% of participants were children eligible for free meals, and participation continued to be much lower overall compared to participation in the NSLP (Leos-Urbel et al., 2013).

By increasing convenience of school breakfast for children through initiatives such as breakfast in the classroom (BIC), participation in SBP also increases. BIC, in which children are permitted to eat a school meal during the first 10-15 minutes of class time, may alleviate barriers to participation including bus schedule difficulties and a lack of time (USDA, 2014A). In addition, research has indicated that promoting the SBP to children should be a multifaceted undertaking; peer influence is a key factor in children's participation (Birch, 1980) as well as advertising (Ferguson et al., 2012, Hastings et al., 2003).

The goal of this project was to assess the impact of universal free breakfast, BIC, and an intervention promoting breakfast consumption on participation in SBP in a rural school district in Oklahoma.

Methods

The study was reviewed and approved by the university's and the district's Institutional Review Boards prior to data collection. Daily breakfast participation data were provided by the school district for each of the 10 schools in the district. The district had a total enrollment of 5987 students in 2012-2013 and 6049 students in 2013-2014. Data were provided for all days when breakfast was served at the beginning, middle, and end of the school year prior to implementation of universal free breakfast and the first year universal free breakfast was implemented in the district. Data were provided for 17 days in September 2012, 15 days for December 2012, 21 days for April 2013, 18 days for September 2013, 14 days for December 2013, and 22 days for April 2014. Data included the number of students who were enrolled at the school and the number of students who participated in school breakfast by eligibility status (including full-price meals, reduced-price meals, and free-meals).

Beginning in school year 2013-2014 free breakfast was provided to all children in the district regardless of their eligibility status for free- or reduced-price meals in an effort to increase participation in the School Breakfast Program. In addition, of the six elementary schools in the

district, three schools implemented breakfast in the classroom in an attempt to further increase participation. Finally, two elementary schools and one middle school also participated in a small intervention to promote breakfast participation beginning in September 2013 and concluding in April 2014. The intervention included posters hung throughout each school, public address announcement once per week from October 2013 to December 2013, and weekly text messages sent to the 75 parents who volunteered to receive the messages.

Statistical Analysis

Breakfast participation analyses were conducted with SAS statistical software, version 9.4 (SAS Institute Inc). Analyses of variance were used assuming a repeated measures model, blocking for school. The comparisons of treatment were the simple effects for a given month, elementary versus secondary student participation, BIC versus traditional breakfast participation for elementary students, and promotion versus non-promotion breakfast participation and year one (school year 2012-2013 with no universal free breakfast) versus year two (school year 2013-2014 with universal free breakfast). Breakfast participation was calculated using three methods: breakfast as a percentage of total enrollment, breakfast participation as a percentage of students enrolled eligible for each category, and breakfast participation as a percentage of total breakfast participants.

Results

School Breakfast Program participation data were collected from the 10 schools in the district for six data collection periods (the months of September 2012, December 2012, April 2013, September 2013, December 2013, and April 2014). Breakfast participation was measured using three methods including breakfast as a percentage of total enrollment at each school, breakfast participation as a percentage of total breakfast participants, and breakfast participation as a percentage of students eligible for each category.

Table 4.1 measured differences between baseline (the control school year 2012-2013) and universal free (the intervention school year 2013-2014) breakfast participation as a percentage of total enrollment at the school in the beginning (September), middle (December) and end (April) of each school year. Significantly higher participation rates were seen in the intervention year for September ($p=0.047$) and April ($p=0.046$) for total SBP participants, and although participation tended to be increased in December of the intervention year, the results were not significantly different. Participation in free breakfast, reduced breakfast, and the combination of free and reduced breakfast as a percentage of total enrollment were not significantly increased. For students not eligible for free or reduced breakfast, breakfast participation increased significantly at each data collection period.

Table 4.2 measured differences in breakfast participation as a percentage of enrolled students eligible for each category. For students eligible for free breakfast and the combination of free- and reduced-price meals, participation did not change in the intervention year. For reduced-price breakfast participants, participation significantly increased in September and December, and tended to increase in April. For full-price breakfast participants, participation increased significantly at all time periods.

In table 4.3, differences are shown for breakfast participation as a percentage of total breakfast participants. There were no significant differences for any category, though there was a trend toward an increased percentage of students eligible for full-price meals in December and April. Students eligible for free meals tended to compose a smaller percentage of participants in April and the combination of free and reduced participation in September and December.

In table 4.4, differences between traditional breakfast in the cafeteria and BIC participation as a percentage of total enrollment at the elementary schools in the beginning (September), middle (December) and end (April) of the school year when free breakfasts were implemented are presented. For total SBP participation, significantly greater breakfast participation was seen for students participating in BIC compared to traditional breakfast service

at all three data points. For students eligible for free- and reduced-price breakfast, a significantly greater percentage of students who received BIC consumed school breakfast. There were no significant differences in participation by students eligible for full-price meals as a percentage of total enrollment.

In table 4.5, differences between traditional breakfast (in the cafeteria) and BIC breakfast participation are presented as a percentage of elementary students eligible for each category. Participation by students who received BIC was significantly higher at all data points than traditional breakfast for students eligible for free, reduced-price, and full-price meals.

In table 4.6, differences between traditional and BIC breakfast participation were compared as a percentage of total breakfast participants. Students eligible for free meals and the combination of students eligible for free- or reduced-price meals made up a significantly larger percentage of total breakfast participants if they consumed BIC compared to students participating in traditional breakfast in the cafeteria. For students eligible for reduced-price meals, participation in April was significantly greater in BIC compared to traditional breakfast participation. Students eligible for full-price meals made up a significantly larger percentage of participants when served traditional breakfast than BIC at all three times.

In table 4.7, differences between elementary and secondary students' breakfast participation are presented as a percentage of total enrollment at the school in the beginning (September), middle (December) and end (April) of the year when universal free breakfasts were available. For total SBP participation, participation in the SBP was significantly higher for elementary students compared to secondary students for September and December, and in April, there was a trend ($p < 0.065$) toward higher participation by elementary students. There were no significant differences between elementary and secondary students eligible for free-meals or the combination of free- and reduced-price meals. For students eligible for reduced-price meals, in September participation was significantly higher for elementary students compared to secondary students but participation was not significantly different in December or April. For those students

eligible for full-price meals, participation as a percentage of total enrollment was significantly higher for elementary students at each time period.

In table 4.8, differences between elementary and secondary students' breakfast participation as a percentage of total students eligible for each category were compared. For students eligible for free-meals, reduced-price meals, or the combination of free- and reduced-price meals, elementary participation was significantly higher in all months compared to secondary participation. For students eligible for full-price meals elementary participation as a percentage of students eligible for full-price meals was significantly higher in September and December compared to secondary participation. In April, participation was not significantly different in elementary students compared to secondary students.

Table 4.9 compared differences between elementary and secondary student breakfast participation as a percentage of total breakfast participants. There were no significant differences. Children eligible for free- or reduced-price meals received more than half the breakfasts served at both elementary and secondary schools.

Tables 4.10-4.12 compared differences in breakfast participation of children attending schools that did and did not receive a breakfast promotion. For all categories (total SBP participation, students eligible for free-meals, students eligible for reduced-price meals, students in the combined free- and reduced-price meal category, and students eligible for full-price meals), breakfast participation rates were very similar with no significant differences in participation between students at schools that received and did not receive a promotion.

Discussion

Because nationally only 51.9 children eligible for free- or reduced-price meals consume school breakfast for every 100 low-income children participating in school lunch, pursuing opportunities to increase participation in the SBP is essential to ensure that children receive adequate nutrition and are able to improve behavior and school achievements (FRAC, 2013). A

study evaluating the impact of universal free breakfast, which measured participation by dividing the number of served breakfasts by the number of eligible students in each category, found increases in breakfast participation rates for all eligibility groups, with the greatest increases seen in children eligible for full-price meals (Leos-Urbel et al., 2013). In our study, when measuring the effect of universal free breakfast as a percentage of students eligible for each category, participation increased significantly for those students eligible for reduced-price and full-price meals. There was approximately a 20% increase in breakfast participation for children eligible for reduced-price meals and full-price meals. When differences in breakfast participation rates were measured as a percentage of total enrollment at each school, total SBP participation increased significantly for two of the three data collection periods, and statistically significant increases in the program were seen in those children eligible for full-price meals, with approximately a 10% increase in participation. When the impact of universal free breakfast was measured as a percentage of total breakfast participants at each school, no significant differences were seen for any eligibility category.

By providing breakfast in the classroom, schools are able to alleviate certain barriers such as bus schedule conflicts and increase participation dramatically in SBP (FRAC, 2014D). In a study evaluating the impact of BIC on breakfast participation by measuring breakfast participation out of total student enrollment, it was found that approximately 74% of children attending a class serving BIC participated in the program whereas only about 43% of children attending a school only serving traditional breakfast participated in the program (Anzman-Frasca, Djang, Halmo, Dolan & Economos, 2015). In another study, researchers found that providing breakfast in the classroom to children attending a school which had implemented universal free breakfast led to a 65% participation rate in the program compared to a 28% participation rate in schools serving universal free breakfast in the cafeteria, where participation was measured as a percentage of students in attendance eligible for a school meal (McLaughlin, Bernstein, Crepinsek, Daft, & Murphy, 2002). In our study, when comparing total breakfast participation as

a percentage of total enrollment at the school for those children attending a school serving BIC, participation in SBP was about 79% whereas participation in SBP at schools only serving traditional breakfast, participation was about 38%. In our study, participation was significantly different between the locations for children from lower-income families. When comparing differences between traditional and BIC breakfast participation as a percentage of students eligible for each category, BIC participation was significantly higher for each category.

Research has indicated increased breakfast skipping as children get older (CDC, 2014), and so ensuring older children consume a nutritionally adequate meal is important. In one study, it was found that breakfast participation at any location for third-graders was almost 99%, whereas by eighth-grade, participation had decreased to about 85% (Lytle, Seifert, Greenstein, & McGovern, 2000). In our study, when comparing elementary versus secondary student participation as a percentage of total enrollment in the schools, total SBP participation was significantly higher for elementary students for two of the three data periods, with participation in those months at about 60% for elementary students and about 23% for secondary students. For students-eligible for reduced-price meals, elementary participation was significantly different in one month compared to secondary participants, and not significantly different for students eligible for free-meals or the combination of free and reduced-price meals. For students eligible for full-price meals, elementary students had a significantly higher participation rate of 23% and for secondary students, participation overall for this category was about 9%. When comparing school breakfast participation as a percentage of students eligible for each category, breakfast participation was significantly higher for elementary students compared to secondary students in all eligibility groups except April for students eligible for full-price meals. When comparing breakfast participation as a percentage of total breakfast participants, none of these results were significant.

By promoting school breakfast, participation in the program may increase by raising awareness of the program. An effective breakfast promotion markets the SBP as a convenient,

smart choice while providing a specific audience with a targeted message (USDA, 2013C). In one study to increase breakfast participation, schools implemented universal free breakfast as well as created promotional fliers addressing common barriers to participation, and overall, found a 242% increase in participation in the program (Cullen, Thompson & Watson, 2012). In our study, offering the universal free breakfast significantly increased participation but the promotion had little effect on breakfast participation rates.

Limitations

A limitation of our study was that data for SBP participation was only collected from one school district. Another limitation was that the breakfast promotion was relatively brief (PA system announcements and parent text messages lasted one semester while posters were hung for one year) and had no effect on breakfast participation rates. The promotion was based on common barriers and stigmas associated with SBP found in the literature, and had we implemented focus groups or conducted a needs assessment to determine the specific needs of our population, we may have had a greater success with the promotion.

In one of the schools serving BIC, students attending lower grades (pre-k through second grade) sat in the cafeteria with their classes to consume the breakfast meal rather than going to a morning assembly or participating in true breakfast in the classroom, which may have had an impact on breakfast participation rates.

Summary/Conclusions

When measuring participation as a percentage of total enrollment at the schools, the implementation of universal free breakfast significantly improved participation overall in the program, and in particular, significantly increased participation was seen in those students eligible for full-price meals. When breakfast participation was measured as a percentage of students

eligible for each category, participation was significantly increased in students eligible for full-price meals, and at two data points, for those students eligible for reduced-price meals.

For those schools that participated in BIC, when participation was measured as a percentage of total enrollment, participation in SBP was significantly higher for total SBP participants, students eligible for free-meals, students eligible for reduced-price meals, and students eligible for the combination of free- or reduced-price meals. When breakfast participation was measured as a percentage of students eligible for each category, significantly higher participation rates were seen in all eligibility categories. When breakfast participation was measured as a percentage of total breakfast participants, participation was significantly higher for at least one data point for students eligible for free-meals, reduced-price meals, and the combination of free- and reduced-price meals, although participation was significantly higher for traditional breakfast for students eligible for full-price meals.

When breakfast participation between elementary and secondary students was compared after the implementation of universal free as a percentage of total enrollment at the schools, elementary students had significantly higher participation rates at least one measurement period for total SBP participants, students eligible for reduced-price meals, and students eligible for full-price meals. When breakfast participation was compared as a percentage of students eligible for each category, significant increases were seen in elementary students all categories including total SBP participation, students eligible for free-meals, reduced-price meals, the combination of free- and reduced-price meals, and students eligible for full-price meals.

The breakfast promotion had no effect on breakfast participation rates.

Implications

In our study, the implementation of universal free breakfast had a large impact on breakfast participation rates, especially in students eligible for full-price meals, implying that once breakfasts were available at no charge, they were more likely to consume a meal at no

charge. Although our study did not measure breakfast consumption outside the school environment, further research on the shift of breakfast consumption from home to a child's school, or whether multiple breakfast meals were consumed, could provide important information on the impact of universal free breakfast on the overall nutrition of these children.

In the elementary schools which served BIC, breakfast participation was higher than those elementary schools only serving traditional breakfast. An important issue brought up by Van Wye et al., (2013) is the question, if children are offered a meal in the classroom are they more likely to consume breakfast at multiple locations? Results of their study indicated that children consuming BIC consumed 95 more calories for breakfast (at school and at home) compared to children consuming traditional breakfast (Van Wye et al., 2013), and so promoting healthy foods for breakfast is important for the health of children nationwide.

When universal free breakfast was provided, breakfast participation was significantly higher for elementary compared to secondary students. Continuing to gain a better understanding of influences on breakfast participation in older children and then creating specific promotions targeted to this age group may help to improve participation. Although our breakfast promotion did not have an effect on participation rates, targeting interventions toward a specific audience (USDA, 2013C) with a longer intervention time and more direct contact between researchers and students can have a strong positive impact on SBP participation rates (Hendrie, Brindal, Baird & Gardner, 2013).

Table 4.1: Differences between baseline (control) and universal free (intervention) breakfast participation as a percentage of total enrollment at the school in the beginning (September), middle (December) and end (April) of the school year.

Type of participant	September		P-value	December		P-value	April		P-value
	Control (mean \pm SE)	Intervention (mean \pm SE)		Control (mean \pm SE)	Intervention (mean \pm SE)		Control (mean \pm SE)	Intervention (mean \pm SE)	
Total SBP participants	30.7 \pm 6.0	48.2 \pm 7.6	0.047	31.7 \pm 5.8	46.2 \pm 8.9	0.063	31.9 \pm 6.0	46.4 \pm 7.6	0.046
Free SBP participants	18.9 \pm 4.5	24.7 \pm 6.6	0.069	20.1 \pm 4.6	23.8 \pm 6.2	0.138	20.5 \pm 4.7	24.7 \pm 5.5	0.133
Reduced SBP participants	3.1 \pm 0.7	4.9 \pm 1.0	0.158	3.0 \pm 0.5	3.9 \pm 0.9	0.311	2.9 \pm 0.5	3.9 \pm 0.9	0.283
Free & reduced SBP participants	22.0 \pm 5.0	29.6 \pm 7.6	0.093	23.0 \pm 5.1	27.8 \pm 7.1	0.191	23.4 \pm 5.1	28.6 \pm 6.3	0.159
Full SBP participants	8.5 \pm 1.6	18.6 \pm 4.0	0.032	8.7 \pm 0.1.7	18.5 \pm 3.7	0.027	8.4 \pm 1.6	17.8 \pm 3.0	0.014

Table 4.2: Differences by between baseline (control) and universal free (intervention) breakfast participation as a percentage of students eligible for each category in the beginning (September), middle (December) and end (April) of the school year.

Type of participant	September		P-value	December		P-value	April		P-value
	Control (mean \pm SE)	Intervention (mean \pm SE)		Control (mean \pm SE)	Intervention (mean \pm SE)		Control (mean \pm SE)	Intervention (mean \pm SE)	
Free SBP participants	44.6 \pm 5.2	58.9 \pm 8.2	0.135	47.4 \pm 4.1	57.6 \pm 7.4	0.207	48.5 \pm 3.8	55.8 \pm 6.7	0.306
Reduced SBP participants	35.1 \pm 5.7	56.3 \pm 9.0	0.050	36.6 \pm 4.2	55.6 \pm 8.2	0.025	37.0 \pm 4.9	52.1 \pm 8.1	0.067
Free & reduced participants	42.7 \pm 5.3	58.3 \pm 8.3	0.119	45.6 \pm 4.1	57.3 \pm 7.5	0.156	46.3 \pm 4.0	55.1 \pm 6.8	0.236
Full SBP participants	18.9 \pm 4.4	42.2 \pm 10.7	0.016	21.0 \pm 5.7	39.0 \pm 8.9	0.033	21.1 \pm 5.8	44.8 \pm 8.4	0.008

Table 4.3: Differences between baseline (control) and universal free (intervention) breakfast participation as a percentage of total breakfast participants at the school in the beginning (September), middle (December) and end (April) of the school year.

Type of participant	September		P-value	December		P-value	April		P-value
	Control (mean \pm SE)	Intervention (mean \pm SE)		Control (mean \pm SE)	Intervention (mean \pm SE)		Control (mean \pm SE)	Intervention (mean \pm SE)	
Free SBP participants	58.7 \pm 4.4	50.0 \pm 4.4	0.104	61.3 \pm 5.0	49.6 \pm 4.9	0.065	62.7 \pm 4.5	51.2 \pm 4.3	0.052
Reduced SBP participants	9.7 \pm 0.6	10.4 \pm 0.9	0.454	9.6 \pm 0.7	8.4 \pm 0.9	0.265	9.2 \pm 0.6	8.0 \pm 0.9	0.259
Free & reduced SBP participants	71.9 \pm 5.2	59.3 \pm 5.2	0.072	70.9 \pm 5.0	57.9 \pm 5.3	0.087	68.5 \pm 4.3	60.5 \pm 4.7	0.244
Full SBP participants	28.5 \pm 6.1	39.6 \pm 5.2	0.188	29.1 \pm 5.0	42.1 \pm 5.3	0.093	28.1 \pm 4.3	40.7 \pm 4.7	0.065

Table 4.4: Differences between traditional (in the cafeteria) breakfast and breakfast in the classroom (BIC) breakfast participation as a percentage of total enrollment at the school in the beginning (September), middle (December) and end (April) of the universal free (intervention) year where elementary students consumed the meal.

