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EFFECTS OF BREAKFAST DELIVERY SYSTEMS AND SCHOOL POVERTY
ON SCHOOL AND STUDENT OUTCOMES IN ARKANSAS

by

Matthew Mellor

Dissertation

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EFFECTS OF BREAKFAST DELIVERY SYSTEMS AND SCHOOL POVERTY
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by

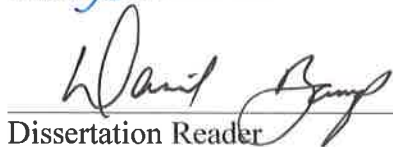
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Dissertation



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Many people contributed to the completion of this dissertation. Thank you to my children for allowing me time to do this work. Thank you to my parents for helping in every way they could, from mowing the grass to keeping kids to staying engaged in my work. Thank you to my beautiful wife, who knows the toll this work has taken and has encouraged me even when it was exceedingly difficult. Thank you to the doctors and medical professionals who diagnosed and treated my cancer and after I was shot. Thank you to my students and staff for inspiring me. Thank you to my office staff for believing in me. Thank you to my co-principal for not letting me give up. Thank you to my teachers and my partners for making a difference in the lives of our community. You make a difference in me.

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ABSTRACT

by
Matthew Mellor
Harding University
May 2022

Title: Effects of Breakfast Delivery Systems and School Poverty on School and Student Outcomes in Arkansas (Under the direction of Dr. Lynette Busceme)

This study investigated the effects of the breakfast in the classroom model and school poverty on attendance, discipline referrals, and fourth-grade literacy scores. The sample was composed of data from Arkansas elementary schools. Overall, the three hypotheses had no significant interaction effect. The main effect of the breakfast delivery system was not significant for discipline referrals and fourth-grade reading but was significant for school attendance. However, the practical significance was negligible. In contrast, school-wide poverty level significantly affected the percentage of scores for fourth-grade literacy in the Ready and Exceeding categories as measured by the ACT Aspire Summative Literacy Assessment with a large effect size. Students in higher poverty rates scored significantly lower than those in lower-poverty schools. Implications include a reduction in the interruption of learning due to absences, tardiness, and disciplinary removal from the classroom; the effect of healthier students receiving a nutrient-appropriate diet when they need it most each day; and serving breakfast in a more comfortable and convenient location for the student learners may lead to a change in the classroom climate. The Arkansas Department of Education and policymakers may want

to consider publicly making student meal participation numbers available. If participation can be tracked, it could be studied and correlated to learning, attendance, and discipline. Researchers could also examine why some schools are achieving greater participation. Vendors may use these data to tailor offerings more widely to schools instead of converting wider market bulk offerings to school packaging. The food delivery model is a financial decision for some districts seeking to raise the number of students participating in breakfast programs and increase their federal repayment dollars. These districts can capture savings by reducing morning supervision since students report directly to classrooms, and buses can arrive later because breakfast is no longer before the bell.

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CHAPTER I

INTRODUCTION

School breakfast and school lunch programs were initially intended to supplement nutrition provided at home. In 2012, the 3-year average of food-insecure households in the United States was 14.7%, with 5.6% of those same households qualifying as very low food security. Nevertheless, even with those data surrounding food insecurity, only 50.4% of eligible students participated in the National School Breakfast Program compared to those who participated in the National School Lunch Program (Food Research and Action Center, 2013). Half of the students eating lunch at school are eligible for free or reduced-cost lunch based on family income. However, they are not choosing to take advantage of a free or reduced-cost nutritional breakfast. This statistic reveals a concern that something keeps food-insecure children from participating in the school breakfast program offered by school districts.

The traditional school breakfast program that offers breakfast in the cafeteria is not being used by the same students who take advantage of the school lunch program in the same school. Many potential reasons for this discrepancy have been identified: language barriers, the stigma of being identified as poor, being late to school, and the simple inconvenience of going to the cafeteria (Hewins & Levin, 2013). Although these students participate in school lunch programs, something is causing them to avoid

breakfast. Other approaches may help mitigate the stigma and inconvenience while being sure the reward is worth the effort.

Typically, a program's cost to feed every low-income, school-aged student in the United States would be a limitation, but funding is not the problem. With low participation in free and reduced-cost breakfast programs and clinical evidence that breakfast improves cognitive performance (Alimo, Olson, & Frongillo, 2001; Middleman, Emans, & Cox, 1996; Pincock, Richardson, Helm, & Hails, 2003), an alternative delivery system has been explored. Districts across the country have implemented a Breakfast in the Classroom (BIC) program, where children are not required to line up in the cafeteria before school starts to receive a breakfast tray. Instead, students eat breakfast in their classroom with their class and teacher. Although this delivery model's immediate success may seem obvious, careful study is needed to examine the perception compared to the data gathered.

Statement of the Problem

The purpose of this study was threefold. First, the purpose of this study was to determine the effects by school-wide poverty level of schools where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the average annual school attendance percentage as reported to the Arkansas Department of Education for elementary schools in Arkansas. Second, the purpose of this study was to determine the effects by school-wide poverty level of schools where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the total number of discipline referrals per capita for elementary schools in Arkansas. Third, the purpose of this study was to determine by school-wide poverty level between schools

where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the fourth-grade literacy percentage of scores in the Ready and Exceeding categories as measured by the ACT Aspire Summative Literacy Assessment for elementary schools in Arkansas.

Background

Basic human needs must be met before students can adequately participate in the learning process. In his theory of human motivation, Maslow (1943) proposed that meeting basic nutrition needs would better allow individuals to satisfy other, more advanced needs, like healthy development and the ability to withstand future adversity. Children who do not get enough to eat have lower cognitive function, lower school achievement, lower IQ levels, and more reported behavior problems (Kar, Rao, & Chandramouli, 2008). Getting enough to eat is a basic need; not meeting that need affects learning. Meeting basic nutritional needs is essential to the growth and development of children.

Children who eat a daily breakfast are more likely to meet their daily nutrient needs. Iron, B vitamins (folate, thiamine, riboflavin, niacin, Vitamin B₆, and Vitamin B₁₂), and Vitamin D are approximately 20-60% higher in children who regularly eat breakfast compared with those who skip breakfast (Gleason & Carol, 2003). Meeting daily nutrient needs allows developing children to be readier to learn. The advantages provided by meeting a child's nutritional needs extend to psychological and physical health. In addition to meeting the nutritional needs of a growing child, breakfast contributes to maintaining a normal body mass index. Children and adolescents who regularly eat breakfast are less likely to be overweight (Szajewska & Rusczyński, 2010).

Eating breakfast is in the best interest of every school to help children stay healthy and active.

A healthy student is a student who is physically ready to learn, not distracted by health concerns. In 2004, the Centers for Disease Control (2009) first ranked obesity as the number one health risk facing America. They stated, "American society has become characterized by environments that promote increased food intake, non-healthy foods, and physical inactivity" (p. 173). At the turn of the century, 30.5% of American adults were obese, and in 2017-2018, the obesity rate reached 42.4%. At the same time, over 49 million families still live in food-insecure households, affecting 16 million children (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2014). The size of the problem sits in classrooms across the country.

The problem is no longer a matter of having enough food; it meets the nutritional needs of children when they need it most. This problem is prevalent in single-parent and households of color (Nord, Coleman-Jensen, Andrews, & Carlson, 2010). School nutrition programs are needed to provide support and direction to American families. Specifically, the delivery system addressing what and when food is provided may significantly affect overall nutrition.

Along with the importance of a healthy learner, attendance is vital to learning. The Arkansas Division of Elementary and Secondary Education (2020) defined chronic absence as missing so much school for any reason that a student is academically at-risk. Chronic absence means missing 10% or more of a school year for any reason—excused, unexcused, and suspensions. Students missing class time because they are late to school

or in the office for a disciplinary referral have the same result as an absence. Learners are missing needed instruction.