Type of participant	September		P-value	December		P-value	April		P-value
	BIC (mean \pm SE)	Traditional (mean \pm SE)		BIC (mean \pm SE)	Traditional (mean \pm SE)		BIC (mean \pm SE)	Traditional (mean \pm SE)	
Total SBP participants	83.5 \pm 1.6	39.2 \pm 8.5	<0.001	78.2 \pm 0.9	37.3 \pm 7.7	<0.001	75.0 \pm 2.9	36.8 \pm 6.6	<0.001
Free SBP participants	49.3 \pm 6.9	12.7 \pm 2.0	0.003	47.2 \pm 6.4	12.2 \pm 1.2	0.004	45.4 \pm 6.2	13.5 \pm 1.3	0.006
Reduced SBP participants	8.6 \pm 0.5	3.7 \pm 1.0	<0.001	7.1 \pm 0.5	2.3 \pm 0.7	0.001	7.2 \pm 0.3	2.1 \pm 0.6	<0.001
Free & reduced SBP participants	57.9 \pm 7.3	16.4 \pm 3.0	0.002	54.3 \pm 6.8	14.4 \pm 1.9	0.002	52.6 \pm 6.1	15.7 \pm 1.8	0.002
Full SBP participants	25.6 \pm 0.6	22.8 \pm 0.6	0.669	23.9 \pm 0.6	22.8 \pm 0.6	0.867	22.4 \pm 0.6	21.1 \pm 0.5	0.853

Table 4.5: Differences between traditional (in the cafeteria) breakfast and breakfast in the classroom (BIC) breakfast participation as a percentage of students eligible for each category in the beginning (September), middle (December) and end (April) of the universal free (intervention) year where elementary students consumed the meal.

Type of participant	September		P-value	December		P-value	April		P-value
	BIC (mean \pm SE)	Traditional (mean \pm SE)		BIC (mean \pm SE)	Traditional (mean \pm SE)		BIC (mean \pm SE)	Traditional (mean \pm SE)	
Free SBP participants	83.6 \pm 1.4	57.1 \pm 10.3	0.002	81.0 \pm 1.1	54.2 \pm 8.0	0.002	75.1 \pm 4.8	56.8 \pm 7.9	0.022
Reduced SBP participants	85.7 \pm 2.0	53.1 \pm 10.0	0.003	84.7 \pm 2.1	47.4 \pm 9.5	0.001	81.1 \pm 0.6	44.3 \pm 7.2	0.001
Free & reduced SBP participants	83.9 \pm 1.4	56.2 \pm 10.1	0.002	81.4 \pm 1.2	53.1 \pm 8.0	0.001	75.8 \pm 4.4	54.8 \pm 7.4	0.012
Full SBP participants	81.7 \pm 4.1	32.5 \pm 8.3	<0.001	70.9 \pm 3.0	31.4 \pm 7.9	0.001	73.6 \pm 1.3	29.8 \pm 6.8	<0.001

Table 4.6: Differences between traditional (in the cafeteria) breakfast and breakfast in the classroom (BIC) breakfast participation as a percentage of total breakfast participants at the school in the beginning (September), middle (December) and end (April) of the universal free (intervention) year where elementary students consumed the meal.

Type of participant	September		P-value	December		P-value	April		P-value
	BIC (mean \pm SE)	Traditional (mean \pm SE)		BIC (mean \pm SE)	Traditional (mean \pm SE)		BIC (mean \pm SE)	Traditional (mean \pm SE)	
Free SBP participants	58.8 \pm 7.7	33.7 \pm 3.7	0.030	60.2 \pm 7.7	34.5 \pm 4.7	0.028	60.6 \pm 7.6	38.3 \pm 4.8	0.044
Reduced SBP participants	10.3 \pm 1.6	9.4 \pm 0.4	0.589	9.1 \pm 0.01	5.8 \pm 0.5	0.9	9.6 \pm 0.2	5.5 \pm 0.9	0.030
Free & reduced SBP participants	69.2 \pm 8.0	43.1 \pm 4.8	0.029	69.3 \pm 8.1	40.3 \pm 4.2	0.020	70.1 \pm 7.3	43.9 \pm 4.3	0.028
Full SBP participants	30.8 \pm 8.0	56.9 \pm 4.8	0.029	30.7 \pm 8.1	59.7 \pm 4.2	0.020	29.9 \pm 7.3	56.1 \pm 4.2	0.028

Table 4.7: Differences between elementary students and secondary students breakfast participation as a percentage of total enrollment at the school in the beginning (September), middle (December) and end (April) of the universal free (intervention) year.

Type of participant	September		P-value	December		P-value	April		P-value
	Elementary (mean \pm SE)	Secondary (mean \pm SE)		Elementary (mean \pm SE)	Secondary (mean \pm SE)		Elementary (mean \pm SE)	Secondary (mean \pm SE)	
Total SBP participants	61.3 \pm 10.6	22.0 \pm 8.9	0.017	57.7 \pm 9.8	23.2 \pm 8.6	0.031	55.9 \pm 9.1	27.4 \pm 3.1	0.065
Free SBP participants	31.0 \pm 8.8	12.1 \pm 4.5	0.127	29.7 \pm 8.3	12.1 \pm 4.4	0.153	29.5 \pm 7.7	15.1 \pm 2.3	0.231
Reduced SBP participants	6.2 \pm 1.2	2.5 \pm 0.9	0.033	4.7 \pm 1.1	2.3 \pm 0.8	0.147	4.7 \pm 1.2	2.4 \pm 0.3	0.175
Free & reduced SBP participants	37.1 \pm 8.7	14.6 \pm 2.2	0.107	34.4 \pm 9.4	14.4 \pm 5.0	0.147	34.1 \pm 9.9	17.5 \pm 5.4	0.218
Full SBP participants	24.2 \pm 4.1	7.4 \pm 3.6	<0.001	23.4 \pm 3.9	8.8 \pm 3.6	0.001	21.8 \pm 3.5	9.9 \pm 1.5	0.026

Table 4.8: Differences between elementary students and secondary students breakfast participation as a percentage of total students eligible for each category at the school in the beginning (September), middle (December) and end (April) of the universal free (intervention) year.

Type of participant	September		P-value	December		P-value	April		P-value
	Elementary (mean \pm SE)	Secondary (mean \pm SE)		Elementary (mean \pm SE)	Secondary (mean \pm SE)		Elementary (mean \pm SE)	Secondary (mean \pm SE)	
Free SBP participants	70.3 \pm 7.5	35.9 \pm 11.1	0.007	67.6 \pm 7.0	37.6 \pm 10.8	0.012	66.0 \pm 5.8	35.5 \pm 8.0	0.014
Reduced SBP participants	69.4 \pm 8.6	30.2 \pm 8.9	0.007	66.0 \pm 9.4	34.8 \pm 6.8	0.025	62.7 \pm 8.8	30.8 \pm 7.1	0.022
Free & reduced SBP participants	70.1 \pm 7.7	34.8 \pm 10.7	0.007	67.3 \pm 7.3	37.2 \pm 9.8	0.016	65.3 \pm 6.1	34.8 \pm 7.6	0.015
Full SBP participants	57.1 \pm 11.7	12.7 \pm 6.3	<0.001	51.2 \pm 9.6	14.7 \pm 6.6	0.021	51.7 \pm 10.3	31.1 \pm 13.3	0.164

Table 4.9: Differences between elementary students and secondary students breakfast participation as a percentage of total breakfast participants at the school in the beginning (September), middle (December) and end (April) of the universal free (intervention) year.

Type of participant	September		P-value	December		P-value	April		P-value
	Elementary (mean \pm SE)	Secondary (mean \pm SE)		Elementary (mean \pm SE)	Secondary (mean \pm SE)		Elementary (mean \pm SE)	Secondary (mean \pm SE)	
Free SBP participants	46.3 \pm 6.8	57.6 \pm 4.9	0.313	47.4 \pm 7.0	54.0 \pm 5.2	0.549	49.5 \pm 6.4	54.6 \pm 4.1	0.638
Reduced SBP participants	9.9 \pm 0.8	11.5 \pm 1.1	0.317	7.4 \pm 0.9	10.2 \pm 2.1	0.861	7.5 \pm 1.0	9.2 \pm 1.7	0.306
Free & reduced SBP participants	56.1 \pm 7.2	69.1 \pm 4.3	0.263	54.8 \pm 7.6	64.2 \pm 3.8	0.263	57.0 \pm 7.0	63.8 \pm 2.44	0.545
Full SBP participants	43.9 \pm 7.2	30.9 \pm 4.3	0.271	45.2 \pm 7.6	35.8 \pm 3.8	0.415	43.0 \pm 7.0	36.2 \pm 2.4	0.551

Table 4.10: Differences between no-promotion school breakfast participation and promotion school breakfast participation as a percentage of total enrollment at the school in the beginning (September), middle (December) and end (April) of the universal free (intervention) year.

Type of participant	September		P-value	December		P-value	April		P-value
	No promotion (mean \pm SE)	Promotion (mean \pm SE)		No promotion (mean \pm SE)	Promotion (mean \pm SE)		No promotion (mean \pm SE)	Promotion (mean \pm SE)	
Total SBP participants	48.5 \pm 13.2	47.7 \pm 17.2	0.964	45.9 \pm 11.8	46.8 \pm 16.1	0.961	47.2 \pm 9.3	44.8 \pm 16.3	0.893
Free SBP participants	26.0 \pm 9.6	21.9 \pm 7.9	0.746	24.7 \pm 9.1	22.1 \pm 7.5	0.836	26.2 \pm 7.9	21.7 \pm 7.4	0.726
Reduced SBP participants	5.1 \pm 1.4	4.6 \pm 1.7	0.753	4.0 \pm 1.1	3.6 \pm 1.7	0.801	4.0 \pm 0.9	3.8 \pm 2.0	0.917
Free & reduced SBP participants	31.2 \pm 10.9	26.5 \pm 9.6	0.744	28.7 \pm 10.1	25.7 \pm 9.3	0.830	30.1 \pm 8.7	25.5 \pm 9.5	0.746
Full SBP participants	17.3 \pm 4.9	21.2 \pm 7.9	0.539	17.2 \pm 4.6	21.1 \pm 7.0	0.535	17.0 \pm 3.4	19.3 \pm 7.0	0.717

Table 4.11: Differences between no-promotion school breakfast participation and promotion school breakfast participation as a percentage of total students eligible for each category at the school in the beginning (September), middle (December) and end (April) of the universal free (intervention) year.

Type of participant	September		P-value	December		P-value	April		P-value
	No promotion (mean \pm SE)	Promotion (mean \pm SE)		No promotion (mean \pm SE)	Promotion (mean \pm SE)		No promotion (mean \pm SE)	Promotion (mean \pm SE)	
Free SBP participants	58.1 \pm 11.6	60.3 \pm 11.3	0.879	56.3 \pm 10.5	60.2 \pm 10.5	0.785	54.4 \pm 9.2	58.7 \pm 10.6	0.761
Reduced SBP participants	56.8 \pm 12.4	55.4 \pm 14.0	0.928	57.4 \pm 10.9	52.1 \pm 14.6	0.741	52.7 \pm 10.5	50.8 \pm 15.2	0.904
Free & reduced SBP participants	57.8 \pm 11.7	59.3 \pm 11.8	0.918	28.7 \pm 10.4	59.9 \pm 10.9	0.858	53.9 \pm 9.2	57.6 \pm 11.2	0.793
Full SBP participants	43.2 \pm 14.0	40.6 \pm 20.0	0.882	38.6 \pm 11.1	39.9 \pm 18.1	0.937	48.6 \pm 9.7	37.4 \pm 18.2	0.528

Table 4.12: Differences between no-promotion school breakfast participation and promotion school breakfast participation as a percentage of total breakfast participants the school in the beginning (September), middle (December) and end (April) of the universal free (intervention) year.

Type of participant	September		P-value	December		P-value	April		P-value
	No promotion (mean \pm SE)	Promotion (mean \pm SE)		No promotion (mean \pm SE)	Promotion (mean \pm SE)		No promotion (mean \pm SE)	Promotion (mean \pm SE)	
Free SBP participants	52.4 \pm 7.2	45.4 \pm 4.3	0.528	51.0 \pm 3.3	46.7 \pm 7.4	0.701	52.3 \pm 6.6	48.9 \pm 2.8	0.758
Reduced SBP participants	10.9 \pm 0.9	9.4 \pm 0.6	0.385	9.1 \pm 1.2	6.9 \pm 1.4	0.187	8.4 \pm 1.0	7.4 \pm 1.9	0.534
Free & reduced SBP participants	63.3 \pm 7.5	54.8 \pm 5.0	0.463	60.1 \pm 7.8	53.6 \pm 4.5	0.572	60.7 \pm 7.0	56.3 \pm 4.0	0.698
Full SBP participants	36.7 \pm 7.5	45.2 \pm 5.0	0.475	39.9 \pm 7.8	46.4 \pm 4.5	0.583	39.3 \pm 7.0	43.7 \pm 4.0	0.706

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CHAPTER V

IMPACT OF BREAKFAST IN THE CLASSROOM AND GRADE LEVEL ON NUTRIENT INTAKES IN THE SCHOOL BREAKFAST PROGRAM

Abstract

Research has shown that most US youth do not consume adequate levels of a number of nutrients for proper growth, but by consuming breakfast, intakes, cognitive functioning, and classroom behavior improve, and risk of overweight decreases. The purpose of this study was to assess the impact of breakfast in the classroom and grade-level on nutrient intakes in a rural school district serving universal free breakfast. A convenience sample of students participated in plate waste surveys at three schools at the beginning, middle, and end of school year 2013-2014. ANOVA was used to determine differences in nutrients and foods by month and school and Student's t-tests were used to determine differences by breakfast location for a total of 288 breakfast meals. Results indicate that although selection of most nutrients was higher in traditional breakfast, only consumption of total and saturated fat were higher in traditional breakfast. Higher amounts of nutrients were consumed by secondary-age children compared to elementary students. By promoting healthy foods in SBP, districts may be able to increase participation in SBP as well as improve nutrition of participating children.

Introduction

Consuming a healthful diet supports optimal growth and development in children (USDA Dietary Guidelines Advisory Committee, 2010), however most United States (US) youth are not following recommendations from the Dietary Guidelines for Americans (USDA Dietary Guidelines Advisory Committee, 2010; Briefel & Johnson, 2004; Reedy & Krebs-Smith, 2010; Forshee, Anderson & Storey, 2006; USDA, 2010A). According to the CDC, most US youth do not consume recommended levels of fruits and vegetables or whole grains, and eat higher levels of sodium than recommended (USDA Dietary Guidelines Advisory Committee, 2010; USDA, 2010A & B). However, research has shown that children who typically ate breakfast had higher nutrient intake and higher daily caloric intakes but were less likely to be overweight, have higher cognitive functioning and better classroom behavior than those not consuming the meal (Rampersaud, Pereira, Girard, Adams & Metzl, 2005; Adolphus, Lawton & Dye, 2013).

The School Breakfast Program can be an effective measure to address poor dietary habits of American children. Meals served are required to provide about a quarter of the recommended amounts for specific nutrients; no more than 30% of calories may come from fat and less than 10% of calories served may be from saturated fat (FRAC, 2012). The SBP nutrient requirements were recently updated in accordance with the 2010 Dietary Guidelines for Americans, and meal pattern changes to the program began gradually in school year 2013-2014. An increase in whole grains was required, sodium levels were decreased, more fruit was served, and adequate caloric levels were served for three grade levels: K-5, 6-8, and 9-12 (USDA, 2012).

Universal free breakfast and breakfast in the classroom are two methods utilized by districts across the country to promote breakfast consumption in students (FRAC, 2010). Providing breakfast free to all students (universal free breakfast) at a school regardless of financial status may improve the quality of foods consumed at breakfast. Studies found that children attending a school with universal free breakfast consumed significantly more healthy foods at breakfast (Murphy et al., 2010) and were significantly more likely to consume a

nutritionally substantive breakfast compared to children attending a school without it (Crepinsek, et al., 2006). By increasing convenience of school breakfast for children, participation also increases. One study found that children consuming breakfast in the classroom, in which children are permitted to eat a school meal during the first 10-15 minutes of class time, were much more likely to consume cereal, milk, or juice compared to children consuming traditional breakfast in the cafeteria (Van Wye, Seoh, Adjoian, & Dowell, 2013).

Promotion of school breakfast to children and their families can also be an effective strategy to improve the food choices of children at breakfast. A number of studies have been conducted to promote changes in food intakes in children. Utilizing specific strategies that have been shown to be effective in promoting other healthy foods such as parent involvement (Reynolds et al., 2000; Thackeray et al., 2002), public address system announcements (Folta, et al., 2006), or social media (Tanner et al., 2008) may be effective ways to promote SBP.

The goal of this project was to assess the impact of universal free breakfast, breakfast in the classroom, and a small intervention on consumption of breakfast in a rural school district in Oklahoma.

Methods

A convenience sample of students attending school in a rural district in Oklahoma was recruited for this study. The study was reviewed and approved by the university's and the school district's Institutional Review Boards prior to participant recruitment and data collection. The study involved measuring differences in school breakfast consumption at three data points (baseline, midpoint, and conclusion) in three schools in the district. One of the participating schools was an elementary school serving traditional breakfast in the cafeteria, one was an elementary school serving breakfast in the classroom, and one was a secondary school serving traditional breakfast in the cafeteria. The elementary school serving traditional breakfast in the cafeteria had 26% of students eligible for free- or reduced-price meals, the elementary school

serving breakfast in the classroom had 68% of students eligible for free- or reduced-price meals, and the middle school had 43% of students eligible for free- or reduced-price meals.

Beginning in school year 2013-2014, the schools provided breakfast free to all children in the district regardless of their eligibility for free/reduced meals in an effort to increase participation in the School Breakfast Program. The meal service in the district was offer-vs-serve. Three schools participated in a small promotion beginning in September 2013 and concluding in April 2014. The intervention included colorful, age-appropriate posters hung throughout each school to promote breakfast consumption. One text message per week was sent to the 75 parents of children attending school in the district who volunteered to receive the messages. The last portion of the intervention included public address (PA) system announcements and took place in one elementary school and the middle school. PA system messages began in October 2013 and concluded in December 2013. Rather than use PA system announcements, the other elementary school elected to have a researcher attend one morning assembly in October 2013 to promote school breakfast.

Convenience sampling was used to select approximately 30 students at each school at baseline (October 2013), midpoint (December 2013) and conclusion (April 2014) for the plate waste surveys. Students were asked for assent to take a photo of his/her meal. The researcher placed a numbered index card on the tray and took a photo of the contents of the tray if a child agreed to participate. After they had finished their meals, the participating students were then asked to bring their trays to a designated area. The research assistants first weighed and recorded the weight of a full and empty carton of each liquid item (white milk, chocolate milk, and juice) and subtracted the empty container weight from the full container weight to determine the total ounces of beverage each carton contained. After the participants brought their trays to the research assistants, the researchers weighed the remaining milk or juice on the tray and recorded the remaining amounts on the index card to determine ounces consumed by each participant. A second photograph was then taken of the tray and the numbered index card showing all remaining

food items. After data were collected, the researcher used ESHA's Food Processor Nutrition Analysis Software (version 10.12, 2013, ESHA Research) to analyze foods selected and consumed by participating children, including kilocalories, protein, carbohydrates, total fat, saturated fat, fiber, vitamin C, and calcium. Pre-meal and post-meal photographs were matched and the percent of foods selected that remained on the tray in the post-meal picture was used to determine the percentage of foods consumed. Nutrient consumption amounts were calculated by multiplying the approximate percent of each food item consumed by the nutrient composition of the served item.