Although evidence is mixed, studies generally demonstrate that eating breakfast has a positive effect on children's cognitive performance, particularly in the domains of memory and attention (Cooper, Bandelow, & Nevill, 2011; Pivik, Tennial, Chapman, & Gu, 2012; Wesnes, Pincock, Richardson, Helm, & Hails, 2003; Wesnes, Pincock, & Scholey, 2012; Widenhorn-Muller, Hille, Klenk, & Weiland, 2008). With educators searching for every opportunity to improve the learner's ability to hold and recall information, increasing the learner's ability to pay attention to instruction is a critical skill needed to improve literacy instruction. Solutions outside of classroom instruction techniques can enhance the work inside the classroom.

The positive effects of breakfast are more evident in students considered undernourished, typically defined as one standard deviation below average height or weight for age using the US National Center for Health Statistics reference (Cueto & Chinen, 2008; Pollitt, Jacoby, & Cueto, 1996). The benefits of breakfast impacts on literacy achievement are worth further study. However, these same categories of students who respond more strongly are also the student population most typically affected by lower literacy scores and a more significant disparity in literacy achievement (Irby et al., 2021).

Publicly provided meal programs for children were first offered during the Great Depression. The Agricultural Adjustment Act was introduced in 1935 (PL 74-320). In 1946, schools began providing supplemental feeding through the National School Lunch Program. The establishment of The Child Nutrition Act in 1966 included a 2-year pilot

program that provided breakfast to children with food insecurities. In 1975, the National School Breakfast Program became permanent (Minton, 2008). Each update brought improved nutritional opportunities for at-risk students.

While each program improved nutritional opportunities, participation in the National School Breakfast Program dramatically dropped in the decades following its initial implementation. In 1998, the Child Nutrition Reauthorization Act called for evaluating the effects of providing free breakfasts to elementary school children (Briefel, Murphy, Kung, & Devaney, 1999). As a result, The Healthy, Hunger-Free Kids Act (2010) allowed funding for schools in high-poverty areas to provide nutritious meals through the National School Lunch and School Breakfast Programs to all students at no charge. The act attempted to remove some of the perceived factors keeping students from participating in school breakfast programs.

The school food programs' popularity was not universal. A 5-year study of 1,000 Wisconsin elementary schools from 2009 to 2014 found a 3.5% reduction in students with low attendance (Bartfeld, Berger, Men, & Chen, 2019). Regardless of the delivery method, the addition of a free breakfast program had a measurable impact on attendance. Any measurable improvement in attendance is desirable toward the goal of student achievement.

School, daycares, and childcare facilities that participated in the National School Breakfast Program and the National School Lunch Program and offered daily meals to every child received free or reduced-cost meal reimbursements. In 2010, participation peaked, yet only 60% of eligible students participated in the free breakfast program (Dahl & John, 2011). Two years later, the 3-year average would fall to 50.4% of those eligible

to participate (Food Research and Action Center, 2013). Though these programs were offered free, many low-income families with children who qualified chose not to participate.

Although free or reduced-cost nutritional breakfast was available, by 2013, only half of the students taking advantage of the lunch program also took advantage of the free or reduced-cost breakfast. Program participants cited time and scheduling conflicts, limited cafeteria space, or the embarrassment associated with eating a free or reduced-cost breakfast as reasons they did not participate (Cullen, 2010). These social and logistical issues are concerning. Even though meals are offered and free, not all needy students take advantage of the two meals a day at school.

Since National School Breakfast Programs offered free or reduced-cost nutrition, parents possibly assumed their children were consuming what was offered. Families may have had a false sense of increased food consumption. Therefore, children may have been provided less food at home because parents' perceptions were that their children were being fed at school (Waehrer, 2008). This false logic allows low-income families to spend less on healthy nutrition, believing their children are receiving good nutrition at school.

Federal reimbursement dollars are linked to the number of meals served. Many districts are losing millions of dollars in unclaimed federal funding (Food Research and Action Center, 2012). Few school districts want to sacrifice increased funding. When more students participate, districts can also take advantage of better discounts in ordering food and supplies.

The creators of the National School Breakfast Program and the National School Lunch Program were surprised that their programs to offer meals to families in poverty and provide basic nutrition were not welcomed by all families and that participation remained below program goals. Although school districts have made efforts to increase participation in the traditional breakfast model, the results have been insignificant (Pennsylvania Hunger Action Coalition, 2012). When students from low-income households participated in National School Breakfast Programs, positive benefits have improved cognitive performance in memory and attention areas (Cooper et al., 2011; Pivik et al., 2012; Wesnes, Pincock, Richardson, Helm, & Hails, 2003; Wesnes, Pincock, & Scholey, 2012; Widenhorn-Muller et al., 2008). In addition to the health benefits, increasing participation in school breakfast programs can boost federal revenue for school districts, allowing schools an incentive to reach every eligible student and extend their academic growth.

First analyzed on a large scale in 2007 was a change in the delivery system of breakfast service in the cafeteria to service in the classroom that has rapidly increased the number of students receiving breakfast. According to the Food Research and Action Center (2020), 3.6 million more low-income children received school breakfast on an average day in the 2018–2019 school year than in the 2008–2009 school year. The BIC delivery model allowed cafeteria personnel to deliver hot or cold breakfasts to the classroom in insulated bags. These bags contained a hot or cold entrée (sausage biscuit, chicken biscuit, breakfast pastry, or French-toast sticks); a snack bite (yogurt, muffin, graham crackers, cereal bar, or cheese stick); a fresh fruit (fruit cup, banana, apple, or other fruit); and a choice of a juice or milk carton. Teachers or designated students

delivered the individual breakfast items to student desks in the classroom. When students arrived, they ate their breakfast as the teacher started the daily routines of record-keeping, morning announcements, and morning instruction. Students threw waste into appropriate recycling or garbage containers when breakfast was finished. The school nutrition program provided funds for antiseptic wipes and paper placemats so students could clean their desks and hands (Augustine-Thottungal, Kern, Key, & Sherman, 2013). This delivery model and the accompanying change in the eating environment to the classroom versus the cafeteria may have affected participation and other aspects such as attendance, general health, and behavior.

Hypotheses

The researcher created the following null hypotheses.

1. No significant difference will exist by school-wide poverty level between schools where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the average annual school attendance percentage reported to Arkansas Department of Education for elementary schools in Arkansas.
2. No significant difference will exist by school-wide poverty level between schools where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the total number of discipline referrals per capita for elementary schools in Arkansas.
3. No significant difference will exist by school-wide poverty level between schools where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the percentage of scores for

fourth-grade literacy in the Ready and Exceeding categories as measured by the ACT Aspire Summative Literacy Assessment for elementary schools in Arkansas.

Description of Terms

ACT Aspire. The ACT Aspire is an assessment system used to measure academic achievement in English, mathematics, reading, science, and writing in Grades 3 through 10. Information from this assessment helps determine if a student's academic growth is on pace for college and career success (ACT, 2020).

Average annual school attendance percentage. Arkansas requires all children between ages 5 and 17 to attend a public, private, parochial school, or homeschool. The bill outlines expectations and exceptions (AR HB 1537). This study's average annual school attendance percentage refers to the average daily attendance as reported on the 2017-2018 Arkansas Department of Education school report card.

Breakfast in the Classroom (BIC). BIC meals are delivered to the classroom, where students eat at their desks during the first 10-15 minutes of the school day instead of going to the cafeteria with the entire student body before school starts (Food and Nutrition Service, 2012).