Statistical Analysis

The statistical analyses conducted in this study were performed using the Statistical Package for Social Sciences (SPSS 20.0). The level of significance was set at $p < 0.05$ for all tests. Differences by month and school in nutrients selected, nutrients consumed, and food consumed were analyzed using univariate analyses of variance with significant differences (LSD) post hoc tests. The percentages of nutrients selected and consumed and percentage of food items consumed by location (breakfast in the classroom or traditional breakfast in the cafeteria) where elementary school students consumed the meal were analyzed using Student's t-tests.

Results

Plate waste surveys were conducted on one day per school during October 2013, December 2013, and April 2014 for Stillwater Middle School, Skyline Elementary School, and Westwood Elementary School. A total of 288 plates were analyzed. Characteristics of breakfast meals observed are listed in table 5.1. All meals at Stillwater Middle School and Westwood Elementary School were consumed in the school cafeterias, whereas at Skyline Elementary students consumed breakfast in the classroom.

Differences by month in nutrients contained in breakfast meals as selected and consumed were compared (table 5.2). Overall, no significant differences by month were seen for kilocalories, protein, carbohydrates, total fat, or saturated fat for selected meals. There were, however, significant differences in fiber, vitamin C, and calcium in the foods selected by month. Fiber in selected foods was significantly higher in October compared to April ($p=0.029$), vitamin C was significantly higher in April compared to October or December ($p<0.001$), and calcium was significantly higher in October compared to December or April ($p=0.007$). No significant differences for consumption by month were noted for kilocalories, protein, carbohydrates, total fat, saturated fat, vitamin C, or calcium, but there was a significant difference between October and April for fiber consumption with higher levels being consumed in October compared to April ($p=0.009$).

Differences by month in percent consumption of selected foods are listed in table 5.3. There were no significant differences for milk, cereal, juice, cheese, yogurt, muffin, fruit, sandwich, or “other” foods in any month. In addition, there was no difference in the average percent of the meal consumed in any month.

The amount of food consumed by elementary school students was also compared by location (either the cafeteria or breakfast in the classroom) (table 5.4). Significant differences were seen in milk and the average percent of the meal consumed. Consumption of milk and the average percent of the meal eaten was higher for breakfast in the classroom compared to cafeteria meals ($p<0.001$).

The amounts of specific nutrients in foods selected by elementary students were also compared by location (either the cafeteria or breakfast in the classroom) (table 5.5). There were significant differences in all compared nutrients including kilocalories, protein, carbohydrates, total fat, saturated fat, fiber, and calcium, except for vitamin C. For all nutrients with significant differences, selection in the cafeteria was higher than in breakfast in the classroom. The amounts of specific nutrients consumed by elementary students by location (either the cafeteria or

breakfast in the classroom) were also compared (table 5.6). No differences were seen for kilocalories, protein, carbohydrates, fiber, or vitamin C by location. For total fat and saturated fat, consumption was significantly higher in the cafeteria compared to breakfast in the classroom ($p=0.032$ and $p=0.022$), and for calcium, intakes were higher for breakfast in the classroom compared to in the cafeteria ($p=0.010$).

Differences in nutrients in the foods selected by children's school sites are listed in table 5.7. Significant differences were seen in kilocalories, protein, carbohydrates, total fat, saturated fat, fiber, vitamin C, and calcium. Kilocalories, carbohydrates and fiber in foods selected by students were significantly lower for Skyline children compared to Middle School and Westwood students ($p<0.001$). Protein selection was significantly higher for Westwood students compared to Middle School and Skyline children ($p<0.001$). Skyline had significantly lower total fat and saturated fat selection compared to Middle School and Westwood students while Middle School students had significantly higher total fat and saturated fat selection compared to Skyline and Westwood children ($p<0.001$). Middle School students had significantly lower vitamin C selection compared to Skyline and Westwood children ($p=0.002$). Middle School students had significantly less calcium in the foods they selected compared to Skyline and Westwood children while Westwood students had significantly higher calcium selection compared to Skyline and Middle School students. Average nutrient selection by school by month was compared in table 5.11. There was a significant interaction between school and month for protein ($p=0.025$), fiber ($p=0.009$), vitamin C ($p=0.022$), and calcium ($p=0.014$).

Differences in nutrients consumed by children attending schools are listed in table 5.8. Middle school children consumed significantly higher intakes compared to Skyline and Westwood students for kilocalories ($p<0.001$), carbohydrates ($p<0.001$), total fat ($p<0.001$), saturated fat ($p<0.001$), and fiber ($p<0.001$). Skyline students consumed significantly more calcium than did Westwood students ($p=0.024$). Average nutrients consumed by school by month were compared in table 5.12. There was a significant interaction between school and month for

fiber ($p < 0.001$). Students at Skyline ate more fiber in October than in December and April while the fiber consumption at the other schools was more consistent.

The percent of foods consumed by children attending schools are listed in table 5.9. Significant differences in consumption by school were seen for milk, juice, sandwiches, and the average percent of food consumed. Westwood students consumed significantly less milk compared to students at the other schools ($p < 0.001$). Middle School students consumed significantly more juice ($p = 0.005$) and sandwiches ($p < 0.001$) compared to Westwood students. Westwood students consumed significantly less of their entire meals compared to Middle School and Skyline students ($p < 0.001$). Average food consumption by school by month was compared in table 5.10. There was a significant interaction between school and month for milk ($p = 0.041$), cereal ($p = 0.001$), and overall consumption (0.008). While Middle School and Skyline students consumed similar levels of milk throughout the year, Westwood students' intakes were lower. Although at the Middle School the consumption levels of cereal remained similar throughout the year, Skyline cereal consumption decreased over the year and consumption of cereal at Westwood increased.

Overall, Skyline students ate less food in December and April than at the beginning of the year, while intakes of students at other schools were more consistent throughout the year.

Discussion

Expanding the School Breakfast Program using methods such as universal free breakfast and breakfast in the classroom allows for a greater number of children to consume breakfast, which in turn promotes improved nutritional status and academic potential for those students participating (FRAC, 2010). In a study implementing universal free breakfast, it was found that children consumed a greater number of healthy food items at breakfast compared to children attending a school not serving universal free breakfast (Moore, Murphy, Chaplin, Lyons, Atkinson, & Moore, 2014). In our study however, all analyses took place in a district providing

universal free breakfasts, and differences in intakes were seen between children at the different schools. Students attending the elementary school serving breakfast in the cafeteria had significantly lower intakes of milk and lower total meal consumption than children at the other schools, which could have been due in part to less time to consume the meal compared to the other elementary school serving BIC, and the secondary school children being more hungry than the elementary children.

By making breakfast a part of the school day, a larger number of students are able to participate in the program (FRAC, 2010) thus allowing them to benefit from the increased health associated with breakfast consumption (Rampersaud et al., 2005). One study evaluated the impact of BIC on a number of nutritional outcomes and found that children who participated in a school serving BIC consumed, on average, 95 more calories for breakfast per day compared to children not offered BIC, and children in BIC classrooms were less likely to report not having consumed any breakfast. Students offered BIC were more likely to consume cereal, milk, and juice than children not participating in BIC (Van Wye, Seoh, Adjoian, & Dowell, 2013). In our study, elementary children eating breakfast in the cafeteria selected foods with significantly more nutrients than children consuming breakfast in the classroom. When actual consumption was evaluated, only total fat and saturated fat consumption were higher for children consuming breakfast in the cafeteria and calcium consumption was higher for children consuming breakfast in the classroom. In addition, children consuming breakfast in the classroom had significantly higher intakes of milk than children eating in the cafeteria, and those children participating in BIC consumed a significantly larger portion of their meal than did children consuming breakfast in the cafeteria. Differences in foods selected may be due to differences in foods offered to children at each meal location (for example, hot breakfast sandwiches are only served in the cafeteria). The differences in the percentages of meals consumed by location could be due to children in the classroom being provided additional time to consume their meals. In the meals observed in the classroom, children were given the opportunity to keep their breakfast items on the table until

they were finished with them, whereas those children in the cafeterias were required to throw away their trays when the bell rang to indicate the start of the school day. One study evaluated the amount of time children had to consume their school meal and the impact on nutrient intakes, and found a positive relationship associated with nutrient intakes and table time (Millburg, 2014).

Throughout the school year, the three schools were involved in a small intervention, and the data collection periods coincided with baseline (prior to implementation of the intervention), midpoint, and conclusion. There were no differences for food items consumed or percent of meals consumed over the study period, overall, students consumed about 70% of food items at all three data collection periods. The intervention in the district focused more on addressing barriers to participation in the SBP as well as benefits of participating, rather than focusing on the consumption of specific food items or nutrients; which may have had an impact on why there were no differences for food consumption or percent of meal consumed between those intervention or control schools.

Overall, no significant differences by month were seen for most nutrients. There were, however, significant differences in the amount of fiber, vitamin C, and calcium in foods selected by month. Fiber selection was significantly higher at baseline compared to the end of the intervention, vitamin C selection was significantly higher at the end of the intervention compared to baseline or midpoint, and calcium selection was significantly higher at baseline compared to later in the study. No significant differences for consumption by month were noted for most nutrients, but fiber consumption was higher at baseline compared to the end. Part of the reason for the lack of differences in most nutrients by month could have also been due to our intervention focusing more on awareness of and increasing participation in the SBP rather than specific foods or nutrients. In addition, research has shown that studies that have longer interventions and increased frequency of contact have greater success in altering children's food intakes (Hendrie et al., 2013), and our intervention only lasted one semester.

In 2013 in a nationally representative sample, 61.9% of adolescents reported breakfast skipping at least one day in the previous week (CDC, 2014) and in one study, researchers measured breakfast consumption in a cohort of children, and found that over time, breakfast consumption of children significantly decreased as the children got older. In third grade, 98.6% of children consumed breakfast, in fifth grade 94.4% of children ate breakfast, and in eighth grade, 85.2% of children reported consuming the meal. In addition, over time the cohort decreased their milk and fruit consumption (Lytle, Seifert, Greenstein, & McGovern, 2000). In our study, middle school children consumed about two-thirds of their milk whereas at the elementary school with BIC, children consumed about three-fourths of their milk and at the elementary school serving traditional breakfast, less than half. Overall, middle school children consumed about 80% of their breakfast meal with similar intakes at the elementary school with BIC and a breakfast consumption of about 58% at the other school.

Limitations

This study had a number of limitations, including a non-representative convenience sample of students attending participating schools. Sample sizes were small, with only approximately 30 plate wastes collected at each data collection period. No data were collected from participating students including age/grade, gender, ethnicity, or school meal eligibility status. Although researchers encouraged students to eat breakfast as they normally would, students may have altered their breakfast consumption because they realized researchers were recording the information.

Summary/Conclusions

Research has indicated that schools serving universal free breakfast and specifically breakfast in the classroom have higher breakfast participation rates and a greater proportion of students consuming a healthy meal (FRAC, 2014E; McLaughlin et al., 2002; Murphy et al., 2001;

Crepinsek et al., 2006; Nanny et al., 2011). In our study, although selection of specific nutrients was higher in the cafeteria compared to in the classroom, actual nutrient intakes were similar between the locations. However, children consuming BIC had significantly higher intakes of milk and consumed a significantly larger portion of their meal than did children consuming breakfast in the cafeteria.

Although our intervention appeared to have little effect on nutrient or food intakes in participants, research has shown that the most effective interventions are those that are high intensity (including a longer intervention period and frequent contact with participants compared to lower intensity interventions) (Hendrie, Brindal, Baird & Gardner, 2013), and so it is important that if an intervention is planned, it should be an adequate duration and intensity.

Research has indicated decreasing fruit and milk consumption with increased age (Lytle, Seifert, Greenstein, & McGovern, 2000), however, our middle school participants consumed similar amounts of milk to those elementary students consuming BIC, and significantly more milk than elementary children consuming breakfast in the cafeteria. Promoting low-fat milk consumption to all breakfast participants can help ensure that children are consuming adequate levels of calcium.

Implications

This study suggests that although children consuming breakfast in the cafeteria had selected significantly higher levels of most nutrients compared to children consuming BIC, actual intakes were only significantly higher for total fat and saturated fat for children participating in traditional breakfast, and calcium consumption was significantly higher for children consuming BIC. Although in this study the breakfast promotion had no effect on consumption, focusing nutrition education efforts on benefits of healthy breakfast food items offered in SBP may be an effective way to not only increase participation in the program, but also encourage consumption

of healthy nutrients when the promotion is targeted to a specific group. In addition, encouraging districts and schools to adopt BIC can have a positive influence on children's nutrition profiles.

Table 5.1: Number of breakfast meals observed

Characteristic	N (%)
School	
Middle School	95 (33.0%)
Skyline Elementary	71 (24.7%)
Westwood Elementary	122 (42.4%)
Month	
October 2013	97 (33.7%)
December 2013	91 (31.6%)
April 2014	100 (34.7%)
Place	
Cafeteria	217 (75.3%)
Breakfast in the classroom	71 (24.7%)

Table 5.2: Differences by month in nutrients contained in breakfast meals that were selected and consumed

Nutrient	Month	N	Selected	P-value	Consumed	P-value
			Mean \pm SD		Mean \pm SD	
Kilocalories	October	97	401.8 \pm 121.7	0.981	266.6 \pm 132.6	0.729
	December	91	405.1 \pm 127.6		282.8 \pm 154.1	
	April	100	402.1 \pm 144.5		270.9 \pm 146.4	
Protein (g)	October	97	14.3 \pm 5.5	0.073	8.7 \pm 4.3	0.578
	December	91	12.3 \pm 4.6		9.7 \pm 18.4	
	April	100	13.0 \pm 7.3		8.0 \pm 5.3	
Carbohydrates (g)	October	97	69.4 \pm 19.4	0.663	46.5 \pm 21.6	0.975
	December	91	66.7 \pm 18.9		45.9 \pm 23.5	
	April	100	67.9 \pm 22.2		45.8 \pm 23.4	
Total fat (g)	October	97	7.7 \pm 7.1	0.128	5.6 \pm 5.4	0.098
	December	91	9.8 \pm 6.8		7.6 \pm 7.2	
	April	100	8.6 \pm 7.8		6.3 \pm 6.8	
Saturated fat (g)	October	97	2.5 \pm 2.9	0.357	1.6 \pm 1.7	0.072
	December	91	3.2 \pm 2.6		2.4 \pm 3.1	
	April	100	2.9 \pm 3.3		1.9 \pm 2.5	
Fiber (g)	October	97	1.9 \pm 1.1 ^a	0.029	1.6 \pm 1.1 ^a	0.009
	December	91	1.8 \pm 1.3 ^{ab}		1.3 \pm 1.1 ^{ab}	
	April	100	1.5 \pm 1.0 ^b		1.1 \pm 0.8 ^b	
Vitamin C (mg)	October	97	34.1 \pm 16.4 ^a	<0.001	23.5 \pm 15.0	0.503
	December	91	31.4 \pm 17.4 ^a		22.5 \pm 16.7	
	April	100	41.9 \pm 22.9 ^b		25.4 \pm 20.2	
Calcium (mg)	October	97	484.1 \pm 162.5 ^a	0.007	294.4 \pm 151.7	0.067
	December	91	405.3 \pm 159.1 ^b		241.7 \pm 159.0	
	April	100	419.0 \pm 212.2 ^b		259.6 \pm 162.6	

Values in the same row with different superscripts are significantly different ($p < 0.05$)

Table 5.3: Differences by month in percent consumption of foods selected by students

Food item	Month	N	Mean \pm SD	P-value
Milk	October	82	54.7 \pm 36.0	0.655
	December	74	58.7 \pm 30.5	
	April	74	54.5 \pm 29.0	
Cereal	October	77	76.3 \pm 34.1	0.557
	December	63	81.1 \pm 30.6	
	April	79	75.3 \pm 34.3	
Juice	October	68	73.7 \pm 35.5	0.889
	December	59	71.1 \pm 38.9	
	April	77	70.0 \pm 57.1	
Cheese stick	October	8	83.8 \pm 31.1	0.300
	December	19	55.8 \pm 45.8	
	April	17	61.9 \pm 42.6	
Yogurt	October	38	64.2 \pm 41.3	0.383
	December	0	—	
	April	23	73.4 \pm 36.8	

Table 5.3 (continued)

Food item	Month	N	Mean \pm SD	P-value
Muffin	October	21	94.8 \pm 17.2	0.385
	December	23	82.6 \pm 36.1	
	April	28	86.8 \pm 30.3	
Fruit	October	0	—	0.901
	December	7	36.4 \pm 47.0	
	April	9	33.3 \pm 50.0	
Sandwich	October	7	43.7 \pm 19.7	0.149
	December	3	88.3 \pm 20.2	
	April	8	56.8 \pm 40.2	
Other	October	1	10.0 \pm N/A	0.139
	December	23	82.6 \pm 36.1	
	April	0	—	
Average % of meal consumed	October	97	70.1 \pm 26.6	0.945
	December	91	69.3 \pm 27.4	
	April	100	68.8 \pm 27.6	

Table 5.4: Percentage of food consumed by location where elementary students consumed the meal

Nutrient	Location				P-value
	N	Cafeteria (Mean \pm SD)	N	Breakfast in the Classroom (Mean \pm SD)	
Milk	112	41.8 \pm 29.4	55	71.1 \pm 26.9	<0.001
Cereal	88	71.2 \pm 34.4	62	78.8 \pm 35.0	0.185
Juice	90	61.4 \pm 40.1	55	72.6 \pm 52.4	0.151
Cheese	6	60.8 \pm 45.9	36	62.5 \pm 43.4	0.930
Yogurt	52	64.9 \pm 40.3	0	—	N/A
Fruit	13	35.0 \pm 47.1	1	100 \pm 0.0	N/A
Sandwich	10	37.0 \pm 24.8	0	—	N/A
Other	17	69.4 \pm 36.6	0	—	N/A
Average consumed	122	57.9 \pm 24.0	71	74.4 \pm 29.3	<0.001

Table 5.5: Nutrients selected by location where elementary students consumed the meal

Nutrient	Location		P-value
	Cafeteria	Breakfast in the Classroom	
	N=122	N=71	
	(Mean \pm SD)	(Mean \pm SD)	
Kilocalories	423.1 \pm 118.5	300.6 \pm 108.0	<0.001
Protein	15.0 \pm 6.3	11.7 \pm 5.3	<0.001
Carbohydrates	73.0 \pm 15.6	54.5 \pm 20.8	<0.001
Total fat	7.6 \pm 7.3	3.5 \pm 2.1	<0.001
Saturated fat	3.0 \pm 3.6	1.4 \pm 1.2	<0.001
Fiber	2.0 \pm 1.3	1.3 \pm 0.9	<0.001
Vitamin C	39.8 \pm 18.0	36.9 \pm 17.9	0.295
Calcium	504.0 \pm 157.5	432.6 \pm 194.2`	0.006