Discipline Referrals. Although discipline policies vary between districts and schools, Arkansas maintains a system of recordable discipline referrals that address violence, language, threatening, weapons, truancy, drugs, alcohol, solicitation, property damage, stealing, lying, internet usage, and bullying (ARK Code Ann 6-18-502). School staff uses discipline referrals to track discipline violations and improve their response to students in crisis. In this study, the total number of discipline referrals refers specifically

to expulsions, weapons incidents, staff assaults, student assaults, referrals to law enforcement, and school-related arrests to the total referrals reported on the 2017-2018 Arkansas Department of Education school report card.

Food Insecurity. At times, being unable to obtain adequate food for one or more household members for financial or other reasons is known as food insecure (Coleman-Jenson et al., 2013).

Food Security: Food security is defined as having access to enough food at all times (Coleman-Jenson et al., 2013).

National School Lunch Program. The National School Lunch Program is a federally assisted meal program serving both public and nonprofit private schools and residential childcare institutions by providing nutritionally balanced, low-cost, or free lunches to school-aged children each school day (Food and Nutrition Service, 2012).

School Breakfast Program. School Breakfast Program provides financial reimbursement to states that provide federally assisted breakfast programs in public schools, nonprofit private schools, and residential childcare institutions (Food and Nutrition Service, 2012). The National School Breakfast Program was the original name of the School Breakfast Program.

School-Wide Poverty Level. The school-wide poverty level is the percentage of students qualifying for free or reduced-cost school lunch based on the United States Department of Agriculture guidelines regarding poverty levels (Food and Nutrition Service, 2012).

Significance

Research Gaps

Although research exists on potential barriers to participation in school breakfast programs, the body of scholarship is focused on improving learning outcomes as measured by academic test scores or literacy programs. Researchers have assessed implications and associations derived from test scores to determine how eating breakfast affects the learner and their achievement levels. This study addressed much less researched effects breakfast may have on the student learner, including attendance, discipline referrals, and fourth-grade literacy scores from a school-wide perspective.

Possible Implications for Practice

School administrators, academic leaders, nutrition leaders, food service managers, community stakeholders, parents, physicians, local governments, and local community leaders would be interested in improving their students' learning, specifically those in greatest need. School food programs are designed to target socioeconomically disadvantaged populations. One implication to consider is reducing the interruption of learning due to absences, tardiness, and disciplinary removal from the classroom. A second implication is the effect of healthier students receiving a nutrient-appropriate diet when they need it most each day. Third, serving breakfast in a more comfortable and convenient location for the student learners may change the classroom climate.

Process to Accomplish

Design

A quantitative, causal-comparative strategy was used in this study. For Hypotheses 1-, the researcher used four 2 x 2 factorial between-groups designs. The

independent variables were type of breakfast program (BIC School Breakfast Program versus a traditional school breakfast program) and school-wide poverty level of schools (69% and less versus 70% and more). The dependent variables for Hypotheses 1-3 included the average annual school attendance percentage, the total number of discipline referrals per capita, and the fourth-grade literacy achievement percentage of students who scored ready or exceeding as measured by the ACT Aspire Summative Literacy Assessment for elementary schools in Arkansas.

Sample

This study's sample was data drawn from elementary schools in Arkansas using the BIC program or a traditional school breakfast program. The BIC program uses the same reimbursement schedule as the traditional school breakfast program. The difference is that with BIC, breakfast is delivered to the classroom, and students eat at their desks within the first 10-15 minutes of the school day. In schools with traditional breakfast, students arrive 30-45 minutes before school starts, and they eat in the cafeteria before going to class. The data collected from the schools included the breakfast delivery program, the average annual school attendance percentage, the total number of discipline referrals for the year, and the fourth-grade literacy achievement scores. To further define the comparison between the schools' breakfast program and school-wide poverty level, a list of 120 Arkansas public schools was selected, with 30 schools offering BIC with a school-wide poverty level of 69% or less, 30 schools with traditional breakfast with a school-wide poverty level of 69% or less, 30 schools offering BIC with a school-wide poverty level greater than 70%, and 30 schools with traditional breakfast with a school-wide poverty level of 70% or greater. For each subpopulation, comparisons were made

on their 2017/2018 average attendance percentage, total discipline referrals, and fourth-grade literacy scores.

Instrumentation

Ark. Code Ann. § 6-15-1402 requires that the Division of Elementary and Secondary Education annually prepare and publish a school performance report for each public school in the state and make the report available to schools, parents, and the local community. Additionally, the report card is presented in an understandable and user-friendly format, which is required under the Every Student Succeeds Act. This information is publicly available through the Arkansas Department of Education (myschoolinfo.arkansas.gov). Through this website, school-wide poverty level (students eligible for free and reduced meals), average annual attendance percentage, total discipline referrals, and school achievement scores were recorded and used to determine the necessary variables in each hypothesis that we explored.

Data Analysis

To address the first hypothesis, a 2 x 2 factorial analysis of variance (ANOVA) was conducted using type of breakfast program (BIC School Breakfast Program versus a traditional school breakfast program) and school-wide poverty level of schools (69% and less versus 70% and more) as the independent variables. The dependent variable was the average annual school attendance percentage for elementary schools in Arkansas. In Hypothesis 2, a 2 x 2 factorial ANOVA was conducted using type of breakfast program (BIC School Breakfast Program versus a traditional school breakfast program) and school-wide poverty level of schools (69% and less versus 70% and more) as the independent variables. The dependent variable was the total number of discipline

referrals per year per capita for elementary schools in Arkansas. To address the third hypothesis, a 2 x 2 factorial ANOVA was conducted using type of breakfast program (BIC School Breakfast Program versus a traditional school breakfast program) and school-wide poverty level of schools (69% and less versus 70% and more) as the independent variables. The dependent variable was the fourth-grade literacy ready or exceeding achievement scores on statewide testing for elementary schools in Arkansas. The researcher used a two-tailed test with a .05 level of significance to test the three hypotheses.

CHAPTER II

REVIEW OF RELATED LITERATURE

The role breakfast programs play in students' academic performance, attendance, and discipline are of great interest to educators. Food insecure children have higher rates of school attendance absence because of headaches, stomachaches, colds, and fatigue. Historically, these same children also had more behavioral, emotional, and academic problems (Kleinman et al., 2002; Murphy et al., 1998). School meal programs would appear to be a viable way to meet nutrition goals and restore the learning capacity of students, considering the known consequences of food insecurity.

Additionally, the consumption of breakfast regularly by children and teens is associated with educational and health benefits. Children who ate breakfast daily were more likely to meet their daily nutrient needs (Deshmukh-Taskar et al., 2010). Iron, B vitamins (folate, thiamine, riboflavin, niacin, vitamin B6, and vitamin B12), and Vitamin D are approximately 20-60% higher in children who regularly eat breakfast when compared with breakfast skippers (Gibson, 2003). Missing breakfast robs the body of needed nutrients and reduces the ability to process information.

The very nature of skipping means to miss out on something and replace it with something deemed more urgent or more important. Students who regularly skipped breakfast were less likely to perform better academically than their peers who consumed breakfast (Hearst Shanafelt, Wang, Leduc, & Nanney, 2016). Although breakfast

provides benefits, students may not view breakfast as a meal of great importance. Some skipped breakfast either because of time, lack of hunger, or thinking it may assist with weight loss (Garg, Rajesh, & Kumar, 2014). Despite the reason given for skipping breakfast, when the body does not have the fuel it needs, a student cannot function at peak performance.

Skipping breakfast has a direct effect on the body and mind of children. When students receive a meal, insulin levels rise, resulting in glucose absorption in the muscle or brain tissues used for energy. Organs, especially the brain, need a constant supply of glucose to operate properly. Thus, after a prolonged fast, which happens while sleeping, glucose and insulin levels drop, and metabolism slows down, resulting in fatigue and hunger. Children and adolescents who skip breakfast have difficulty concentrating and staying focused in school due to lower glucose intake (Ptomey et al., 2016). Lack of nutrition dramatically affects how a student may feel towards attempting to learn and succeed.