Table 5.6: Nutrients consumed by location where elementary students consumed the meal

Nutrient	Location		P-value
	Cafeteria	Breakfast in the Classroom	
	N=122	N=71	
	(Mean \pm SD)	(Mean \pm SD)	
Kilocalories	228.3 \pm 105.5	218.2 \pm 109.4	0.524
Protein	7.2 \pm 4.0	10.8 \pm 20.6	0.063
Carbohydrates	40.2 \pm 17.4	39.4 \pm 21.3	0.777
Total fat	4.4 \pm 4.3	3.0 \pm 4.2	0.032
Saturated fat	1.6 \pm 2.6	1.0 \pm 1.1	0.022
Fiber	1.2 \pm 1.0	1.1 \pm 1.0	0.437
Vitamin C	22.4 \pm 16.7	26.4 \pm 18.4	0.128
Calcium	244.8 \pm 139.8	308.6 \pm 176.5	0.010

Table 5.7: Average percent of nutrients selected by students attending schools

Nutrient	Percent selected \pm SD			P-value
	Middle (N=95)	Skyline (N=71)	Westwood (N=122)	
Kilocalories	453.6 \pm 121.7 ^a	300.6 \pm 107.9 ^b	423.1 \pm 118.5 ^a	<0.001
Protein	12.1 \pm 5.6 ^a	11.7 \pm 5.3 ^a	15.0 \pm 15.3 ^b	<0.001
Carbohydrates	71.6 \pm 20.6 ^a	54.5 \pm 20.8 ^b	73.0 \pm 15.6 ^a	<0.001
Total fat	13.8 \pm 6.3 ^a	3.5 \pm 2.1 ^b	7.6 \pm 7.3 ^c	<0.001
Saturated fat	3.8 \pm 2.6 ^a	1.4 \pm 1.2 ^b	2.9 \pm 3.6 ^c	<0.001
Fiber	1.9 \pm 0.9 ^a	1.3 \pm 0.9 ^b	1.9 \pm 1.3 ^a	<0.001
Vitamin C	30.4 \pm 21.8 ^a	36.9 \pm 17.9 ^b	39.8 \pm 18.0 ^b	0.002
Calcium	352.1 \pm 170.3 ^a	432.6 \pm 194.6 ^b	503.9 \pm 157.5 ^c	<0.001

Values in the same row with different superscripts are significantly different (p<0.05)

Table 5.8: Average percent of nutrients consumed by students attending schools

Nutrients	School (Percent consumed \pm SD)			P-value
	Middle (N=95)	Skyline (N=71)	Westwood (N=122)	
Kilocalories	371.9 \pm 159.4 ^a	218.2 \pm 107.9 ^b	228.3 \pm 105.5 ^b	<0.001
Protein	9.3 \pm 5.6	10.8 \pm 20.6	7.2 \pm 4.0	0.079
Carbohydrates	58.6 \pm 24.9 ^a	39.4 \pm 21.3 ^b	40.2 \pm 17.4 ^b	<0.001
Total fat	11.7 \pm 7.2 ^a	3.0 \pm 4.2 ^b	4.4 \pm 4.3 ^b	<0.001
Saturated fat	3.1 \pm 2.7 ^a	1.0 \pm 1.1 ^b	1.6 \pm 2.6 ^b	<0.001
Fiber	1.6 \pm 1.1 ^a	1.1 \pm 0.9 ^b	1.2 \pm 1.0 ^b	<0.001
Vitamin C	23.8 \pm 17.7	26.4 \pm 18.4	22.4 \pm 16.7	0.316
Calcium	260.4 \pm 163.2 ^{ab}	308.6 \pm 176.5 ^a	244.8 \pm 139.8 ^b	0.024

Values in the same row with different superscripts are significantly different (p<0.05)

Table 5.9: Percent of foods consumed by children attending schools

Food Item	Percent consumed \pm SD						P-value
	N	Middle	N	Skyline	N	Westwood	
Milk	63	67.2 \pm 30.2 ^a	55	71.1 \pm 26.9 ^a	112	41.8 \pm 29.4 ^b	<0.001
Cereal	69	83.8 \pm 28.5	62	78.8 \pm 35.0	88	71.2 \pm 34.4	0.055
Juice	59	86.1 \pm 46.3 ^a	55	72.6 \pm 52.4 ^{ab}	90	61.4 \pm 40.6 ^b	0.005
Cheese	2	83.0 \pm 24.0	36	62.5 \pm 43.4	6	60.8 \pm 45.9	0.802
Yogurt	9	83.3 \pm 32.9	0	—	52	64.9 \pm 40.3	0.201
Muffin	72	87.8 \pm 29.3	0	—	0	—	—
Fruit	2	0.0 \pm 0.0	1	100.0 \pm 0.0	13	35.0 \pm 47.1	0.233
Sandwich	8	81.9 \pm 24.3	0	—	10	37.0 \pm 24.8	0.001
Other	2	30.0 \pm 28.3	0	—	17	69.4 \pm 36.6	0.163
Average %	95	80.4 \pm 23.6 ^a	71	74.4 \pm 29.3 ^a	122	57.9 \pm 23.9 ^b	<0.001

Values in the same row with different superscripts are significantly different (p<0.05)

Table 5.10: Average food consumption by school by month

Food Item	Month: N (Percent consumed \pm SD)							P-value
	School	N	October	N	December	N	April	
Milk	Middle	21	62.7 \pm 26.8	20	76.2 \pm 31.0	22	65.2 \pm 32.2	0.041
	Skyline	19	78.2 \pm 24.7	14	66.6 \pm 27.5	22	67.7 \pm 28.2	
	Westwood	43	34.2 \pm 30.2	38	52.1 \pm 29.9	31	39.6 \pm 24.6	
Cereal	Middle	15	83.8 \pm 27.6	17	90.2 \pm 19.3	26	78.5 \pm 34.7	0.001
	Skyline	18	99.2 \pm 2.6	18	76.0 \pm 35.4	26	66.7 \pm 41.0	
	Westwood	37	60.6 \pm 38.3	24	76.9 \pm 34.0	27	80.6 \pm 25.3	
Juice	Middle	59	84.3 \pm 26.3	55	79.2 \pm 34.3	27	91.5 \pm 53.2	0.067
	Skyline	13	96.2 \pm 13.9	17	59.9 \pm 42.5	25	68.9 \pm 66.7	
	Westwood	40	62.4 \pm 38.9	25	73.2 \pm 39.3	25	47.9 \pm 42.0	
Avg %	Middle	29	82.3 \pm 18.9	29	79.2 \pm 25.1	37	79.9 \pm 25.1	0.008
	Skyline	21	90.2 \pm 12.3	20	67.5 \pm 30.9	30	67.9 \pm 32.9	
	Westwood	47	53.6 \pm 24.5	42	63.2 \pm 25.9	33	57.1 \pm 19.7	

Table 5.11: Average nutrients selected by school by month

Nutrient	Percent consumed \pm SD							P-value
	School	N	October	N	December	N	April	
Kcals	Middle	29	455.5 \pm 101.6	29	466.2 \pm 121.5	37	442.1 \pm 137.4	0.691
	Skyline	21	283.8 \pm 86.5	20	303.8 \pm 107.5	30	310.1 \pm 122.9	
	Westwood	47	421.4 \pm 112.9	42	411.2 \pm 112.4	33	440.7 \pm 134.4	
Protein (g)	Middle	29	12.3 \pm 4.78	29	13.2 \pm 5.6	37	11.0 \pm 6.2	0.025
	Skyline	21	12.3 \pm 4.8	20	10.9 \pm 5.0	30	11.8 \pm 5.8	
	Westwood	47	16.4 \pm 5.6	42	12.4 \pm 3.5	33	16.3 \pm 8.6	
CHOs (g)	Middle	29	74.1 \pm 18.3	29	72.1 \pm 20.7	37	69.1 \pm 22.4	0.361
	Skyline	21	51.6 \pm 18.4	20	54.2 \pm 19.3	30	56.8 \pm 23.6	
	Westwood	47	74.3 \pm 15.6	42	68.9 \pm 14.8	33	76.5 \pm 16.0	
T. fat (g)	Middle	29	12.5 \pm 5.5	29	14.5 \pm 6.4	33	14.4 \pm 6.8	0.740
	Skyline	21	23.6 \pm 2.9	20	4.3 \pm 1.4	37	2.9 \pm 1.7	
	Westwood	47	46.5 \pm 7.6	42	9.2 \pm 6.4	30	7.1 \pm 7.8	
S. fat (g)	Middle	29	3.2 \pm 1.7	20	4.1 \pm 2.9	37	4.1 \pm 3.0	0.929
	Skyline	21	1.4 \pm 1.6	42	1.6 \pm 0.8	30	1.3 \pm 1.1	
	Westwood	47	2.6 \pm 3.8	29	3.3 \pm 2.7	33	3.1 \pm 4.3	
Fiber (g)	Middle	29	1.8 \pm 0.9	29	2.2 \pm 1.2	37	1.7 \pm 0.8	0.009
	Skyline	21	2.0 \pm 1.1	20	0.9 \pm 0.3	30	0.9 \pm 0.7	
	Westwood	47	2.1 \pm 1.2	42	1.9 \pm 1.5	33	1.9 \pm 1.2	
Vit. C (mg)	Middle	29	26.3 \pm 16.6	29	29.1 \pm 18.3	37	34.7 \pm 26.9	0.022
	Skyline	21	30.1 \pm 15.6	20	37.7 \pm 14.7	30	41.2 \pm 20.2	
	Westwood	47	40.7 \pm 14.1	42	29.9 \pm 17.7	33	50.9 \pm 16.9	
Calcium (mg)	Middle	29	386.2 \pm 166.8	29	370.6 \pm 162.9	37	310.8 \pm 174.7	0.014
	Skyline	21	462.8 \pm 154.3	20	431.3 \pm 183.6	30	412.4 \pm 226.8	
	Westwood	47	552.0 \pm 130.0	42	416.9 \pm 143.2	33	546.4 \pm 167.6	

Table 5.12: Average nutrients consumed by school by month

Nutrient	School	Percent consumed \pm SD						P-value
		N	October	N	December	N	April	
Kcals	Middle	29	383.7 \pm 140.7	29	375.1 \pm 171.9	37	360.2 \pm 166.4	0.248
	Skyline	21	248.7 \pm 82.6	20	202.7 \pm 99.2	30	207.1 \pm 129.4	
	Westwood	47	202.3 \pm 92.9	42	257.3 \pm 132.5	33	228.6 \pm 71.3	
Protein (g)	Middle	29	9.8 \pm 4.4	29	10.1 \pm 5.8	37	8.4 \pm 6.2	0.488
	Skyline	21	10.1 \pm 4.2	20	15.1 \pm 38.4	30	8.3 \pm 5.5	
	Westwood	47	7.3 \pm 4.0	42	6.8 \pm 4.1	33	7.3 \pm 4.1	
CHOs (g)	Middle	29	62.1 \pm 22.6	29	58.4 \pm 26.4	37	55.9 \pm 25.7	0.195
	Skyline	21	45.9 \pm 17.4	20	34.2 \pm 18.3	30	38.3 \pm 24.7	
	Westwood	47	37.1 \pm 16.8	42	42.9 \pm 19.9	33	41.3 \pm 14.5	
T. fat (g)	Middle	29	11.2 \pm 5.8	29	11.5 \pm 7.9	37	12.2 \pm 7.7	0.213
	Skyline	21	3.2 \pm 2.6	20	4.7 \pm 6.9	30	1.8 \pm 1.7	
	Westwood	47	3.1 \pm 2.9	42	6.3 \pm 5.6	33	3.8 \pm 3.1	
S. fat (g)	Middle	29	2.8 \pm 1.4	29	3.1 \pm 2.9	37	3.4 \pm 3.2	0.199
	Skyline	21	1.1 \pm 1.4	20	1.2 \pm 1.0	30	0.7 \pm 0.9	
	Westwood	47	1.1 \pm 1.6	42	2.6 \pm 3.8	33	1.2 \pm 1.8	
Fiber (g)	Middle	29	1.6 \pm 1.1	29	2.0 \pm 1.3	37	1.3 \pm 0.7	<0.001
	Skyline	21	2.1 \pm 0.9	20	0.7 \pm 0.5	30	0.7 \pm 0.8	
	Westwood	47	1.3 \pm 1.2	42	1.1 \pm 0.9	33	1.3 \pm 0.8	
Vit. C (mg)	Middle	29	21.5 \pm 14.8	29	23.5 \pm 17.9	37	25.9 \pm 19.7	0.896
	Skyline	21	27.9 \pm 15.7	20	23.4 \pm 14.8	30	27.2 \pm 22.2	
	Westwood	47	22.8 \pm 14.8	42	21.4 \pm 17.1	33	23.2 \pm 19.1	
Calcium (mg)	Middle	29	308.7 \pm 168.0	29	266.9 \pm 157.5	37	217.5 \pm 156.4	0.52
	Skyline	21	381.3 \pm 137.3	20	257.5 \pm 178.2	30	291.8 \pm 188.4	
	Westwood	47	246.8 \pm 129.4	42	216.9 \pm 150.5	33	277.6 \pm 136.7	

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CHAPTER VI

PARENT & CHILD PERCEPTIONS OF SCHOOL BREAKFAST PROGRAM IN A DISTRICT SERVING UNIVERSAL FREE BREAKFAST AND BREAKFAST IN THE CLASSROOM

Abstract

Research has indicated a number of barriers to participation in the School Breakfast Program (SBP), which may have a large impact on the much lower SBP participation rates compared to the National School Lunch Program. The objective of this study was to assess the effectiveness of universal free breakfast, breakfast in the classroom (BIC), and a small promotion on child and parent perceptions of SBP. Convenience sampling was used to measure perceptions of elementary and secondary students and their parents using online surveys in a rural school district that had recently implemented universal free breakfast and BIC. Overall, 747 children and 828 parents participated in the surveys. Analyses included Student's t-tests, ANOVA, and Chi-square tests. Results indicated lower overall survey responses at the conclusion of the year, elementary students who participated in BIC, and for older students and their parents. Targeting interventions on those groups with low SBP perceptions by addressing specific barriers and stigmas may have a positive impact on perceptions and in turn, increase participation in the program.

Introduction

Consuming breakfast has been shown to be an important factor in children and adolescents' well-being (Nicklas, O'Neil, & Myers, 2004), but breakfast consumption has decreased over time (Rampersaud et al., 2005). Breakfast consumption frequency can have an impact on a number of factors including appetite control, diet quality, and chronic disease risk (Timlin & Pereira, 2007) as well as classroom behavior (Adolphus, Lawton & Dye, 2013). Although National Health and Examination Survey (NHANES) data showed that children who skipped breakfast had lower total energy intakes compared to children who consumed breakfast, children who skipped breakfast had higher BMI z scores for age and larger waist circumferences than children consuming ready to eat cereal for breakfast (Deshmukh-Taskar et al., 2010). A review of literature found that children who consistently consumed breakfast had improved nutritional outcomes and academic behavior compared to breakfast-skipping children (Rampersaud et al., 2005). One study found that the percentage of children consuming at least two-thirds of their Recommended Daily Allowance (RDA) for nearly all nutrients was significantly lower for adolescents who skipped breakfast compared to adolescents who regularly consumed the breakfast meal (Nicklas, Reger, Myers, & O'Neil, 2000).

A solution to breakfast skipping may be participation in the School Breakfast Program (SBP). Access to school breakfast decreased the risk of food insecurity (Bartfeld & Ahn, 2011) and breakfast skipping (Bartfeld, Kim, Ryu & Ahn, 2009). However, rates of participation in the SBP are drastically lower than those in the National School Lunch Program (NSLP) (FRAC, 2012). Two methods of increasing participation in the program include universal free breakfast and breakfast in the classroom (BIC). Providing breakfast free to all children at a school regardless of school meal eligibility status is called universal free breakfast, and schools that serve universal free breakfast have higher breakfast participation rates than schools that do not provide free meals (FRAC, 2009). BIC, in which children are permitted to eat a school meal

during the first 10-15 minutes of class time, may alleviate barriers to participation including bus schedule difficulties and a lack of time and further increase participation (USDA, 2014A).

Studies have been conducted to help determine why the SBP has lower participation rates than the NSLP. Perceived disadvantages for children participating in the SBP included the early scheduling of the breakfast meal, limited time for children to eat (Lambert et al., 2007; Greves et al., 2007) and conflicting bus schedules (Chopade et al., 2007). A common theme was a preference for children to consume breakfast at home compared to consuming it at school, due in part to the lack of time to consume the meal once at school (Bailey-Davis et al., 2013; Sabol, Struempfer, & Zizza, 2011). Other perceived barriers include friends not participating in the program, participation being “uncool,” low preference for certain foods, and the cost of SBP meals (Cullen et al., 2012). Children also indicated that foods served in SBP were often disliked, with small portions served, and many children would prefer a hot breakfast option (Sabol, Struempfer, & Zizza, 2011). Also, another common complaint was a lack of healthy foods being served (Sabol, Struempfer, & Zizza, 2011; Sampson et al., 1991; Nanney et al., 2011). Parents indicated similar barriers including their children disliking foods served, lack of time, and a lack of hunger (Cullen et al., 2012). Parents also felt that meals were unhealthy, provided too little food, and had a lack of variety. In addition, negative parental attitudes about the SBP were associated with non-participation among children (Sampson et al., 1991), and parents indicated that more education about the program was needed for students and their parents (Cullen et al., 2012). By addressing perceptions of SBP by students and their parents, nutrition educators can identify those areas in which education about the program may be most beneficial.

The purpose of this study was to assess the impact of universal free breakfast, BIC, and a small intervention on child and parent perceptions of the SBP. Differences in perceptions between elementary and secondary students were also compared.

Methods

A convenience sample of students attending school in a rural district in Oklahoma and their parents were recruited for this study through email invitations sent to parents by the district's Director of Nutrition Services at the beginning and end of the 2013-2014 school year. The study was reviewed and approved by Oklahoma State University's Institutional Review Board and the district's Institutional Review Board prior to participant recruitment and data collection.

Parents and children who agreed to participate in the study were directed to an online Qualtrics survey (Qualtrics, 2013, v. 37892) and participation took less than five minutes. The purposes of the surveys were to measure changes in perceptions of SBP and collect information about children's usual breakfast consumption. Researchers developed the questions based on a review of the literature on perceptions of the SBP (McDonnell et al., 2004; Rosen et al., 2014; Lambert et al., 2007; Cullen et al., 2012; Reddan et al., 2002; Greves et al., 2007; Sabol et al., 2011; Bailey-Davis et al., 2013; Sampson et al., 1991). Parents were asked what school their child attended and what grade he/she was in, and other questions on the survey concerned size, variety of foods, appeal, how they felt about their child consuming school breakfast, food safety and sanitation, how often their child consumed school breakfast, and if their opinions of the program had improved after implementation of universal free breakfast. Parents were also asked the same questions on the conclusion survey and additional questions included whether their child regularly ate breakfast (either at school or at home) and how many days per week their child ate breakfast at school. In addition, parents were given space to provide any recommendations for improving the breakfasts served at their child's school. Similar questions were asked on the survey for children. Children were asked if they liked the program, served foods, taste, freshness, portion size, whether they had enough time to eat, if their friends consumed the meal, the effect of breakfast on concentration, and if they were hungry for breakfast in the mornings. The conclusion

survey provided additional space for children to provide any feedback they had about the program.