When students miss a meal, they often feel the physical consequences of their decision that make concentration difficult. Students may struggle to focus on learning when they hear their stomachs churning. A difficulty focusing may contribute to poor attention to the instruction and lead to reduced academic performance. Poor academic performance was an essential contributor to adolescents' dropout decisions (Cueto & Chinen, 2008). Moreover, many students in the United States do not have food readily available outside of the school.

With food insecurity rapidly spreading to many families, many school administrators use the school meal program to fill a gap for students. School meal

programs nourish students and contribute to 50% of their daily caloric intake (Gleason & Sutor, 2001). On a typical school day in the United States, more than 20% of school-age children (5-17 years) receive free breakfast, and greater than 30% receive free lunches (United States Department of Agriculture, 2018). Nevertheless, despite all the research conducted on the effects of nutrition on school-aged students, few research efforts have focused on food delivery programs.

Maslow and the History of School Food Programs

The following literature review summarizes the research on the effect of school breakfast delivery programs on academic performance, absenteeism, and office referrals. Maslow (1943) proposed that meeting basic needs of nutrition would better allow individuals to satisfy other more advanced needs such as healthy development and the ability to withstand future adversity. Researchers found that children who did not get enough to eat had lower cognitive function, lower school achievement, lower IQ levels, and greater behavior problems (Kar et al., 2008). Nutrition is a well-known basic need with pronounced effects. Children need to improve the quality of their nutrition and increase participation in consuming meals offered in schools.

The foundation of a functioning society is access to food. As researchers examined the food security status of children and their ability to access meals through school-based breakfast and lunch programs, they found that school-based breakfast programs diminished differences in participation rates in the schools' meal programs between children who were food secure and children who were food insecure (Khan, Pinckney, Keeney, Frankowski, & Carney, 2011). The researchers called on school leaders to increase access to high-quality and higher quantities of food to reduce the

incidence of food insecurity on campuses by expanding access to food to all children. This process would reduce students' perceived negative social stigma related to their eligibility for and receipt of free or reduced-priced meal programs by providing free meals to all students and providing these free breakfast meals in the classroom setting. BIC was implemented to help meet these recommendations.

In 2011, Vice President Joe Biden explained the need for continued investment to ensure global food security and ensure local, regional, and international economic and political stability specifically to ". . . redouble our commitment to feed the future, so that we can ultimately make famine a thing of the past" (p. 13)." According to then-Secretary of State Hillary Clinton, "food security is not only good national security strategy and policy, but it is good social policy... We have and are guided by a 'moral purpose' to address concerns regarding food insecurity at home and abroad" (Senate Hearing 112-736, 2012). Elevating food security to a part of national security likely contributed to the rapid rise of programs like BIC before its effectiveness was evaluated.

The political question was not whether school administrators would feed the poor but what avenue should be used to accomplish this task. General social values, such as feeding the hungry and assisting the poor in times of great need, pervade society and are held by virtually all people, regardless of their "ideological, philosophical, or religious" commitments (Fowler, 2013, p. 92). In essence, the democratic values of liberty and equality have become the ideals to which people aspire and constitute reasons why the nation addresses social ills through social programs and policies such as the creation of mass feeding programs and public schooling for the citizenry. No longer is the debate

about the need for feeding programs; the debate has shifted to the effectiveness in delivering feeding programs.

The Healthy, Hunger-Free Kids Act of 2010 was signed into law as Public Law 111-296 by President Barack Obama on December 13, 2010. The law directed the United States Department of Agriculture to review and upgrade the National School Lunch Program meal pattern and nutrition standards based on the latest Dietary Guidelines for Americans. The new meal pattern went into effect at the beginning of the school year 2012-2013 and increased the availability of fruits, vegetables, and whole grains on the school menu (United States Department of Agriculture, 2010). The law also required the review of existing school food programs to shift funding to programs found to be more successful at meeting nutrition goals.

Then acting Special Representative for Global Food Security, Jonathan Shrier (2011), stated, "although 'national security' often conjures up images of missiles and militaries, it should also prompt images of maize and millet. The availability of and access to food is inextricably linked to prosperity and stability" (p. 1). The federally financed and administered National School Lunch Program facilitates the delivery of lunch meals at more than 100,000 public and private schools and in-home care institutions all over the United States. The sheer scope of the National School Lunch Program reveals its relevance to American society.

In his statement regarding the 2010 passage of The Healthy, Hunger-Free Kids Act, Secretary of Agriculture Tom Vilsack emphasized what the Obama Administration believed was at stake for the nation and the nation's youth regarding this new law: "Our national security, economic competitiveness, and health and wellness of our children will

improve as a result of the action Congress took today" (p. 1). According to both Secretary Vilsack's (2010) statement and the words of President Obama, there appeared to be a direct correlation between the health and welfare of youth and national security in that the nation's security was dependent on the ability to meet the basic nutrition and health needs of the most at-risk school-age children by providing them access to high-quality, nutritious, and sufficient amounts of food daily. This importance is most evident in communities of higher need where children have limited healthy food access when not in school.

Much of the current research reviewed focused on children with limited food resources. The effects of breakfast were more pronounced in children considered undernourished compared to their nourished peers (Cueto, Jacoby, & Pollitt, 1998; Pollitt et al., 1996). Identifying the most at risk and establishing a National School Lunch program should have been enough to meet the need, yet the need continues. The barriers to good nutrition continue to present challenges that merit solutions.

In a Philadelphia study on fourth-sixth graders' urban eating habits, researchers found that 46.0% of students had breakfast at home, 13.1% at school, and 21.8% at a corner store (Polonsky et al., 2018). Of the total, 41% said they had breakfast at multiple locations each day. The study found that students eating at school were more likely to eat fruit or vegetables and meet their daily breakfast nutrient goals (Polonsky et al., 2018). Urban living in Philadelphia, an urban center with a population of 5.7 million, is a much different environment than Arkansas, where the largest city, Little Rock, has 198,000 people. Regardless of how and where students receive breakfast, their perceptions of the need for breakfast are complex issues.

While adequately meeting fundamental human needs is a requirement for a successful student career, a concern often raised with increased breakfast participation and low-income students is that it can lead to unhealthy food quantities and even childhood obesity. A study that examined possible relationships between contributing factors to childhood obesity and the type of school children attended found that public school-attending children had, on average, a higher body mass than did children who attended private schools (Li & Hooker, 2010). If a child both attended a public school and was eligible to participate in the school-provided meal program, then that child's average body mass was likely to be higher than if he or she were not eligible for meal programs provided by the school. Accordingly, the researchers concluded that eligibility for public school-provided meal programs was associated with children's increased body mass and because children from lower-income homes typically attended public schools, they were, therefore, more likely to be classified as overweight.

These results were consistent with other researchers who examined the relationship between students' participation in school-provided meal programs and weight gain. The authors concluded that a positive relationship between students' participation in these meal programs and weight gain existed, concluding that school-meal program participation exacerbated the obesity epidemic (Millimet, Tchernis, & Husain, 2009). These studies and others indicated an alarming increase in childhood obesity in the United States and were used as evidence to pass The Healthy, Hunger-Free Kids Act of 2010, which balanced the nutrition and serving portions in school food programs.

Studies have also shown that obesity's association with poor health and increased absenteeism could influence a learner's academic performance. This connection is also

true for mental and physiological health problems associated with obesity that contribute to the observed correlation between obesity and student absenteeism (Datar & Sturm, 2004; Taras, 2005). Furthermore, obese students suffer from low self-esteem, social anxiety, discipline problems, and absenteeism by skipping school more frequently than nonobese students (Daniels, 2008). While obesity is not linked explicitly to BIC, the possible connection serves as a cautionary data point.

Although poverty has traditionally been linked with people being underweight, research reveals that poverty and obesity now co-exist in the United States. Over a quarter of American elementary-aged children are classified as overweight or obese (Hofferth & Curtin, 2005). Hofferth and Curtin (2005) examined data to determine whether low-income status might be linked to school-aged children being overweight and whether school food programs were positively associated with children in different income groups becoming overweight. The authors found no evidence that suggested children who live in impoverished homes were more likely to be overweight and found no evidence that school meal programs were directly responsible for making meal-participating children overweight.

Change of Venue: The Breakfast in the Classroom Program

Schools have seen cafeteria remodels, new menus, friendlier food packaging, music, and atmosphere improvements in an attempt to increase participation. Despite these and other efforts, the results have been insignificant (Pennsylvania Hunger Action Coalition, 2013). Despite tasty food, an attractive atmosphere, and cafeteria improvements, the stigma perseveres. A fresh look at the delivery method was explored with BIC to avoid the stigma of students gathering before school in the cafeteria for a

soup-kitchen breakfast experience. The new model delivers breakfast directly to the classroom as the school day starts, so all students have the same opportunity to eat in a familiar neutral environment.

If students did not go to the cafeteria, the cafeteria would go to the students. With low participation in free and reduced-price breakfast programs and clinical evidence that breakfast improved cognitive performance (Alimo et al., 2001; Middleman et al., 1996; Pincock et al., 2003), districts across the country have implemented a BIC program, where all children eat breakfast with their classrooms rather than in the cafeteria (Creighton, 2012; Food Research and Action Center, 2014a). This approach promised to reduce the stigma of being poor as everyone would receive the same opportunity. The service method would also remove the need to arrive at school early because breakfast would be waiting in the classroom.

The traditional breakfast delivery model offered breakfast in the school cafeteria before school began, but the most significant need was that students did not take advantage of the offering. Despite evidence of its benefits, 20-30% of school-aged children skipped breakfast (Corder et al., 2011; Deshmukh-Taskar et al., 2010). Many reasons for skipping breakfast were identified: language barriers, the stigma of being identified as poor, being late to school, and the inconvenience of going to the cafeteria before the start of school (Hewins & Levin, 2013). However, the problem exists across the country. Students in the greatest need are not getting the nutrition that will allow them to grow physically and academically.

Besides traditional cafeteria breakfast, BIC is the most common elementary school breakfast model of breakfast delivery. BIC allows cafeteria personnel to deliver

hot or cold breakfasts to the classroom in insulated coolers. In this model, students receive an entrée (i.e., sausage biscuit, chicken biscuit, pop-tart, French-toast sticks), a snack bite (i.e., yogurt, muffin, graham crackers, cereal bar, cheese stick), fresh fruit (i.e., fruit cup, banana, apple), and a choice of a juice or milk. Teachers or designated students deliver the individual breakfast items to student desks (Food Research and Action Center, 2014b). When students arrive, they eat their breakfast as the teacher starts the daily routines of record-keeping, morning announcements, and morning instruction. Students throw their waste into appropriate recycling or garbage containers when breakfast is finished. The program provides wet wipes and paper placemats so students can clean their desks and hands. More common in secondary school is *grab-and-go breakfast*, allowing students to pick up breakfast from kiosks or tables in convenient student-friendly locations and then carry it with them to class.

Moving the breakfast offering to the classroom and out of the cafeteria significantly increases participation. Although the literature is suggestive of positive outcomes associated with school breakfast programs (Alimo et al., 2001; Middleman et al., 1996; Pincock et al., 2003), critics, including stakeholders like teachers and parents, have expressed concerns about the BIC program (Folta et al., 2016). Two concerns reported relate to the time commitment to serve breakfast and the food waste from students participating in BIC (Krueger, Eggett, & Stokes, 2018). The concern is that students may be missing valuable academic time by eating in the classroom. This concern comes from the same stakeholders (teachers and parents) who believe a healthy breakfast contributes to staying awake and paying attention in class.

Perceived Benefits of the Breakfast in the Classroom Program

BIC programs commonly operate in large urban school districts like Houston, Chicago, Cincinnati, Washington, DC, Boston, San Diego, and Compton. Program advocates believe that when students eat breakfast in a classroom setting, their academic achievement, attention span, and task-completion skills improve (Deasy, 2012). In addition, their absenteeism, tardiness, and likelihood of a school nurse referral from feeling hungry or lethargic decreases (Deasy, 2012). These programs are administered in large districts by designated, focused leadership to shape the perception of the program.

A Philadelphia study of 16 public schools tried to identify the effect of BIC on the foods and drinks students consumed in the morning. After over 2 years of collecting student self-reported data, they found BIC led to improvements in the types of foods and drinks students consumed. However, the program did not reduce skipping breakfast but increased the number of locations where students ate breakfast (Bauer et al., 2020). This study relied on urban fourth through sixth graders to voluntarily report their breakfast diet and location each morning. Although students reported improvement in the types of foods they consumed, they still skipped breakfast at the same rate.

The National Education Association Health Information Network published a guide called "Start School with Breakfast: A Guide to Increasing School Breakfast Participation" and provided interested schools and organizations with information and statistics on the benefits of the breakfast program. They included topics related to how to increase school breakfast consumption and participation, resources, and tools that schools can use, and sample letters to parents, staff, site principals, and superintendents, as well as school breakfast success stories (National Education Association Health Information

Network, 2013). Although specific research was not cited, the foundation bases its findings on perceptions and school surveys. The National Education Association Health Information Network (2013) noted that according to a survey of America's teachers, teachers agree that schools and the education community have a role to play in addressing child hunger and that proper nutrition helps students learn (National Education Association Health Information Network, 2013). With major funding from the Walmart Foundation, The National Education Association Health Information Network and Share Our Strength (2013) partners with the Food Research and Action Center, the School Nutrition Foundation, and Share Our Strength. Working together, the group calls themselves the "Partners for Breakfast in the Classroom." Share Our Strength is officially an advocate and lobbying group promoting solutions to decrease the effects of poor nutrition and poverty. The group also offers grants and seed funding to expand school breakfast programs.

North Carolina was an early adopter of the ideas proposed by the National Education Association Health Information Network and NO KID Hungry North Carolina and offered free breakfast to all students through BIC, Grab and Go, and Second Chance breakfast to its 2,285 public schools, serving 1,445,287 students (Soldavini, Berner, & Silva, 2019). After reviewing the participation data, North Carolina found that offering free breakfast to all students had the most significant influence on increased breakfast participation. They also found a positive association with BIC for elementary students, while the Grab and Go and Second Chance approaches were more favorable for middle and high school students (Soldavini et al., 2019). By design, BIC fits the elementary school schedule more closely where students rarely move around the school

unaccompanied. The Grab and Go and Second Chance program breakfasts allow students to grab meals on the way to their next class or activity.

The Milwaukee Public Schools established a Hunger Task Force to evaluate their pilot breakfast program at various schools. The research revealed that the BIC program improved student breakfast access and participation rates through conducting surveys, interviews, and reviewing quantitative data (Wong, 2006). Breakfast participation doubled at the two schools where breakfast was served in the classroom. Surveys indicated that 78% of combined school staff believed the BIC program ran better than the cafeteria. None of the 22% who rated it slightly less than the cafeteria gave BIC a failing score. Although some opposition did exist, the implementation of BIC appeared to be accepted.