Each of the question answer choices was assigned a numerical value so that a total score could be derived; an answer of “never” received zero points, “sometimes” received one point, and “always” received two points. Scores from each question were added together to derive the total score; Cronbach’s alpha coefficient was 0.772 for the seven items in the parent perceptions surveys. For the children’s survey, seven items were included in the total score; the question about child hunger was not included. The reliability coefficient for the child perception scale was 0.737. A reliability coefficient of 0.70-0.90 is considered an “acceptable” measure of internal consistency (Portney & Watkins, 2009).

The baseline surveys were administered at the beginning of the school year 2013-2014 when the district provided universal free breakfast for the first time. In addition, out of six elementary schools in the district, two schools fully implemented BIC and another school served BIC to children in grades 3-5 and teaching assistants served younger students who were seated by class in the cafeteria.

Three schools (two elementary and one middle school) participated in a small intervention beginning in September 2013 and concluding in April 2014. One of the participating elementary schools served breakfast in the classroom whereas the other served traditional breakfast in the cafeteria. The intervention included colorful, age-appropriate posters hung throughout each school promoting breakfast consumption. Another portion of the intervention included sending one text message per week to 75 parents of children who provided their contact information to receive the messages. Messages addressed benefits to participation in SBP. The last portion of the intervention included public address (PA) system announcements in one elementary school and the middle school. Messages were read during the scheduled morning announcements once per week for seven weeks. One elementary school elected to have a researcher attend one morning assembly in October 2013 to promote school breakfast.

Statistical Analysis. The statistical analyses conducted in this study were performed using the Statistical Package for Social Sciences (SPSS 20.0). The level of significance was set at $p < 0.05$ for all tests. The potential differences in overall scores in parent and child perceptions of school breakfast by time, grade category, and breakfast delivery method were conducted using Student's t-tests. Differences in parent and child perceptions of school breakfast by time, grade category, delivery method, and intervention for each survey question were conducted using Chi-square tests. were conducted using ANOVA.

Results

Parent Perceptions: A total of 493 parents of children attending Stillwater Public Schools participated in the baseline perceptions survey and 495 parents participated in the perceptions survey at the conclusion of the survey. Characteristics of the parents completing surveys are listed in table 6.1. There were no differences between baseline and conclusion by school, grade category, or child participation in BIC or traditional breakfast in the cafeteria.

Overall, perceptions of school breakfast changed significantly over the study period with lower perceptions seen at the conclusion of the study compared to at baseline (table 6.2). Most parents at the beginning and the end of the study agreed that free breakfast improved their feelings about the program and their child had increased breakfast intake, but at the end of the study parents were more likely to disagree with these statements (table 6.3). At baseline, parents were more likely to indicate a variety of foods were “always” served at breakfast ($p=0.005$), that the breakfasts served were “always” appealing to their children ($p=0.047$), and they “always” felt good about their children consuming the meal compared to the conclusion survey ($p=0.047$). At baseline, more parents indicated that their child had increased the number of times he/she ate school breakfast compared to the conclusion survey ($p<0.001$). At the conclusion survey, parents were asked how often their child consumed school breakfast each week, and most parents (53.1%) stated their child consumed school breakfast four or five times per week. Parents were

also asked if their child regularly consumed breakfast (at school or at home), and most parents (94.3%) indicated that their child regularly consumed the meal.

Parent perceptions were also compared by type of school (parents of elementary school children and parents of secondary school children). Responses at baseline and conclusion were received from 698 parents of elementary school students and 205 parents of secondary students. Overall, elementary parent perceptions were not significantly different over time than secondary parent perceptions (table 6.4). However, parents of secondary children were less likely to indicate that: “The school breakfasts are the right size for my child” ($p<0.001$), “The breakfasts served are appealing to my child” ($p<0.001$), “I believe the cafeteria follows food safety and sanitation regulations” ($p=0.007$), and “My child has increased the times he/she eats breakfast after free breakfast was started” ($p=0.008$) compared to elementary school parents (table 6.5).

Perceptions of the parents of elementary children by the location of breakfast in the school (traditional breakfast in the cafeteria or BIC) were also measured. Parents of children attending schools where BIC was provided had a greater decrease in their perceptions of the program from baseline to conclusion than did parents of children consuming traditional breakfast ($p=0.003$) (table 6.6). Parents of children eating traditional breakfast were more likely to respond with “always” or “sometimes” compared to parents of children participating in BIC for the following questions: “A variety of foods are served at breakfast” ($p=0.028$), “The breakfasts served are appealing to my child” ($p=0.047$), and “I believe the cafeteria follows food safety and sanitation regulations” ($p=0.044$) (table 6.7). BIC parents, however, did indicate that their children increased breakfast participation after the implementation of free breakfast more than traditional breakfast parents ($p=0.049$).

Differences in perceptions between parents of children attending an intervention school were also compared to perceptions of parents of children attending control schools. In general, no differences were seen between perceptions (table 6.8) of parents with children attending intervention or control schools at baseline or conclusion. However, parents with children in the

intervention schools were significantly more likely to agree with the statement “Free breakfast served has improved my feelings about the program” ($p=0.046$) (table 6.9).

Child perceptions: A total of 395 children attending Stillwater Public Schools participated in the baseline survey and 402 children participated in the perceptions survey at the end of the study. Characteristics of children participating in the surveys are listed in table 6.10, with no differences between baseline and conclusion in schools attended by participating children, grade category, or breakfast location. Overall, perceptions of school breakfast were significantly different between baseline and conclusion, with lower perceptions seen at conclusion compared to baseline ($p=0.017$) (table 6.11). Children were more likely to answer “always” or “sometimes” at the beginning of the study than at the end of the study survey for the following questions: “I like eating School Breakfast” ($p=0.013$), and “The foods served at breakfast are fresh” ($p=0.004$), although more children did indicate that they were “always” or “sometimes” hungry in the mornings at the end of the study ($p<0.001$) (table 6.12). At the beginning and end of the study, most children selected “always” or “sometimes” for the following questions: “The foods served at breakfast taste good,” “The size of the meals are not too large or too small,” “I have enough time to eat breakfast after I get to school,” “My friends eat school breakfast,” and “Eating breakfast helps me pay attention at school.” Most children (89%) said they usually ate breakfast either at school or at home (table 6.12).

Child perceptions of the SBP were compared by grade level (elementary versus secondary school). Responses were received from 468 elementary students and 273 secondary children (table 6.10). Perceptions of SBP decreased over the study period for both elementary and secondary students, but there was no interaction between grade category and time (table 6.14). For most questions asked in the survey, secondary aged children were more likely to answer “never” compared to elementary aged children for the following questions: “I like eating School Breakfast” ($p<0.001$), “The foods served at breakfast taste good” ($p<0.001$), “The foods served at

breakfast are fresh” ($p<0.001$), “The size of the meals are not too large or too small” ($p<0.001$), “I have enough time to eat breakfast after I get to school” ($p=0.026$), “My friends eat School Breakfast” ($p<0.001$), and “Eating breakfast helps me pay attention at school” ($p<0.001$). However, most elementary and secondary students indicated they were “always” or “sometimes” hungry for breakfast (table 6.13).

Perceptions of elementary children by the location of breakfast in the school (traditional breakfast in the cafeteria or BIC) were also measured. There were 233 elementary children consuming traditional breakfast and 250 children attending a school serving BIC who participated in the surveys (table 6.15). Overall, there were no differences in perceptions over time between children consuming BIC or traditional breakfast in the cafeteria. Elementary children consuming traditional breakfast were more likely to answer “always” or “sometimes” compared to children consuming BIC for the following questions: “The foods served at breakfast taste good” ($p=0.015$) and “Eating breakfast helps me pay attention at school” ($p=0.043$) (table 16). For the following questions however, children consuming BIC were more likely to respond with “always” or “sometimes” compared to traditional breakfast children: “I have enough time to eat breakfast after I get to school” ($p=0.001$) and “My friends eat School Breakfast” ($p<0.001$).

Differences in perceptions between children attending an intervention school were also compared to perceptions of children attending other schools. There were 331 children attending an intervention school who participated, and 488 children attending control schools who participated (table 6.17). Overall, there were no differences in perceptions over time between children attending an intervention school or children attending a control school. For most questions, no differences were seen in perceptions of students attending an intervention school or a control school, although children attending a control school were more likely to answer “always” or “sometimes” for the question “Eating breakfast helps me pay attention at school” ($p<0.001$) compared to intervention schools (table 6.18).

Parent and child qualitative results: In addition to the quantitative questions asked in the baseline and conclusion surveys, parents and children were provided space for additional comments at the end of the conclusion survey. Out of 495 parent responses, 196 included comments, and out of 402 child survey participants, 116 included responses.

Major themes that were evident in the parent responses included comments about variety, health awareness, hot foods, portion sizes, dislike of served foods, differences in breakfasts served between the schools in the district, lack of time, dislike of SBP, opinions about BIC, and overall positive comments about the program. Themes that were evident in the child responses were very similar to those seen in the parent responses and included variety, health awareness, hot foods, taste, dislike of foods served, portion sizes, dislike of the program, comments about BIC, and positive comments.

The perceived importance of variety was apparent in many of the comments from parents of both elementary and secondary aged children; nine secondary parents and 42 elementary parents indicated the importance of including a variety of foods to the children. One elementary-school parent said, “The free breakfast is great, but more of a variety [sic] is better. Not the same old thing everyday [sic] per week.” Fifteen elementary responses about variety were provided, and one child stated that “I don't really like to have cereal 3 times a week. I get tired of it but I do like the bagel and the muffin. Cereal is okay sometimes but not always. Maybe you could have poptarts!”

Health awareness was another major theme apparent in the comments; nine secondary parents and 38 elementary parents included this theme in their comments. Several parents discussed the perceived importance of fruit, and one parent said, “Healthier options. The few times I've been in with my son to have breakfast, there hasn't been any fruit. Also, almost every child that I've seen that goes through without a parent has grabbed chocolate milk and a juice box. All they are doing is sugaring the kids up with that stuff. Maybe limit it to one or the other.” Several other parents wrote about “real” or “unprocessed” foods, and one elementary parent said,

“The food seems terribly unhealthy and artifitial [sic] to me and my child. How about real food?” Another parent from the same school said, “I would like to see breakfasts lower in sugar and less processed foods.” Health awareness was an issue indicated in eight elementary children responses and one secondary child response. Although this theme was evident, it was clear that there were some differences in opinion about what constituted “healthy.” One secondary child stated, “Whole milk would be much better. Studies prove it's good for you, sticks with you and even promotes weight loss. Skim tastes like it's spoiled and 1% like water and is not filling at all. We are still growing!”

The importance of offering hot foods was indicated by 16 elementary parents and no secondary parents. One parent said, “It would be nice to have good hot breakfast and not cereal all the time or hot breakfast that the kids don't like,” and another parent from another school said, “Breakfast is not served until :30 [sic], and often by the time I have dropped off my child at school whilewaiting [sic] in the drop off line 7:45ish, the only option available to her is cereal. Our family appreciates the free breakfast program, as it has helped us, but often wish there were enough hot breakfasts to go around.” Hot foods were indicated as a preference in two secondary children and seven elementary children.

Portion size was an identified issue for eight secondary parents and six elementary parents. One parent indicated that although portions were the appropriate size for her child in pre-k, her child in third grade was often still hungry after breakfast. Another elementary parent said, “More variety, more portions, my children complain every day that they don't get enough to eat, for breakfast or lunch. Since the changes the amount and variety of food has got very bad, it is very disappointing,” and a parent of a secondary child stated, “Let the kids have more if they're still hungry; the portions are too small for the boys, at least mine. He's still growing which I imagine most are at his age.” Portion sizes were mentioned in five secondary children responses and 10 elementary responses. One elementary student said, “Serving sizes aren't enough for me. I leave the cafeteria hungry.”

A dislike of served foods was indicated by five parents of secondary children and 12 parents of elementary children. One secondary parent stated that foods were “bland and not fresh,” and another parent stated, “My student is a very good milk drinker and my student has quit drinking the milk at school because it tastes bad! Please consider changing the milk vendor.” An elementary parent indicated that although his/her children enjoyed the foods served as a part of School Breakfast in previous years, for the 2013-2014 year they did not. A dislike of served foods was apparent in nine secondary child response and eight elementary responses. One student said that the food “was pretty bad” and another stated that it “tastes bland and is gross.”

Parents of nine elementary children indicated perceived differences in SBP in their children’s schools compared to other schools in the district. These comments were made from parents of children attending three elementary schools in the district. One parent questioned, “was just curious at why all the elementary schools do not eat the same type of meal hot or cold. i am sure kindergarteners would love to eat a hot breakfast meal too. how does the school board decide on which schools get hot breakfast?” Another parent said, “I've noticed that other schools are given 2 options 5 days a week, Skyline kids don't get this option. I think there needs to be a [sic] option for breakfast choices across all the schools. I've had to start feeding breakfast beforehand because 1 tiny muffin doesn't last like a bowl of oatmeal and strip of bacon will.”

Some comments indicated overall dislike about the universal free breakfasts— with three secondary parents and seven elementary parents voicing their concerns. One parent said that the free breakfasts should be eliminated with money used on the program used elsewhere, and another stated “Save money and stop feeding every kid in Stillwater or stop complaining about reduced school funding.” Another parent said, “Stop wasting tax dollars on this program!! I've seen how much food is wasted and it is absolutely appalling!!!” A dislike of the program was seen in three comments of secondary children and one elementary children; one junior high student indicated a stigma associated with the program, “Eggs aren't real and don't taste good. The lunch ladies are not nice. The kids who eat breakfast do not have stable home lives.”

Lack of time was an issue brought up by three secondary parents and six elementary parents, and one parent stated that because the elementary school children began the school day earlier in 2013-2014, it had prevented his/her child from having enough time to participate in the program. Although BIC is a program designed to help address lack of time for consuming breakfast in the mornings, of the seven BIC comments made by elementary school parents, none of them were positive. A parent of one child said, "Please consider serving breakfast in the cafeteria to help provide daily choices. It is unfair to provide breakfast to the entire school district w/o giving each child the choices," and another parent from the same school simply said to "move it back to the cafeteria." A parent at a different elementary school stated that the children complain about BIC, and a different parent at the same school stated that "If there wasn't BIC then I think the choices would be greater and more students would eat." Lack of time was an issue in four secondary children and six elementary children; and one high school student stated that he/she is "unable to eat breakfast at school because of morning activities such as band" and an elementary school student indicated that since school started earlier in the 2013-2014 school year there was not time to eat breakfast at school and so she ate breakfast on the way to school (in the car) instead. Three elementary students perceived barriers with BIC, and one child stated, "I would rather eat in the lunchroom because it gets really loud in my room and I want to be able to sit and eat with my friends instead of my regular table."

Although the majority of comments made by parents were critical, five secondary parents and six parents of elementary children did provide positive statements. One parent said she was glad for the program, and another secondary parent said, "Thank you for providing a good breakfast she will eat, that she normally doesn't [sic] take the time at home or doesn't [sic] like what we have at home. She also enjoys the social aspect of the relaxing time with friends before the day begins at school. I think the free breakfasts help curb aggression [sic] and hurt, in the kids who do not have a good home life. I would think this levels the playing field for all of the kids, because ultimately all of our children are interconnected. What hurts one, will cause hurt in

another-directly or indirectly.” Positive comments were provided by two elementary children and two secondary children; and one middle school student stated, “it is really good.”

Discussion

Results of the child and parent perceptions surveys indicated that overall, perceptions of school breakfast were significantly higher at the beginning than at the end of the school year. Children were more likely to indicate they enjoyed consuming school breakfast and parents reported feeling good about their child eating breakfast at school more often in the baseline survey compared to the conclusion survey. Bailey-Davis et al. (2013) found that parents and their children preferred children to eat at home because of the social stigma associated with eating breakfast at school.

In the current study, almost all children in the baseline study and in the conclusion study indicated that their friends “always” or “sometimes” consumed school breakfast, but another study found that children reported their peers ridiculing them for participating in school breakfast (Bailey-Davis et al., 2013). Bailey-Davis et al. (2013) found that parents and their children considered breakfast an important factor in learning, being able to focus, having energy, and being alert, and our study found similar results.

Overall, parent perceptions of school breakfast were significantly lower at conclusion compared to baseline. Although the numbers were not high, a greater number of parents at conclusion compared to baseline believed a variety of foods was never served at breakfast, the foods served to their children were never appealing, and foods served were not fresh. Another study found similar parental concerns about school breakfast focused mainly on the quality, palatability, and lack of variety of served foods and found that parents believed prepared foods were a better choice for children compared to processed foods (Greves et al., 2007).

Research has shown that breakfast skipping rates in the US generally range from 10-30% based on age group, gender, race and ethnicity (Rampersaud, Pereira, Girard, Adams & Metzl,

2005), and in the current study, 89% of children indicated that they usually consumed breakfast either at school or at home. In the conclusion survey, children were more likely to indicate they were hungry for breakfast compared to the baseline survey. In one study, 28% of children who skipped breakfast did so due to a lack of hunger in the mornings (Sweeney & Horishita, 2005). Another study found that children said if they were hungry and had the time to eat, they would participate in the SBP (Olsta, 2013). Although research has shown that a lack of time is a major barrier for breakfast participation (Shaw, 1998), most children in this study believed they “always” or “sometimes” had enough time to eat breakfast once they got to school. The implementation of BIC in several of the schools in the district may have contributed to the high number of children indicating they had enough time to consume school breakfast.

Research has shown that children are more likely to skip breakfast as they get older (Rampersaud et al., 2005), and results of the Youth Risk Behavior Surveillance System data from 2011 and 2013 found that about 62% of high school students reported breakfast skipping at least one day per week (CDC, 2014). These results may help explain the findings of our study indicating significantly lower perceptions of school breakfast for children attending secondary schools compared to those children attending an elementary school. However, results of one study found that participation in the SBP was negatively associated with children’s breakfast consumption either at school or at home (Waehrer, 2008). Stigma associated with the program may be an issue, and in a focus group measuring middle-school children’s perceptions of school breakfast, one student stated “I think some people don’t eat school meals because they get teased for it, like they would call them a name or something” (Bailey-Davis et al., p. 253, 2013).