Financial Considerations

In addition to direct academic and health-related benefits, these large districts claim that greater participation leads to financial benefits. As more students eat breakfast in school, schools generate and reap financial rewards because the federal and state monies generated from each meal served are directed back to the district and schools themselves (Deasy, 2012). Districts may believe the growth in participation improves student achievement, but it may also benefit districts financially and allow funds to be allocated elsewhere, thereby further improving student achievement.

Another point related to finances is the perceived increased cost of delivering breakfast to the classrooms. A case study on the benefits and costs associated with providing students breakfast in the classroom setting reviewed documents and records relevant to the BIC program, observed food service operations, and conducted interviews

of various leader stakeholders, including school leaders and cafeteria managers who were involved in BIC preparation and delivery (Rainville & Carr, 2008). The authors concluded that BIC provided several benefits, including increased student participation and access to breakfast, which facilitated improved child nutrition. The study did find challenges to the program: a lack of support from some school-based employees; a limited number of menu items; and a limited timeframe for breakfast preparation, delivery, and implementation in the classroom, which, when not delivered on time, adversely affected instructional time (Rainville & Carr, 2008). The program is not without flaws, and additional research is needed to address custodial concerns, menu variety concerns, and teacher and staff concerns. These concerns are not consistent, nor were the solutions applied consistently across the study schools.

To illustrate the financial potential, in the 2011-2012 school year, Missouri reported that only 53.7% of students eligible for free and reduced lunches took advantage of the school breakfast program. If the percentage of participation in Missouri schools had increased from 53.7% to 70% at just the schools offering a free breakfast program, 62,544 more children would have been fed, and the state would have received an additional \$15,286,733 in funding (Food Research and Action Center, 2013). The ripple effect of the additional funds could contribute to students having higher achievement, fewer absences, and more high school graduates (Augustine-Thottungal et al., 2013). This increase is mainly from students being present in school, but breakfast may be a viable incentive.

Academic Achievement

As important as a healthy breakfast may be, the goal of an educational institution is to improve academic achievement for the benefit of the community. In a review of national studies, Oaks et al. (2019) found that high poverty schools do far less well in providing students a solid fundamental education, as evidenced by low achievement scores and other outcomes. Studying the idea that a school breakfast program could be as effective as an intervention program, researchers examined the literature on breakfast consumption and found that breakfast provided direct and indirect positive academic achievement-related benefits for children (Basch, 2011). Basch (2011) noted that school-based breakfast programs provided positive health and education-related benefits to students and schools and generated an increase in federal funding to state budgets and schools themselves. Student participation in school-provided meal programs, including the school breakfast program, appeared to improve student attendance rates, a precursor to student academic achievement. Basch concluded that high-quality universal breakfast programs that allow students to eat breakfast in the classroom are especially needed for youth who are not likely to get good nutrition the rest of the day. This broader approach to including the body's fueling as an intervention may seem obvious, but it often remains undervalued.

Injured athletes are not expected to perform at their best, and prolonged illnesses reduce their victims' ability to work. The health of learners is just as relevant to their academic success. Educationally, relevant health disparities influence students' motivation and ability to learn but reducing these disparities has been largely overlooked as an element of an overall strategy for closing the achievement gap (Basch, 2011). Basch

(2011) argued that unless educationally relevant health disparities were confronted, school reform efforts, in general, would be at-risk. Only implementing a comprehensive and coordinated school health service model that supports students' nutrition, health, and concomitantly would begin to close academic achievement gaps. Just as an employer makes accommodations for workers with disabilities, educators are called to meet nutritional needs to improve student achievement.

Providing for the dietary needs of a growing body ensures fuel for physical and mental growth. Studying nutrition and student performance at school, specifically how nutritional supplements such as vitamins and minerals affected children's cognitive functioning and overall school performance, indicated that children with iron deficiencies were at an academic disadvantage to those whose iron levels were normal (Taras, 2005). Taras (2005) noted that school-provided meal programs appeared to result in improved student attendance records and a decrease in student tardiness, thereby improving student academic achievement results. These findings allow educators to conclude that school-provided breakfast meal programs enhance students' general cognitive abilities and overall academic performance. Providing the proper fuel at the most appropriate times allows the body to function at peak performance levels.

The effects of poor health on academic performance have been documented in various studies. A review of the most prominent studies included the relationship between academic achievement and child nutrition. The researchers found that enrollment, attendance, school behavior, and even drop-out rates were positively associated with the nutritional health of students (Grantham-McGregor, 2005). Grantham-McGregor (2005) found that previous research studies showed a relationship

between hunger, poor diet, stunted cognitive and physical development, and poor school performance. They concluded that students missing breakfast could experience harmful effects on their cognitive abilities, whereas students' consumption of breakfast has shown nutritive and academic benefits in children, particularly in children who had previously been considered malnourished. The body functions more effectively when receiving proper nutrition.

If the effects of nutrition on the body are well established, educators must still determine if BIC increases academic achievement. A cross-sectional survey of schools with and without the BIC program found that elementary school students using the BIC program were more likely to consume breakfast than children at non-BIC schools (Van Wye, Seoh, Adjoian, & Dowell, 2013). These results indicated that academic achievement would be positively affected because more students received appropriate nourishment. However, a study of large urban schools offering breakfast to free and reduced students through BIC or traditional breakfast in the cafeteria found no significant relationship in academic performance when breakfast was served in the classroom compared to in the cafeteria for students eligible for free and reduced-price meals. The study further found that low-income students in the BIC program had lower mathematics scores than schools that served a traditional breakfast (Bartfeld et al., 2018). Since the study only looked at students who receive free and reduced-price meals, Bartfeld et al. (2018) did not address the stigma attached. When BIC is offered as a poverty program, moving meals from the cafeteria to the classroom alone does not remove the obstacles to learning.

Some teachers and school administrators complain that meal programs take away from academic time. This idea corroborates concerns raised in studies that having BIC may take time away from schoolwork, resulting in students falling behind in their class work (Adolphus, Lawton, & Dye, 2013; Krueger et al., 2018). However, Adolphus et al. (2013) and Krueger et al. (2018) only looked at students who received free and reduced-price lunches. No comparison was made to schools where all students receive free meals. In contrast, a study from Kansas examined the effects of breakfast consumption and the meal's composition on academic performance using standardized test scores of elementary school children (Ptomey et al., 2016). Participants completed a breakfast recall of all foods and beverages consumed in the morning and found that those who consumed whole grain foods over fruit juice had significantly higher scores in mathematics and comprehensive reading (Ptomey et al., 2016). Students were not categorized by lunch status, only by achievement.

While examples exist for both sides of the issue, overall current literature indicates an association between breakfast consumption and academic performance. Some studies reveal positive results in undernourished children or with those designated as coming from low-SES homes (Chau et al., 2016). Study outcomes suggest that habitual breakfast consumption improves academic performance even when accounting for confounding factors.

Attendance, Health, and Acting Out

Study results vary by urban or suburban settings, free and reduced lunch status, and research focus. A study of 446 public kindergartens through sixth-grade elementary schools in large urban school districts that served predominantly low-income minority

students compared 257 BIC and 189 non-BIC schools. The BIC program produced overall greater school attendance rates, with BIC schools reaching nearly 74% breakfast participation while non-BIC schools maintained a 42.9% breakfast participation rate. There were no group differences in standardized test performance in mathematics or literacy (Anzman-Frasca, Djang, Halmo, Dolan, & Economos, 2014). Although attendance improved, academics did not. Because this study spans a single school year, results might be different over time.

Although it may seem evident that school attendance correlates to academic achievement, establishing this premise with data is essential. Evidence indicates that students are more likely to succeed academically by attending school regularly (Anzman-Frasca et al., 2014; Basch, 2011). While these two studies yielded comparable results, the Basch (2011) study examined the effect of a universal breakfast program structured as BIC and compared outcomes to those with breakfast in the cafeteria. Anzman-Frasca et al. (2014) analyzed data associated with a BIC program without this comparison. While the approaches varied, both indicated a higher attendance rate in BIC schools. In his conclusion, Basch (2011) suggested that when a nourishing breakfast is offered in school at no cost, it incentivizes children to attend school. Increased attendance may also indicate that overall student health is sustained when breakfast is regularly consumed.

Researchers studied BIC by interviewing stakeholders, school leaders, and cafeteria managers. They found that the interviewees perceived the BIC program as increasing student participation, access to breakfast, and child nutrition (Rainville & Carr, 2008). Additionally, the same researchers found BIC decreased the number of student discipline referrals to school administrative offices, facilitated a sense of classroom

community, and increased students' sense of responsibility. Increases in costs were outweighed by the benefits of the program and the additional income from increased breakfast participation (Rainville & Carr, 2008). These improvements were based on leadership perceptions and their own beliefs of the effectiveness of their efforts.

Finally, a \$3 million Walmart-funded initiative was launched in 2011 to increase school breakfast programs and foster increased student achievement by moving school breakfasts from the cafeteria to the classroom. The initiative was launched by four nationally recognized organizations, collectively known as Partners for Breakfast in the Classroom. This effort paralleled the public release of "School Breakfast in America's Big Cities," a report issued by Food Research and Action Center, a Washington, DC-based health and food policy advocacy organization (Levin & Kast, 2011, p. 1). They found that of the 23 schools, "classroom-based breakfast programs...that provide breakfasts free to all students have the highest participation rates" (p. 1). Levin and Kast (2011) noted that the benefits of eating breakfast in the classroom included increased student alertness, increased academic performance, and improved student attendance rates. Levin and Kast added that the program also could reduce obesity, tardiness, and anxiety connected to feeling rushed because breakfast took place in classrooms during morning attendance-taking and announcements. The launch created a nationwide excitement for BIC programs, with large corporations like Kellogg's, Target, and Post contributing products and finances to promote implementation. However, little research has been completed on the effectiveness or claims of the BIC program.

Not all students are appreciative of moving breakfast to the classroom. Hearst et al. (2016) found that rural 9th- and 10th-grade adolescents experienced numerous barriers

to accessing breakfast despite their school's aim to increase school breakfast participation rates. The barriers identified by students included experiences of the breakfast taking too long to consume, the expense of the breakfast, the undesirable taste of food items offered, transportation to school resulting in a late arrival, and eating in the classroom being uncomfortable. Many of these barriers are unique to adolescents and do not necessarily affect elementary school-aged children.

Student perceptions of breakfast influence why and where they receive breakfast. In a study surveying upper elementary school students in six universal breakfast pilot schools, Reddan, Wahlstrom, and Reicks (2002) found that most students believed that eating the school breakfast helped them learn by increasing their energy levels and attention span. Students also reported not having enough time and not being hungry for breakfast as the most significant reasons they skipped breakfast. Students who participated in school breakfast programs were found less likely to wish they were thinner, go on a diet, or skip breakfast because it might make them fat, and more likely to believe that eating breakfast would give them energy and help them pay attention. While this study was admittedly based on perceptions, it changed students' perceptions of who they were.

Most research on the school breakfast programs focused on the nutritional benefits of breakfast. Bhattacharya, Currie, and Haider (2006) surveyed the effects of school-provided breakfast programs and measured differences between students who participated in school breakfast programs and those who did not. The researchers found that school breakfast programs improved students' nutrition by providing fiber, iron, and potassium-rich meals. These programs ensured better dietary habits, healthier eating,

reduced caloric intake from fat, and a decreased likelihood of vitamin and mineral deficiencies. While this research identifies health improvement, it did not look at academic or behavioral differences.

Summary

While establishing the importance of food security, there is also a concern that low-income students (since they may participate at higher levels) will suffer the most by falling behind academically due to participating in breakfast programs like BIC that take time away from academic work. However, these concerns come from stakeholders (teachers and parents) who at the same time advocate for the consumption of a healthy breakfast as an essential contributor to improve attention span and academic performance (Adolphus et al., 2013; Krueger et al., 2018). Advocates of BIC point out that BIC interrupts learning very little compared to the interruption of a student who does not eat breakfast. Chapter III includes the research design, sample, instrumentation, data collection procedures, analytical methods, and study limitations.

CHAPTER III

METHODOLOGY

Research on the effects of breakfast delivery model on school-wide poverty has been sparsely applied to school attendance or discipline. Although much of the existing research that applies to school breakfast relates primarily to nutrition and its effect on learning, the breakfast delivery model has yet to be used as a value-added contender in the realm of helping students gain an advantage in learning. Although many nutrition components are clarified through the research, little literature addressed the delivery model. The literature review suggested that the quality of the breakfast delivery program could be applied to affect student attendance, student behavior, and student learning.

The purpose of this study was to determine the effects of school-wide poverty level and type of school breakfast program on the average annual school attendance percentage, the total number of discipline referrals per year, and the fourth-grade literacy percentage of students who scored Ready or Exceeding as measured by the ACT Aspire Summative Literacy Assessment for elementary schools in Arkansas. The hypotheses are as follows:

1. No significant difference will exist by school-wide poverty level between schools where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the average annual school

attendance percentage reported to the Arkansas Department of Education for elementary schools in Arkansas.

2. No significant difference will exist by school-wide poverty level between schools where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the total number of discipline referrals per capita for elementary schools in Arkansas.
3. No significant difference will exist by school-wide poverty level between schools where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the percentage of scores for fourth-grade literacy in the Ready and Exceeding categories as measured by the ACT Aspire Summative Literacy Assessment for elementary schools in Arkansas.

Research Design

A quantitative, causal-comparative strategy was used in this study. For Hypotheses 1-3, the researcher used three 2 x 2 factorial between-groups designs. The independent variables were the type of breakfast program (BIC School Breakfast Program versus a traditional school breakfast program) and the school-wide poverty level (69% and less versus 70% and more). The dependent variables for Hypotheses 1-3 included the average annual school attendance percentage, the total number of discipline referrals, and the fourth-grade literacy achievement on the fourth-grade literacy determined by the percentage of scores in the Ready and Exceeding categories on statewide testing, respectively, for elementary schools in Arkansas.

Sample

The sample was composed of data drawn from elementary schools in Arkansas using the BIC program or a traditional school breakfast program. The BIC program uses the same reimbursement schedule as the traditional school breakfast program. The breakfast is delivered to the classroom with BIC, and students eat at their desks within the first 10-15 minutes of the school day. In schools with traditional breakfast, students arrive 30-45 minutes before school starts and eat in the cafeteria before class. The data collected from the schools included the breakfast delivery program, the average annual attendance percentage, the total number of discipline referrals per capita for the year, and the fourth-grade literacy achievement scores in two categories. Fourth-grade literacy scores were the combined percentage of scores determined to be at the Ready or Exceeding levels, as reported on the 2017-2018 state-required ACT Aspire assessment.

To further define the comparison between the schools' breakfast program and school-wide poverty level, a list of 479 Arkansas public schools with fourth-grade students were selected. In the 2017-2018 school year, 85 elementary schools with fourth-grade classes offered BIC. Only 28 schools with fourth grade also had a school-wide poverty level of 69% or less. From this list were selected all 28 schools offering BIC with a school-wide poverty level of 69% or less, 50 randomly selected schools with traditional breakfast and a school-wide poverty level of 69% or less, 50 schools offering BIC with a school-wide poverty level greater than 70%, and 50 schools with traditional breakfast and a school-wide poverty level of 70% or greater. For each identified subpopulation, comparisons were made for the 2017-2018 school year average attendance percentage, total discipline referrals, and fourth-grade literacy achievement scores by category. In the

second hypothesis, 5 extreme outliers were deleted in disciplinary referrals. For this calculation, 26 schools offering BIC with a school-wide poverty level of 69% or less (2 were removed), 48 schools with traditional breakfast with a school-wide poverty level of 69% or less (2 were removed), 49 schools offering BIC with a school-wide poverty level greater than 70% (1 was removed), and 50 schools with traditional breakfast with a school-wide poverty level of 70% or greater.