Research has shown that BIC has a positive effect on school outcomes including increased breakfast participation and greater school attendance rates (Anzman-Frasca et al., 2015). In one study, 77% of teachers indicated that BIC had a positive effect on their students’ learning, and 85% noticed an increase in their students’ moods after implementation (Salomon, 2009). BIC appears to have positive impacts on school outcomes, and in one study, researchers

found that in a sample of middle school students receiving BIC, 64% were “very satisfied” with eating in their classrooms (Nanney et al., 2013). In our study, overall there were no differences in perceptions between elementary children who attended a school serving BIC or traditional breakfasts in the cafeteria. Although there were no differences for children, perceptions of school breakfast were overall higher for parents of children who attended elementary schools that served traditional breakfast compared to BIC. In those schools where BIC was served, some parents perceived that their children were not being provided an equivalent breakfast to children who attended a school serving traditional breakfast.

In the current study, there were no significant differences in perceptions of children or their parents between intervention schools or control schools over time, although perceptions did decrease over time for all groups. Another study that increased accessibility and visibility of the program by adding grab-n-go breakfast stations and additional convenient serving lines, and allowing eating of breakfast outside of the school cafeteria found positive results from the promotion: a greater awareness of the program was reported by students, faculty, and staff and increased participation was seen (Haesly, Nanney, Coulter, Fong & Pratt, 2014).

Limitations

Because this study used convenience samples to recruit participants, a true representation of the various perceptions of SBP in the district may not have been achieved since those willing to participate may have had stronger feelings (either positive or negative) than those individuals who chose not to participate. In addition, because it was a convenience sample, participants did not necessarily participate in both the baseline and the conclusion surveys. Another limitation was that children were recruited for participation in the surveys through their parents’ email, and parents were asked to help their child complete the survey, and to save time, parents may have completed the child survey themselves without asking their children the questions.

Summary/Conclusions

Overall, perceptions of school breakfast decreased over time in our study for both children and their parents. Although perceptions of parents with children in secondary schools were not significantly different from parents of children in elementary schools, perceptions of parents of secondary school children were lower for a number of questions. A greater decrease in perceptions was seen in parents of children consuming BIC compared to traditional breakfast in the cafeteria, but with children, there was no interaction between time and breakfast location, however, children consuming a breakfast at a school serving traditional breakfast did have higher perceptions of the program for some questions. Overall, the promotion had little effect on perceptions of school breakfast, but parents who had a child attending a school receiving a promotion were more likely to feel that universal free breakfast had improved their feelings about the program, but for children, those students attending a control school were more likely to indicate they were hungry for breakfast in the morning compared to students at an intervention school. Parents and children indicated a desire for more variety in foods served, an increase in hot foods served, and a desire for an increase in healthy foods offered.

Implications

In our study, perceptions of breakfast were significantly lower at the conclusion surveys compared to the baseline surveys. This suggests the importance of promoting SBP throughout the year, and since many students and their parents indicated a lack of variety in food items served, providing a wider array of food choices may help improve perceptions of the program. In our study, secondary children and their parents had lower perceptions of school breakfast than did younger children, and so focusing breakfast promotions specifically for this audience may increase perceptions and thus increase breakfast consumption. Our results indicate that breakfast perceptions were lower in the parents of children who ate breakfast in the classroom compared to

traditional breakfast, and one reason was that parents perceived their children were receiving less breakfast options in the cafeteria. Because of BIC's many benefits, it is important for districts to promote the concept if they participate in it, and to provide education of the benefits as well as the similarities of BIC to traditional breakfast; doing so may help alleviate concerns about BIC for children and their parents. In addition, because parents of secondary children were less likely to believe their children were receiving the "right" amount of food compared to elementary parents, and both children and parents indicated they would like to see an increase in the number of healthy food items served, educating families about the Healthy Hunger Free Kids Act of 2010 (USDA, 2014B) and the required nutrient regulations may allow participants and their families to see the school breakfasts are providing an adequate, nutrient-dense meal for the child's age.

Table 6.1: Characteristics of the schools attended by the children of parents who participated in the perception surveys

Characteristic	Baseline N (%)	Conclusion N (%)	P-value
School			
High School	13 (2.6%)	24 (4.8%)	0.254
Lincoln Academy	2 (0.4%)	1 (0.2%)	
Junior High	40 (8.1%)	41 (8.3%)	
Middle School	66 (13.4%)	43 (8.7%)	
Highland Park	57 (11.6%)	67 (13.5%)	
Richmond	66 (13.4%)	65 (13.1%)	
Sangre Ridge	80 (16.2%)	77 (15.6%)	
Skyline	65 (13.2%)	66 (13.3%)	
Westwood	44 (8.9%)	57 (11.5%)	
Will Rogers	60 (12.2%)	54 (10.9%)	
Grade Category			0.152
Elementary	372 (75.5%)	326 (79.5%)	
Secondary	121 (24.5%)	84 (20.5%)	
Breakfast Delivery Method for Elementary Children			0.942
Breakfast in the classroom	182 (48.9%)	161 (49.4%)	
Traditional breakfast	190 (51.1%)	165 (50.6%)	

Table 6.2: Differences in parent perceptions scores by time for baseline versus conclusion

Time	N	Mean \pm SD	P-value
Baseline	460	9.7 \pm 2.9	<0.001
Conclusion	368	7.8 \pm 2.6	

Table 6.3: Parent perceptions by time

Question	Response	Baseline	Conclusion	P-value
		N (%)	N (%)	
A variety of foods are served at breakfast	Always	164 (33.8%)	118 (25.9%)	0.005
	Sometimes	280 (57.7%)	277 (60.7%)	
	Never	41 (8.5%)	61 (13.4%)	
The school breakfasts are the right size for my child	Always	203 (41.8%)	155 (34.1%)	0.053
	Sometimes	240 (49.4%)	251 (55.3%)	
	Never	43 (8.8%)	48 (10.6%)	
The breakfasts served are appealing to my child	Always	90 (18.6%)	72 (15.7%)	0.047
	Sometimes	356 (73.6%)	331 (72.0%)	
	Never	38 (7.9%)	57 (12.4%)	
I feel good about my child eating school breakfast	Always	238 (48.8%)	200 (42.6%)	0.047
	Sometimes	202 (41.4%)	203 (43.2%)	
	Never	48 (9.8%)	67 (14.3%)	
I believe the cafeteria follows food safety and sanitation regulations	Always	407 (83.9%)	373 (79.0%)	0.103
	Sometimes	73 (15.1%)	89 (18.9%)	
	Never	5 (1.0%)	10 (2.1%)	

Table 6.3 (continued)

Question	Response	Baseline	Conclusion	P-value
		N (%)	N (%)	
Free breakfast served has improved my feelings about the program	Yes	408 (83.1%)	336 (69.7%)	<0.001
	No	83 (16.9%)	146 (30.3%)	
My child has increased the times he/she eats breakfast after free breakfast was started	Yes	389 (79.7%)	289 (60.1%)	<0.001
	No	99 (20.3)	192 (39.9%)	
On average, how many days per week does your child eat breakfast at school?	0	N/A	110 (22.2%)	N/A
	1		20 (4.0%)	
	2		48 (9.7%)	
	3		53 (10.7%)	
	4		46 (9.3%)	
	5		217 (43.8%)	
Does your child regularly eat breakfast (either at school or at home?)	Yes	N/A	464 (94.3%)	N/A
	No		28 (5.7%)	

Table 6.4: Differences in parent perceptions scores by time for elementary versus secondary schools

Time	Elementary		Secondary		P-value
	N	Mean \pm SD	N	Mean \pm SD	
Baseline	346	10.0 \pm 2.8	114	8.7 \pm 3.2	0.064
Conclusion	298	7.8 \pm 2.5	70	7.3 \pm 2.9	

Table 6.5: Parent perceptions by grade category

Question	Response	Elementary	Secondary	P-value
		N (%)	N (%)	
A variety of foods are served at breakfast	Always	199 (29.5%)	50 (26.2%)	0.454
	Sometimes	405 (60.1%)	116 (60.7%)	
	Never	70 (10.4%)	25 (13.1%)	
The school breakfasts are the right size for my child	Always	267 (39.6%)	51 (26.6%)	<0.001
	Sometimes	360 (53.4%)	107 (55.7%)	
	Never	47 (7.0%)	34 (17.7%)	
The breakfasts served are appealing to my child	Always	112 (16.6%)	33 (17.1%)	<0.001
	Sometimes	508 (75.5%)	123 (63.7%)	
	Never	53 (7.9%)	37 (19.2%)	
I feel good about my child eating school breakfast	Always	313 (45.8%)	81 (41.5%)	0.569
	Sometimes	289 (42.3%)	89 (45.6%)	
	Never	81 (11.9%)	25 (12.8%)	
I believe the cafeteria follows food safety and sanitation regulations	Always	571 (83.7%)	145 (74.0%)	0.007
	Sometimes	100 (14.7%)	47 (24.0%)	
	Never	11 (1.6%)	4 (2.0%)	
Free breakfast served has improved my feelings about the program	Yes	537 (77.7%)	148 (73.6%)	0.255
	No	154 (22.3%)	53 (26.4%)	
My child has increased the times he/she eats breakfast after free breakfast was started	Yes	496 (72.4%)	129 (63.2%)	0.014
	No	189 (27.6%)	75 (36.8%)	

Table 6.6: Differences in parent perceptions scores by time for traditional breakfast versus breakfast in the classroom

Time	Breakfast in the classroom		Traditional breakfast		P-value
	N	Mean \pm SD	N	Mean \pm SD	
Baseline	176	10.3 \pm 2.8	170	9.7 \pm 2.7	0.003
Conclusion	178	7.6 \pm 2.7	171	8.3 \pm 2.3	

Table 6.7: Perceptions of the parents of elementary children by the location of breakfast in the school

Question	Response	Breakfast in Classroom	Traditional breakfast	P-value
		N (%)	N (%)	
A variety of foods are served at breakfast	Always	97 (28.4%)	102 (30.6%)	0.028
	Sometimes	198 (58.1%)	207 (62.2%)	
	Never	46 (13.5%)	24 (7.2%)	
The school breakfasts are the right size for my child	Always	135 (39.6%)	132 (39.6%)	0.426
	Sometimes	178 (52.2%)	182 (54.7%)	
	Never	28 (8.2%)	19 (5.7%)	
The breakfasts served are appealing to my child	Always	46 (13.6%)	66 (19.7%)	0.047
	Sometimes	260 (76.9%)	248 (74.0%)	
	Never	32 (9.5%)	21 (6.3%)	
I feel good about my child eating school breakfast	Always	171 (49.8%)	142 (41.8%)	0.105
	Sometimes	134 (39.1%)	155 (45.6%)	
	Never	38 (11.1%)	43 (12.6%)	
I believe the cafeteria follows food safety and sanitation regulations	Always	271 (80.2%)	300 (87.2%)	0.044
	Sometimes	60 (17.8%)	40 (11.6%)	
	Never	7 (2.1%)	4 (1.2%)	
Free breakfast served has improved my feelings about the program	Yes	262 (76.6%)	275 (78.8%)	0.523
	No	80 (23.4%)	74 (21.2%)	
My child has increased the times he/she eats breakfast after free breakfast was started	Yes	258 (75.9%)	238 (69.0%)	0.049
	No	82 (24.1%)	107 (31.0%)	

Table 6.8: Differences in parent perceptions scores by time for intervention versus control schools

Time	Intervention		Control		P-value
	N	Mean \pm SD	N	Mean \pm SD	
Baseline	166	9.7 \pm 2.8	296	9.7 \pm 3.0	0.176
Conclusion	148	8.2 \pm 2.4	284	7.6 \pm 2.7	

Table 6.9: Perceptions of parents whose children attended an intervention or control school

Question	Response	Intervention	Control	P-value
		N (%)	N (%)	
A variety of foods are served at breakfast	Always	105 (32.2%)	177 (28.8%)	0.531
	Sometimes	188 (57.7%)	369 (60.0%)	
	Never	33 (10.1%)	69 (11.2%)	
The school breakfasts are the right size for my child	Always	129 (39.7%)	229 (37.2%)	0.409
	Sometimes	170 (52.3%)	321 (52.2%)	
	Never	26 (8.0%)	65 (10.6%)	
The breakfasts served are appealing to my child	Always	61 (18.8%)	101 (16.3%)	0.240
	Sometimes	238 (73.2%)	449 (72.5%)	
	Never	26 (8.0%)	69 (11.1%)	
I feel good about my child eating school breakfast	Always	157 (47.7%)	281 (44.7%)	0.531
	Sometimes	137 (41.6%)	268 (42.6%)	
	Never	35 (10.6%)	80 (12.7%)	
I believe the cafeteria follows food safety and sanitation regulations	Always	270 (82.1%)	510 (81.2%)	0.497
	Sometimes	56 (17.0%)	106 (16.9%)	
	Never	3 (0.9%)	12 (1.9%)	
Free breakfast served has improved my feelings about the program	Yes	271 (80.2%)	473 (74.5%)	0.027
	No	67 (19.8%)	162 (25.5%)	
My child has increased the times he/she eats breakfast after free breakfast was started	Yes	239 (71.1%)	439 (69.4%)	0.606
	No	97 (28.9%)	194 (30.6%)	

Table 6.10: Characteristics of the schools attended by the children who participated in the perception surveys

Characteristic	Baseline	Conclusion	P-value
	N (%)	N (%)	
School			0.965
High School	9 (2.3%)	14 (3.5%)	
Lincoln Academy	2 (0.5%)	2 (0.5%)	
Junior High	27 (6.8%)	26 (6.5%)	
Middle School	109 (27.6%)	101 (25.1%)	
Highland Park	37 (9.4%)	45 (11.2%)	
Richmond	44 (11.1%)	42 (10.2%)	
Sangre Ridge	47 (11.9%)	52 (12.9%)	
Skyline	46 (11.6%)	43 (10.7%)	
Westwood	29 (7.3%)	34 (8.5%)	
Will Rogers	45 (11.4%)	43 (10.7%)	
Grade Category			0.879
Elementary	248 (62.8%)	220 (63.6%)	
Secondary	147 (37.2%)	126 (36.4%)	
Delivery Method for Elementary Children			0.859
Breakfast in the classroom	128 (51.6%)	131 (50.6%)	
Traditional breakfast	120 (48.4%)	128 (49.4%)	

Table 6.11: Differences in average child perceptions scores for baseline versus conclusion (out of a possible 0-14 scale)

Time	N	Mean \pm SD	P-value
Baseline	379	8.9 \pm 2.8	0.017
Conclusion	368	8.4 \pm 2.7	

Table 6.12: Child perceptions by time

Question	Response	Baseline	Conclusion	P-value
		N (%)	N (%)	
I like eating school breakfast	Always	125 (31.4%)	86 (22.2%)	0.013
	Sometimes	218 (54.8%)	237 (61.1%)	
	Never	55 (13.8%)	65 (16.8%)	
The foods served at breakfast taste good	Always	90 (23.0%)	69 (18.1%)	0.206
	Sometimes	270 (68.9%)	274 (71.9%)	
	Never	32 (8.2%)	38 (10.0%)	
The foods served at breakfast are fresh	Always	179 (45.8%)	131 (34.7%)	0.004
	Sometimes	178 (45.5%)	197 (52.3%)	
	Never	34 (8.7%)	49 (13.0%)	
The size of the meals are not too large or too small	Always	127 (32.5%)	112 (29.9%)	0.089
	Sometimes	217 (55.5%)	196 (52.4%)	
	Never	47 (12.0%)	66 (17.6%)	

Table 6.12 (continued)

Question	Response	Baseline	Conclusion	P-value
		N (%)	N (%)	
I have enough time to eat breakfast after I get to school	Always	165 (41.9%)	162 (42.0%)	0.478
	Sometimes	176 (44.7%)	161 (41.7%)	
	Never	53 (13.5%)	63 (16.3%)	
My friends eat school breakfast	Always	132 (33.2%)	107 (27.2%)	0.147
	Sometimes	235 (59.2%)	259 (65.7%)	
	Never	30 (7.6%)	28 (7.1%)	
Eating breakfast helps me pay attention at school	Always	183 (46.4%)	187 (47.2%)	0.901
	Sometimes	158 (40.1%)	160 (40.4%)	
	Never	53 (13.5%)	49 (12.4%)	
I am hungry for breakfast in the mornings	Always	54 (13.7%)	235 (59.2%)	< 0.001
	Sometimes	199 (50.5%)	135 (34.0%)	
	Never	141 (35.8%)	27 (6.8%)	
Do you usually eat breakfast (either at school or at home?)	Yes	N/A	357 (89.0%)	N/A
	No	N/A	44 (11.0%)	

Table 6.13: Child perceptions by grade category

Question	Response	Elementary	Secondary	P-value
		N (%)	N (%)	
I like eating school breakfast	Always	135 (29.3%)	57 (21.4%)	<0.001
	Sometimes	281 (61.0%)	143 (53.8%)	
	Never	45 (9.8%)	66 (24.8%)	
The foods served at breakfast taste good	Always	100 (21.9%)	41 (15.8%)	<0.001
	Sometimes	335 (73.5%)	175 (67.3%)	
	Never	21 (4.6%)	44 (16.9%)	
The foods served at breakfast are fresh	Always	221 (48.7%)	63 (24.5%)	<0.001
	Sometimes	205 (45.2%)	147 (57.2%)	
	Never	28 (6.2 %)	47 (18.3%)	
The size of the meals are not too large or too small	Always	153 (33.8%)	61 (23.9%)	<0.001
	Sometimes	259 (57.2%)	132 (51.8%)	
	Never	41 (9.1%)	62 (24.3%)	

Table 6.13 (continued)

Question	Response	Elementary	Secondary	P-value
		N (%)	N (%)	
I have enough time to eat breakfast after I get to school	Always	204 (44.4%)	99 (37.5%)	0.026
	Sometimes	198 (43.1%)	114 (43.2%)	
	Never	57 (12.4%)	51 (19.3%)	
My friends eat school breakfast	Always	153 (32.8%)	65 (24.3%)	<0.001
	Sometimes	293 (62.9%)	168 (62.9%)	
	Never	20 (4.3%)	34 (12.7%)	
Eating breakfast helps me pay attention at school	Always	262 (56.5%)	84 (31.3%)	<0.001
	Sometimes	179 (38.6%)	115 (42.9%)	
	Never	23 (5.0%)	69 (25.7%)	
I am hungry for breakfast in the mornings	Always	166 (35.9%)	84 (31.1%)	0.232
	Sometimes	190 (41.0%)	128 (47.4%)	
	Never	107 (23.1%)	58 (21.5%)	

Table 6.14: Differences in average child perceptions scores for elementary versus secondary schools (out of a possible 0-14 scale)

Time	Elementary		Secondary		P-value
	N	Mean \pm SD	N	Mean \pm SD	
Baseline	238	9.4 \pm 2.5	137	8.9 \pm 2.3	0.205
Conclusion	208	7.9 \pm 2.9	107	7.0 \pm 2.8	

Table 6.15: Differences in perceptions scores of elementary children for traditional breakfast versus breakfast in the classroom (out of a possible 0-14 scale)

Time	Breakfast in the classroom		Traditional breakfast		P-value
	N	Mean \pm SD	N	Mean \pm SD	
Baseline	125	9.7 \pm 2.5	113	9.1 \pm 2.6	0.116
Conclusion	127	9.0 \pm 2.5	120	9.1 \pm 2.4	

Table 6.16: Perceptions of the elementary children by the location of breakfast in the school category

Question	Response	Breakfast in the classroom	Traditional breakfast	P-value
		N (%)	N (%)	
I like eating school breakfast	Always	80 (31.0%)	71 (29.3%)	0.424
	Sometimes	158 (61.2%)	144 (59.5%)	
	Never	20 (7.8%)	27 (11.2%)	
The foods served at breakfast taste good	Always	8 (3.1%)	66 (27.7%)	0.015
	Sometimes	200 (77.8%)	158 (66.4%)	
	Never	49 (19.1%)	14 (5.9%)	
The foods served at breakfast are fresh	Always	119 (46.7%)	122 (51.3%)	0.530
	Sometimes	120 (47.1%)	100 (42.0%)	
	Never	16 (6.3 %)	16 (6.7%)	
The size of the meals are not too large or too small	Always	84 (32.9%)	90 (38.0%)	0.460
	Sometimes	146 (57.2%)	128 (54.0 %)	
	Never	25 (9.8%)	19 (8.0%)	
I have enough time to eat breakfast after I get to school	Always	134 (51.9%)	87 (36.2%)	0.001
	Sometimes	100 (38.8%)	117 (48.8%)	
	Never	24 (9.3%)	36 (15.0%)	

Table 6.16 (continued)

Question	Response	Breakfast in the classroom	Traditional	P-value
		N (%)	N (%)	
My friends eat school breakfast	Always	118 (45.7%)	54 (21.9%)	<0.001
	Sometimes	138 (53.5%)	175 (70.9%)	
	Never	2 (0.8%)	18 (7.3%)	
Eating breakfast helps me pay attention at school	Always	133 (51.4%)	148 (60.7%)	0.043
	Sometimes	113 (43.6%)	80 (32.8%)	
	Never	13 (5.0%)	16 (6.6%)	
I am hungry for breakfast in the mornings	Always	96 (37.4%)	100 (40.8%)	0.580
	Sometimes	107 (41.6%)	91 (37.1%)	
	Never	54 (21.0%)	54 (22.0%)	

Table 6.17: Differences in perceptions scores of children by intervention or control school (out of a possible 0-14 scale)

Time	Intervention		Control		P-value
	N	Mean \pm SD	N	Mean \pm SD	
Baseline	173	8.7 \pm 2.9	206	9.0 \pm 2.7	0.286
Conclusion	159	8.0 \pm 2.7	209	8.7 \pm 2.7	

Table 6.18: Differences in child perceptions for intervention versus control schools

Question	Response	Intervention	Control	P-value
		N (%)	N (%)	
I like eating school breakfast	Always	94 (26.7%)	117 (27.0%)	0.242
	Sometimes	196 (55.7%)	259 (59.7%)	
	Never	62 (17.6%)	58 (13.4%)	
The foods served at breakfast taste good	Always	72 (20.7%)	87 (20.4%)	0.791
	Sometimes	241 (69.5%)	303 (71.1%)	
	Never	34 (9.8%)	36 (8.5%)	
The foods served at breakfast are fresh	Always	133 (38.6 %)	177 (41.8%)	0.648
	Sometimes	174 (50.4%)	201 (47.5%)	
	Never	38 (11.0%)	45 (10.6%)	
The size of the meals are not too large or too small	Always	101 (29.4%)	138 (32.8%)	0.209
	Sometimes	184 (53.5%)	229 (54.4 %)	
	Never	59 (17.2%)	54 (12.8%)	

Table 6.18 (continued)

Question	Response	Intervention	Control	P-value
		N (%)	N (%)	
I have enough time to eat breakfast after I get to school	Always	146 (41.8%)	181 (42.0%)	0.684
	Sometimes	147 (42.1%)	190 (44.1%)	
	Never	56 (16.0%)	60 (13.9%)	
My friends eat school breakfast	Always	97 (27.2%)	142 (32.7%)	0.141
	Sometimes	229 (64.1%)	265 (61.1%)	
	Never	31 (8.7%)	27 (6.2%)	
Eating breakfast helps me pay attention at school	Always	142 (39.7%)	228 (52.8%)	<0.001
	Sometimes	147 (41.1%)	171 (39.6%)	
	Never	69 (19.3%)	33 (7.6%)	
I am hungry for breakfast in the mornings	Always	126 (35.2%)	163 (37.6%)	0.739
	Sometimes	156 (43.6%)	178 (41.1%)	
	Never	76 (21.1%)	92 (21.2%)	

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CHAPTER VII

CONCLUSION

The study questions presented in this project were developed to address the issue of low School Breakfast Program perceptions and participation, and possible strategies to improve breakfast consumption in children.

In the study, it was found that universal free breakfast had a large impact on breakfast participation rates. When measuring participation as a percentage of total enrollment at the schools, the implementation of universal free breakfast significantly improved participation overall in the program, and in particular, significantly increased participation was seen in those students eligible for full-price meals. When breakfast participation was measured as a percentage of students eligible for each category, participation was significantly increased in students eligible for full-price meals, and at two data points, for those students eligible for reduced-price meals. Most parents at the beginning and the end of the study agreed that free breakfast improved their feelings about the program and their child had increased breakfast intake, but at the end of the study parents were more likely to disagree with these statements

The study also found that BIC had an impact on breakfast participation rates, consumption of school breakfast, and perceptions of the SBP. For those schools that participated in BIC, when participation was measured as a percentage of total enrollment, participation in SBP was significantly higher for total SBP participants, students eligible for free-meals, students

eligible for reduced-price meals, and students eligible for the combination of free- or reduced-price meals. When breakfast participation was measured as a percentage of students eligible for each category, significantly higher participation rates were seen in all eligibility categories. When breakfast participation was measured as a percentage of total breakfast participants, participation by students attending a school serving BIC was significantly higher for at least one data point for students eligible for free-meals, reduced-price meals, and the combination of free- and reduced-price meals, although participation was significantly higher in schools serving traditional breakfast for students eligible for full-price meals.

For consumption, although selection of specific nutrients was higher in the cafeteria compared to in the classroom, actual nutrient intakes were similar between the locations. However, children consuming BIC had significantly higher intakes of milk and calcium and they consumed a significantly larger portion of their meal than did children consuming breakfast in the cafeteria.

Although BIC had a positive impact on participation in the SBP and consumption of meals, a greater decrease in perceptions of SBP was seen in parents of children attending schools that served BIC compared to traditional breakfast in the cafeteria, but with children, there was no interaction between time and breakfast location. Children who attended a school serving traditional breakfast did have higher perceptions of the program for some questions.

The current study found differences by grade level for perceptions and participation in the SBP and consumption of nutrients. When breakfast participation by elementary and secondary students was compared after the implementation of universal free was calculated as a percentage of total enrollment at the schools, elementary students had significantly higher participation rates in at least one measurement period for total SBP participants, students eligible for reduced-price meals, and students eligible for full-price meals. When breakfast participation was compared as a percentage of students eligible for each category, elementary students were significantly more likely to consume SBP in all categories (including total SBP participation, students eligible for

free-meals, reduced-price meals, the combination of free- and reduced-price meals, and students eligible for full-price meals) than secondary students.

Middle school participants consumed similar amounts of milk to those elementary students consuming BIC, and significantly more milk than elementary children consuming breakfast in the cafeteria. Overall, middle school children consumed significantly higher intakes for kilocalories, carbohydrates, total fat, saturated fat, and fiber.

Overall, perceptions of school breakfast decreased over time in our study for both children and their parents. Although perceptions of parents with children in secondary schools were not significantly different from parents of children in elementary schools, perceptions of parents of secondary school children were lower for a number of questions. For children, although perceptions of SBP decreased over the study period for both elementary and secondary students, there was no interaction between grade category and time. For most questions, secondary student perceptions were lower compared to elementary students.

The purpose of our breakfast promotion was to improve participation in the SBP and perceptions of the SBP, and overall, the promotion had little effect on participation in the program or perceptions of the program. However, parents who had a child attending a school receiving a promotion were more likely to feel that universal free breakfast had improved their feelings about the program, but for children, those students attending a control school were more likely to indicate they were hungry for breakfast in the morning compared to students at an intervention school.

In addition, the promotion appeared to have little effect on nutrient or food intakes in participants, and research has shown that the most effective interventions are those that are high intensity (including a longer intervention period and frequent contact with participants compared to lower intensity interventions) (Hendrie, Brindal, Baird & Gardner, 2013), and so it is important that if an intervention is planned, it should be an adequate duration and intensity and be developed specifically for the targeted group.

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APPENDICES
APPENDIX A

Oklahoma State University Institutional Review Board

Date: Tuesday, August 27, 2013

IRB Application No HE1348

Proposal Title: Evaluation of the Promotion of Free School Breakfast on
Participation Rates, Consumption, and Perceptions of School
Breakfasts in Rural Schools

Reviewed and Expedited
Processed as:

Status Recommended by Reviewer(s): Approved Protocol Expires: 8/26/2014

Principal Investigators:

Lauren Amaya

700 Parkhurst Terrace Edmond, OK 73003

Gail Gates

301 HES

Stillwater, OK 74078

The IRS application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

The final versions of any printed recruitment, consent and assent documents bearing the IRS approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRS approval. Protocol modifications requiring approval may include changes to the title, PI, advisor, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar

APPENDIX A (CONTINUED)

year. This continuation must receive IRS review and approval before the research can continue

1. Report any adverse events to the IRS Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
2. . Notify the IRS office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRS and that the IRS office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRS procedures or need any assistance from the Board, please contact Dawnett Watkins 219 Cordell North (phone: 405-744-5700. dawnett.watkins@okstate.edu).

Sincerely,

A handwritten signature in cursive script that reads "Shelia M. Kennison".

Shelia Kennison, Chair
Institutional Review Board

APPENDIX B

SPS IRB Approval

STILLWATER BOARD OF EDUCATION	GVA-E
RESEARCH STUDY REQUEST STILLWATER PUBLIC SCHOOLS	
<p>I hereby request permission to conduct a research study in the Stillwater Public Schools district during the period <u>August 2013</u> to <u>April 2014</u></p> <p>Evaluation of the promotion of free school breakfast on participation rates, consumption & The topic is <u>perceptions of school breakfast</u></p> <p>Date Submitted <u>7/15/2013</u> Daytime Phone Number <u>405-323-9897</u></p> <p>Reason for Request: <u>Class Requirement</u> <u>Master's Thesis</u> <input checked="" type="checkbox"/> <u>Doctoral Dissertation</u> <u>Other</u></p> <p>If this request is granted, I agree to abide by the Stillwater Board of Education policy and administrative procedures.</p> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 45%;"> <p><u>Lauren Amaya</u> Typed Name of Researcher</p> </div> <div style="width: 45%;"> <p><u>Lauren Amaya</u> Signature of Researcher(s)</p> <p><u>Oklahoma State University</u> Institution of Higher Education</p> <p><u>Department of Nutritional Sciences, College of Human Sciences</u> Department of Nutritional Sciences, College of Human Sciences</p> <p><u>Sponsoring College or Department</u> Sponsoring College or Department</p> <p><u>Gail Gates, PhD, RD</u> Typed Name of Faculty Member</p> <p><u>Gail Gates</u> Signature of Faculty Member</p> </div> </div> <p>Submit approval letter from the IRB (Must have IRB approval to proceed.)</p> <p>ENDORSEMENT:</p> <p>This request was <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Disapproved <u>8/15/13</u> (date)</p> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 45%;"> <p><u>Guy Washington</u> Assistant Superintendent or Designee</p> </div> <div style="width: 45%;"> <p><u>K. Neal</u> <u>8/15/13</u> Supervising District Employee Date</p> </div> </div>	
Adoption Date: August 11, 2009	Revision Date(s):
Page 1 of 3	

APPENDIX C

Survey email for initial perceptions of SBP (intervention)

Original Email:

Hello,

Stillwater Public Schools Child Nutrition Services in cooperation with Oklahoma State University is interested in learning how universal free breakfast impacts opinions about the School Breakfast Program (SBP). You are invited to participate in this research project because you are a parent/guardian of a child enrolled in Stillwater Public Schools.

Your participation in this study is voluntary, and if you choose to participate in this research survey, you may withdraw at any time. If you choose not to participate or if you choose to withdraw, you will not be penalized.

The procedure for this portion of the study involves filling out an online survey that will take approximately 3 minutes. After you fill out the parent survey, you will be asked to fill out a survey with your child so we can gain perceptions of both you and your child so improvements can be made to the School Breakfast Program. Your responses will be confidential and we do not collect identifying information such as your name, email address, or IP address.

Your information will remain confidential. All data is stored in a password protected file, and to help protect your confidentiality, the surveys will not contain information that will personally identify you. The results of this study will be used for scholarly purposes and as a way to improve the School Breakfast Program.

As a part of the research study, you may also wish to follow us on Twitter where benefits of School Breakfast will be shared. The link to our Twitter account is: www.twitter.com/insertname. The same benefits listed on Twitter will also be available to be received in a text message format if you wish (no more than one message per week will be sent). At the end of the survey linked below, you will have the option of entering your cell phone number if you would like to receive weekly text messages about the benefits of breakfast and the School Breakfast Program. If you choose to provide your cell phone number, it will be collected independently of your survey answers, and will not be matched to your responses.

If you have any questions about the research study, please contact OSU doctoral student Lauren Amaya at lauren.tilford@okstate.edu.

Electronic consent:

Clicking on the link below indicates that:

- You have read the above information
- You voluntarily agree to participate

To participate, please click on this link. If you do not wish to participate in the research study, please disregard this email.

Thank you very much for your time and your assistance in this research study!

APPENDIX C (CONTINUED)

Initial survey email for beginning perceptions of SBP (non-intervention):

Original Email:

Hello,

Stillwater Public Schools Child Nutrition Services in cooperation with Oklahoma State University is interested in learning how universal free breakfast impacts opinions about the School Breakfast Program (SBP). You are invited to participate in this research project because you are a parent/guardian of a child enrolled in Stillwater Public Schools.

Your participation in this study is voluntary, and if you choose to participate in this research survey, you may withdraw at any time. If you choose not to participate or if you choose to withdraw, you will not be penalized.

The procedure for this portion of the study involves filling out an online survey that will take approximately 3 minutes. After you fill out the parent survey, you will be asked to fill out a survey with your child so we can gain perceptions of both you and your child so improvements can be made to the School Breakfast Program. Your responses will be confidential and we do not collect identifying information such as your name, email address, or IP address.

Your information will remain confidential. All data is stored in a password protected file, and to help protect your confidentiality, the surveys will not contain information that will personally identify you. The results of this study will be used for scholarly purposes and as a way to improve the School Breakfast Program.

If you have any questions about the research study, please contact OSU doctoral student Lauren Amaya at lauren.tilford@okstate.edu.

Electronic consent:

Clicking on the link below indicates that:

- You have read the above information
- You voluntarily agree to participate

To participate, please click on this link. If you do not wish to participate in the research study, please disregard this email.

Thank you very much for your time and your assistance in this research study!

Lauren Amaya

APPENDIX C (CONTINUED)

Follow-up email for beginning perceptions survey (intervention):

Hello,

This is a follow-up email requesting your assistance in a research project that aims to improve children's nutrition. If you have already participated in the survey, please disregard this email. Stillwater Public Schools Child Nutrition Services in cooperation with Oklahoma State University is interested in learning how universal free breakfast impacts opinions about the School Breakfast Program (SBP). You are invited to participate in this research project because you are a parent/guardian of a child enrolled in Stillwater Public Schools.

Your participation in this study is voluntary, and if you choose to participate in this research survey, you may withdraw at any time. If you choose not to participate or if you choose to withdraw, you will not be penalized.

The procedure for this portion of the study involves filling out an online survey that will take approximately 3 minutes. After you fill out the parent survey, you will be asked to fill out a survey with your child so we can gain perceptions of both you and your child so improvements can be made to the School Breakfast Program. Your responses will be confidential and we do not collect identifying information such as your name, email address, or IP address.

Your information will remain confidential. All data is stored in a password protected file, and to help protect your confidentiality, the surveys will not contain information that will personally identify you. The results of this study will be used for scholarly purposes and as a way to improve the School Breakfast Program.

As a part of the research study, you may also wish to follow us on Twitter where benefits of School Breakfast will be shared. The link to our Twitter account is: www.twitter.com/insertname. The same benefits listed on Twitter will also be available to be received in a text message format if you wish (no more than one message per week will be sent). At the end of the survey linked below, you will have the option of entering your cell phone number if you would like to receive weekly text messages about the benefits of breakfast and the School Breakfast Program. If you choose to provide your cell phone number, it will be collected independently of your survey answers, and will not be matched to your responses.

If you have any questions about the research study, please contact OSU doctoral student Lauren Amaya at lauren.tilford@okstate.edu.

Electronic consent:

Clicking on the link below indicates that:

- You have read the above information
- You voluntarily agree to participate

To participate, please click on this link. If you do not wish to participate in the research study, please disregard this email.

Thank you very much for your time and your assistance in this research study!

Lauren Amaya

APPENDIX C (CONTINUED)

Follow-up survey email for initial perceptions of SBP (non-intervention):

Hello,

This is a follow-up email requesting your assistance in a research project that aims to improve children's nutrition. If you have already participated in the survey, please disregard this email. Stillwater Public Schools Child Nutrition Services in cooperation with Oklahoma State University is interested in learning how universal free breakfast impacts opinions about the School Breakfast Program (SBP). You are invited to participate in this research project because you are a parent/guardian of a child enrolled in Stillwater Public Schools.

Your participation in this study is voluntary, and if you choose to participate in this research survey, you may withdraw at any time. If you choose not to participate or if you choose to withdraw, you will not be penalized.

The procedure for this portion of the study involves filling out an online survey that will take approximately 3 minutes. After you fill out the parent survey, you will be asked to fill out a survey with your child so we can gain perceptions of both you and your child so improvements can be made to the School Breakfast Program. Your responses will be confidential and we do not collect identifying information such as your name, email address, or IP address.

Your information will remain confidential. All data is stored in a password protected file, and to help protect your confidentiality, the surveys will not contain information that will personally identify you. The results of this study will be used for scholarly purposes and as a way to improve the School Breakfast Program.

If you have any questions about the research study, please contact OSU doctoral student Lauren Amaya at lauren.tilford@okstate.edu.

Electronic consent:

Clicking on the link below indicates that:

- You have read the above information
- You voluntarily agree to participate

To participate, please click on this link. If you do not wish to participate in the research study, please disregard this email.

Thank you very much for your time and your assistance in this research study!

Lauren Amaya

APPENDIX C (CONTINUED)

Initial email for final perceptions of School Breakfast Program:

Stillwater parents,

This past school year, Stillwater Public Schools School Nutrition Services in cooperation with Oklahoma State University has investigated how universal free breakfast impacts opinions about the School Breakfast Program (SBP). Last semester, we collected parent/children perceptions of the SBP, and we are following up with a similar survey to measure how opinions may have changed over the course of the school year. You are invited to participate in this research project because you are a parent/guardian of a child enrolled in Stillwater Public Schools.

Your participation in this study is voluntary, and if you choose to participate in this research survey, you may withdraw at any time. If you choose not to participate or if you choose to withdraw, you will not be penalized.

The procedure for this portion of the study involves filling out an online survey that will take approximately 3 minutes. After you fill out the parent survey, you will be asked to fill out a survey with your child so we can gain perceptions of both you and your child so improvements can be made to the School Breakfast Program. Your responses will be confidential and we do not collect identifying information such as your name, email address, or IP address.

Your information will remain confidential. All data is stored in a password protected file, and to help protect your confidentiality, the surveys will not contain information that will personally identify you. The results of this study will be used for scholarly purposes and as a way to improve the School Breakfast Program.

If you have any questions about the research study, please contact OSU doctoral student Lauren Amaya at lauren.tilford@okstate.edu.

Electronic consent:

Clicking on the link below indicates that:

You have read the above information

You voluntarily agree to participate

To participate, please click on this link. If you do not wish to participate in the research study, please disregard this email.

[Parent survey](#)

[Child survey](#)

Thank you very much for your time and your assistance in this research study!

Lauren Amaya

APPENDIX C (CONTINUED)

Final email for final perceptions of School Breakfast Program:

Stillwater parents,

This is a follow-up email requesting your assistance in a research project that aims to improve children's nutrition. **If you have already participated in the survey, please disregard this email.** Stillwater Public Schools School Nutrition Services in cooperation with Oklahoma State University is interested in learning how universal free breakfast impacts opinions about the School Breakfast Program (SBP). You are invited to participate in this research project because you are a parent/guardian of a child enrolled in Stillwater Public Schools.

Your participation in this study is voluntary, and if you choose to participate in this research survey, you may withdraw at any time. If you choose not to participate or if you choose to withdraw, you will not be penalized.

The procedure for this portion of the study involves filling out an online survey that will take approximately 3 minutes. After you fill out the parent survey, you will be asked to fill out a survey with your child so we can gain perceptions of both you and your child so improvements can be made to the School Breakfast Program. Your responses will be confidential and we do not collect identifying information such as your name, email address, or IP address.

Your information will remain confidential. All data is stored in a password protected file, and to help protect your confidentiality, the surveys will not contain information that will personally identify you. The results of this study will be used for scholarly purposes and as a way to improve the School Breakfast Program.

If you have any questions about the research study, please contact OSU doctoral student Lauren Amaya at lauren.tilford@okstate.edu.

Electronic consent:

Clicking on the link below indicates that:

- You have read the above information
- You voluntarily agree to participate

To participate, please click on this link. If you do not wish to participate in the research study, please disregard this email.

[Parent Survey](#)

[Child Survey](#)

Thank you very much for your time and your assistance in this research study!

Lauren Amaya

APPENDIX D

Project handout for parents

How does universal free breakfast impact participation, consumption, & perceptions of School Breakfast?

Stillwater Public Schools Child Nutrition Services in cooperation with Oklahoma State University is interested in learning how universal free breakfast impacts participation, consumption, and perceptions of the School Breakfast Program (SBP). Representatives from OSU Department of Nutritional Sciences will be in Stillwater Public Schools in school year 2013-2014 to help us answer this question.

What will the researchers do? We will measure perceptions of the School Breakfast Program by asking parents to fill out an online survey, and asking parents to help their children fill out the survey.

- ♦ Another component of the research will be asking students if they can take a picture of their meal tray as they leave the breakfast service line.
- ♦ No picture will be taken if a student responds 'no.'
- ♦ For students who respond 'yes', a numbered card will be placed on the tray and a picture will be taken of the tray. When the student finishes eating, a 2nd picture of the tray will be taken.
- ♦ At no time will the child be included in the picture or asked for his or her name.

How do the students benefit?

We hope to decrease concerns associated with the School Breakfast Program, as well as increase the number of children consuming a healthy breakfast.

Who can participate? Any student or parent of a student in the Stillwater School District may participate.

Confidentiality: The records of this study will be kept private. Any written results will discuss group findings and will not include information that will identify your child. Research records will be stored securely and only researchers and individuals responsible for research oversight will have access to the records. It is possible that the consent process and data collection will be observed by research oversight staff responsible for safeguarding the rights and wellbeing of people who participate in research.

Will my child be at risk? No. The procedures create no risks, discomforts or harm to the child.

What if I don't want my child to participate?

- ♦ Participation is voluntary.
- ♦ Instruct your child to tell the researcher 'no thank you' if he or she, or you, do not want their meal tray to be photographed.
- ♦ Refusal to participate will not result in any loss of benefits or privileges.

For more information

Contact:

lauren.tiford@okstate.edu; 323.9897
gail.gates@okstate.edu; 744.3845
irb@okstate.edu; 744.3377

Oklahoma State Univ.
IRB
Approved 8-27-13
Expires 8-26-14
HS HE-13-98

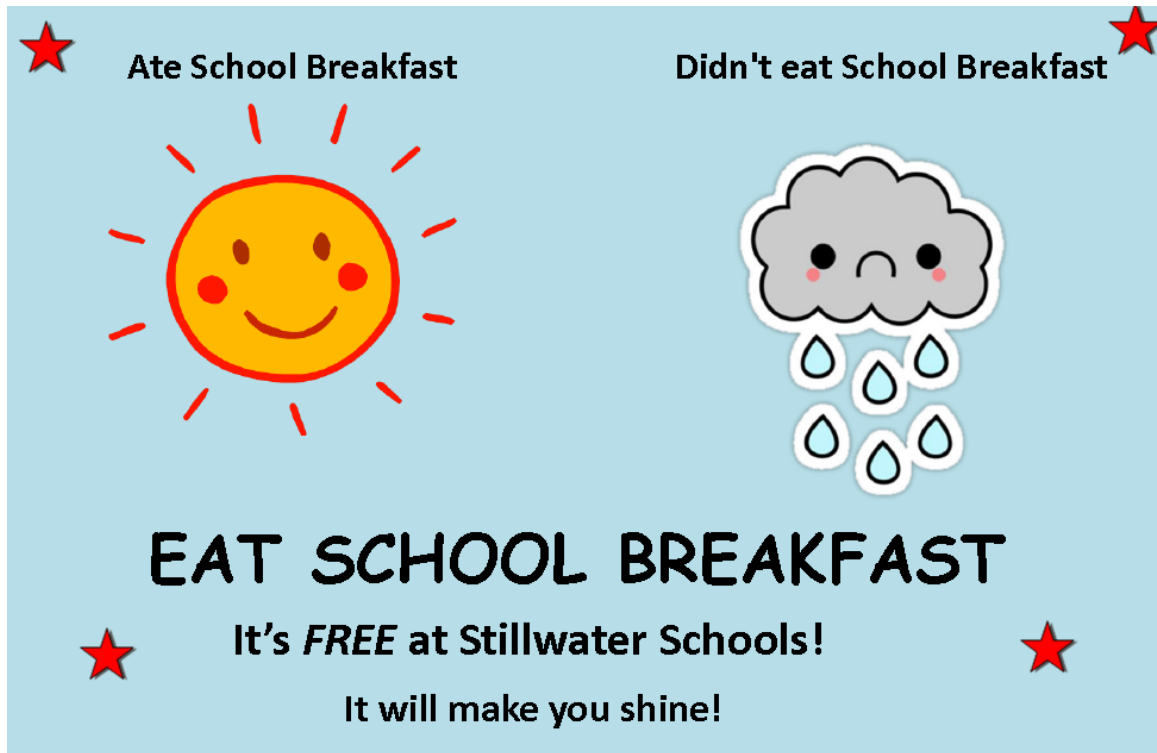
APPENDIX E

Elementary school posters



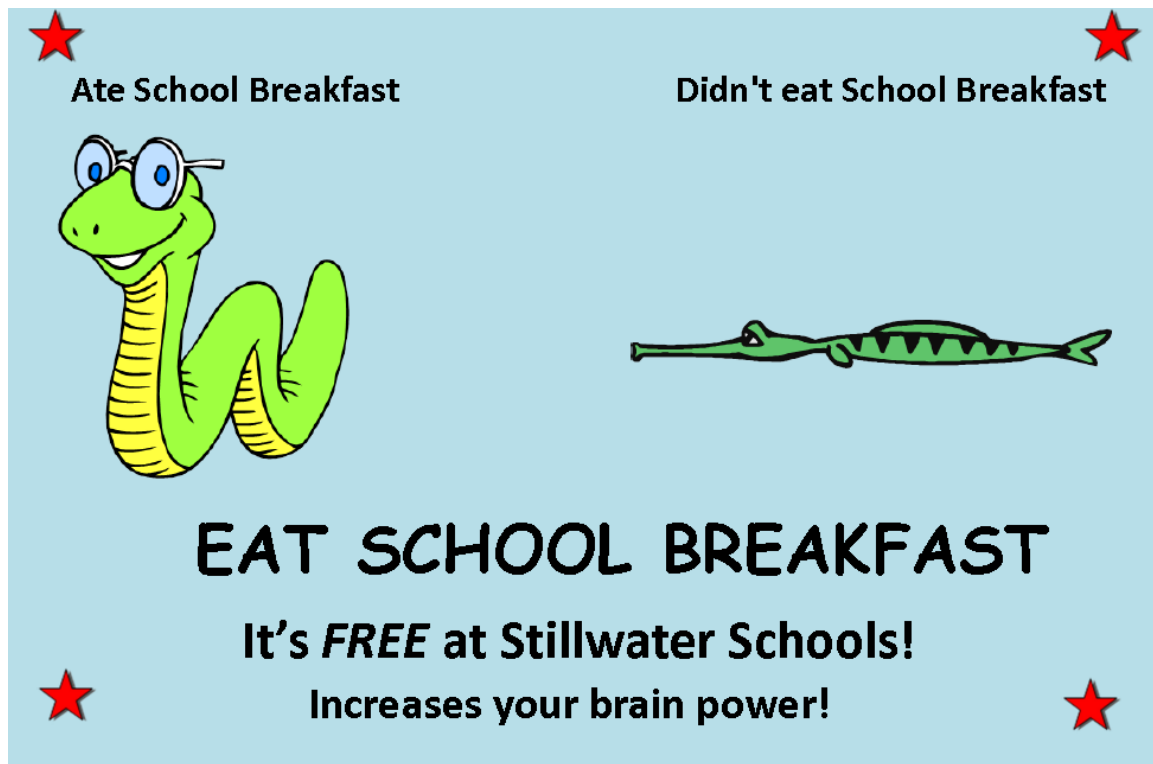
APPENDIX E (CONTINUED)

Elementary school posters (continued)



APPENDIX E (CONTINUED)

Elementary school posters (continued)



Middle School posters

179

APPENDIX E (CONTINUED)

Middle School posters (continued)

This pioneer chose not to eat
free School Breakfast because
he thought he wouldn't like the
food.



After his friends ate, they said
the food was good and helped
them do well in school.

APPENDIX E (CONTINUED)

Middle School posters (continued)

This Pioneer is feeling tired
this morning.



What he doesn't know is that
eating free School Breakfast
will perk him right up.

APPENDIX E (CONTINUED)

Middle School posters (continued)

The pioneer feels sad
and hungry.



He skips School Breakfast
because he doesn't know his
friends eat it every morning.
Now he doesn't see them, or
get to eat, until lunch.

APPENDIX F

Texts for school breakfast promotion:

Week 1:

Parents, remember School Breakfast is free in Stillwater! Have your kids check it out each morning to start their day right.

Week 2:

Research shows that kids who eat School Breakfast miss less school each year than kids who don't. Remember, Breakfast is free in SPS!

Week 3:

Parents, did you know that kids who eat School Breakfast score 17.5% higher on math tests than kids who don't?

Week 4:

Hungry kids: can't concentrate, lack energy, don't do well in school, and can cause disruption. Don't forget: SPS serves free breakfast!

Week 5:

Kids who eat School Breakfast are more likely to: have higher levels of achievement in reading & math and retain more of what they learn

Week 6:

School Breakfast is associated with reduced tardiness and fewer nurse visits. Start your kids' day right with free breakfast at SPS!

Week 7:

School Breakfast is associated with more positive learning environments for kids; help them succeed with free breakfast!

Week 8:

Research shows that a healthy breakfast can reduce obesity risk; Remember SPS serves healthy breakfasts free each morning to students!

APPENDIX G

PA system announcements

Introduction + reminder about school breakfast being free + a benefit of consuming breakfast + the upcoming week's menu.

Week 1:

Hi Pioneers (or other mascot)! Don't forget that school breakfast is completely free! You and your friends should check it out. This upcoming week we're serving (list entrees). We hope to see you in the cafeteria/eating in the classroom!

Week 2:

Hi Pioneers! As always, breakfast is free in Stillwater Schools. Did you know that kids who eat School Breakfast miss less school and are sick less often than kids who don't? Make sure you're helping to keep yourself healthy by eating breakfast. This week, we're serving (entrees).

Week 3:

Hi Pioneers! Did you know that eating free School Breakfast can help you do better in math and reading? You should check out if this works for you by eating breakfast at school! This week we're serving (entrees).

Week 4:

Pioneers, do you feel exhausted when you get to school and find it hard to pay attention in the mornings? We recommend you eat free School Breakfast, it can give you the energy you need to do your best in school! This week we're serving (entrees).

Week 5:

Pioneers, do you sometimes have trouble remembering what you learned at school? Sometimes this problem can be caused by feeling hungry. A good solution to this would be to start your day off right with School Breakfast! It's free, and this week we are serving (entrees).

Week 6:

Pioneers, do you feel like a lot of people around you are getting sick? By eating free School Breakfast, you can help make sure that your body stays strong and healthy. This week we are serving (entrees).

Week 7:

Hi Pioneers! A healthy breakfast in the morning can help you have a great day! Remember, it's always free, and this week we are serving (entrees).

APPENDIX H

Baseline parent survey questions

Thank you for participating in this survey! Your answers can help us better serve our children. At the conclusion of this survey, you will be redirected to a child perception survey.

The school breakfasts are the right size for my child

Always

Sometimes

Never

A variety of foods are served at breakfast

Always

Sometimes

Never

The breakfasts served are appealing to my child

Always

Sometimes

Never

I feel good about my child eating the school breakfast

Always

Sometimes

Never

I believe the cafeteria follows food safety and sanitation rules

Always

Sometimes

Never

APPENDIX H (CONTINUED)

Baseline parent survey questions (continued)

My child has increased the number of times he/she eats school breakfast after universal free breakfast started in the Stillwater School District

Always

Sometimes

Never

Universal free breakfast served at my child's school has improved my feelings about the School Breakfast Program

Always

Sometimes

Never

What school does your child attend?

What grade is your child in?

Would you be interested in receiving weekly text messages about Stillwater's School Breakfast Program? *If you are interested, please enter your cell phone number below. Otherwise, please skip this question.*

At the conclusion of this study, you will be redirected to the children's perceptions survey. You may take the survey at that time, or you may click on the "Child Survey" link in the email at a later time. Thank you!

APPENDIX I

Conclusion parent survey questions

Thank you for participating in this survey! Your answers can help us better serve our children. At the conclusion of this survey, you will be redirected to a child perception survey.

Does your child regularly eat breakfast (either at school or at home)?

Yes
No

On average, how many days per week does your child eat breakfast at school?
My child does not usually eat breakfast at school

1
2
3
4
5

The school breakfasts are the right size for my child

Always
Sometimes
Never

A variety of foods are served at breakfast

Always
Sometimes
Never

The breakfasts served are appealing to my child

Always
Sometimes
Never

APPENDIX I (CONTINUED)

Conclusion parent survey questions (continued)

I feel good about my child eating the school breakfast

Always
Sometimes
Never

I believe the cafeteria follows food safety and sanitation rules

Always
Sometimes
Never

My child has increased the number of times he/she eats school breakfast after universal free breakfast started in the Stillwater School District

Yes
No

Universal free breakfast served at my child's school has improved my feelings about the School Breakfast Program

Yes
No

What school does your child attend?

What grade is your child in?

Do you have any recommendations for improving the breakfasts served at your child's school?

At the conclusion of this study, you will be redirected to the children's perceptions survey. You may take the survey at that time, or you may click on the "Child Survey" link in the email at a later time. Thank you!

APPENDIX J

Baseline child survey questions

Parents, thank you for helping your children fill out this survey! If you would like, you can fill this survey out with each of your children who attend Stillwater Public Schools.

I like eating School Breakfast

Always
Sometimes
Never

The foods served at breakfast taste good

Always
Sometimes
Never

The foods served at breakfast are fresh

Always
Sometimes
Never

The size of the meals are not too big and not too small

Always
Sometimes
Never

I have enough time to eat breakfast after I get to school

Always
Sometimes
Never

APPENDIX J (CONTINUED)

Baseline child survey questions (continued)

My friends eat School Breakfast

Always
Sometimes
Never

Eating breakfast helps me pay attention at school

Always
Sometimes
Never

I am not usually hungry for breakfast

Always
Sometimes
Never

What school do you go to?

What grade are you in?

APPENDIX K

Conclusion child survey questions

Parents, thank you for helping your children fill out this survey! If you would like, you can fill this survey out with each of your children who attend Stillwater Public Schools.

Do you usually eat breakfast (either at home or at school)?

Yes
No

I like eating School Breakfast

Always
Sometimes
Never

The foods served at breakfast taste good

Always
Sometimes
Never

The foods served at breakfast are fresh

Always
Sometimes
Never

The size of the meals are not too big and not too small

Always
Sometimes
Never

I have enough time to eat breakfast after I get to school

Always
Sometimes
Never

APPENDIX K (CONTINUED)

Conclusion child survey questions (continued)

My friends eat School Breakfast

Always
Sometimes
Never

Eating breakfast helps me pay attention at school

Always
Sometimes
Never

I am hungry for breakfast in the mornings

Always
Sometimes
Never

What school do you go to?

What grade are you in?

Do you have any other information you would like to share with us about the School Breakfast Program?

VITA

Lauren Lynn Amaya

Candidate for the Degree of

Doctor of Philosophy

Thesis: EVALUATION OF THE PROMOTION OF FREE SCHOOL BREAKFAST ON PARTICIPATION RATES, CONSUMPTION, AND PERCEPTIONS OF SCHOOL BREAKFASTS IN RURAL SCHOOLS

Major Field: Human Sciences with an option in Nutritional Sciences

Biographical:

Education:

Completed the requirements for the Doctor of Philosophy in Human Sciences with a Nutritional Sciences option major at Oklahoma State University, Stillwater, Oklahoma in May 2015.

Completed the requirements for the Master of Science in Nutrition & Food Management at University of Central Oklahoma, Edmond, OK in May 2011.

Completed the requirements for the Bachelor of Science in Nutrition, Dietetics, and Food Management at University of Central Oklahoma, Edmond, OK in May 2010.

Experience:

2013- Present: *Contract dietitian through Medicare/Developmental Disabilities Service Division*, Stillwater, OK

2011- Present: *Adjunct instructor*, UCO, Edmond, OK

2011- Present: *Teaching Assistant for Principles of Human Nutrition*, OSU, Stillwater, OK

Professional Memberships:

Academy of Nutrition & Dietetics
Society for Nutrition Education & Behavior