Instrumentation

Ark. Code Ann. § 6-15-1402 requires that the Division of Elementary and Secondary Education annually prepare and publish a school performance report for each public school in the state and make the report available to schools, parents, and the local community. Additionally, the report card is presented in an understandable and user-friendly format required under the Every Student Succeeds Act. The archival data sources were publicly available through the Arkansas Department of Education (myschoolinfo.arkansas.gov). Through this website, school-wide poverty level (students eligible for free and reduced meals), average annual attendance percentage, total discipline referrals, and school achievement scores were recorded and used to determine the necessary variables in each hypothesis explored.

Each dependent variable was gathered and calculated to be used for analysis. Average annual attendance was used as reported. Total discipline referrals were recorded and then divided by average annual attendance to reflect each school's average percentage of referrals per capita. School achievement scores were gathered using the fourth-grade literacy percentage of scores determined to be at the Ready or Exceeding levels, combined, as reported on the 2017-2018 state-required ACT Aspire assessment.

Data Collection Procedures

After a request was made to the Institutional Review Board, the study was deemed not to need approval as all data sets were publicly available information. All data sets were collected through the Arkansas Department of Education public database maintained as the Arkansas Department of Education Data Center (adedata.arkansas.gov) or the My School Info (myschoolinfo.arkansas.gov) website. All data used regarding schools in Arkansas were publicly available; no permissions or approvals were needed. A list of schools offering BIC in the 2017-2018 school year was obtained by contacting Stephanie Alsbrook, Associate Director of Healthy Schools and Training for the Arkansas Department of Education. Once the data sets were electronically collected, they were transferred to a spreadsheet for correlation and analysis. This spreadsheet included all variables needed for the study, including elementary schools with fourth grade ACT Aspire literacy scores, school poverty level, school average annual attendance, total school discipline referrals, and breakfast delivery method.

Scores collected electronically were password protected and were stored on the researcher's personal computer. Any hard copy data were stored in a locked storage area. Identities of participating school districts and individual students' scores were kept confidential. Data were coded, and no personal identifiers were used. Three years after the completion of this study, the data will be deleted. No risk should be involved for the participants as all information remains publicly available.

Analytical Methods

IBM Statistical Packages for the Social Sciences (SPSS) Version 27 was used for data analysis. Additional information on the proper tests to conduct was obtained from

IBM SPSS for Intermediate Statistics (Leach, Barrett, & Morgan, 2015). Data collected for the three hypotheses were coded according to BIC participation, school-wide poverty percentage, average school attendance, total discipline referrals, and fourth-grade standardized test scores. The following codes were used for each school: breakfast participation (1 = BIC, 2 = Traditional), school-wide poverty determined by the percentage of students eligible for free and reduced-cost lunches status (1 = less than 69%, 2 = more than 70%), attendance percentage (2017-2018 average daily school attendance), total discipline referrals per capita (total number of referrals for any reason divided by the Average Daily Attendance), and fourth-grade literacy percentage of students who scored Ready or Exceeding as measured by the ACT Aspire Summative Literacy Assessment for elementary schools in Arkansas reported for the 2017-2018 school year.

The three hypotheses were explored using a similar process for each statistical analysis. To address each hypothesis, a 2 x 2 factorial ANOVA was conducted using breakfast participation (BIC versus traditional) by school-wide poverty level (less than 69% versus greater than 70%) as the independent variables. The dependent variables were average annual school attendance percentage reported to the Arkansas Department of Education, the total number of discipline referrals per capita, and the percentage of scores for fourth-grade literacy in the Ready and Exceeding categories measured by the ACT Aspire Summative Literacy Assessment for elementary schools in Arkansas.

The analysis took place in two steps. First, the interaction effect was examined for significance. This analysis was to determine if the two independent variables were interacting on each dependent variable. If significance was found, the nature of the

difference was further examined with a simple effects analysis. Second, if no interaction significance was found, the two main effects: school-wide poverty level and type of program, were analyzed individually. The researcher used a two-tailed test with a .05 level of significance to test the three hypotheses.

Limitations

Although research exists on potential barriers to participation in school breakfast, the body of scholarship is focused on large urban schools and districts. Very few studies exist looking at rural programs and their effect on participation. In many small rural schools, the cafeteria may already provide a comfortable caring environment, so a change in serving location may have no influence. Little research considers the existing individual school culture and assumes a standard set of needs that may not be present in all schools.

Likewise, this research did not consider the fidelity of the breakfast program. A BIC program just getting started may look quite different from an established, seasoned program. Educators also may find that a program that has been in place for years has lost its way from its initial success. Many starting programs struggle with stakeholder buy-in and fundamental problems of sanitization. For instance, a common complaint is that moving breakfast will bring trash and bugs to the classroom. Custodial staffs have mitigation tools for both bugs and sanitation concerns. These tools must be communicated and applied effectively. Otherwise, these concerns will greatly affect the perception of the program.

Another limitation was in the reporting of discipline data. Although it was a requirement under Arkansas Code 6-15-1402, some schools and districts reported zero

disciplinary referrals. On the other extreme, some schools and some districts reported every disciplinary referral at a rate of two or three times their number of students. This variance in reporting let some districts have 0% referrals per capita while others had as high as 266% referrals per capita. Because of outliers, 5 extreme outliers were deleted in the disciplinary referrals related to Hypothesis 3. For this calculation 26 schools offering BIC with a school-wide poverty level of 69% or less (2 were removed), 48 schools with traditional breakfast with a school-wide poverty level of 69% or less (2 were removed), 49 schools offering BIC with a school-wide poverty level greater than 70% (1 was removed), and 50 schools with traditional breakfast with a school-wide poverty level of 70% or greater. For each subpopulation, comparisons were made for the 2017-2018 school year average attendance percentage, total discipline referrals, and fourth-grade literacy achievement scores by category.

The researcher did not attempt to distinguish the number of referrals made per student or whether students had multiple infractions. Possibly, a few students could have had a high percentage of the total number of infractions, potentially skewing the data. In other words, a few students could make the number of referrals appear high when it was the same student getting in trouble on multiple occasions.

Finally, although nutrition is the purpose of the school feeding program, students may not like what is being served. What is nutritious is not always liked. Although there is research about food preferences and nutrition, they are not linked to breakfast program delivery. Informal observation revealed that portable choices used in BIC varied greatly from school to school. Some schools create warm breakfasts like sausage biscuits or scrambled eggs, and others opt for pre-packaged items like pop-tarts or syrup-infused

pancakes. A popular program appeals to what kids want and will eat, a nutritional program may be extremely healthy, but students may not want the food it provides.

Summary

This researcher intended to explore the effects of two methods of school breakfast delivery. The purpose of the study was to determine if there is a difference by poverty level in attendance, discipline, or fourth-grade literacy achievement levels between schools that participated in BIC or those that participated in traditional breakfast in the cafeteria. Findings are discussed in Chapter IV.

CHAPTER IV

RESULTS

The purpose of this study was three-fold. First, the purpose of this study was to determine the effects by school-wide poverty level where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the average annual school attendance percentage as reported to the Arkansas Department of Education for elementary schools in Arkansas. Second, the purpose of this study was to determine the effects by school-wide poverty level where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the total number of discipline referrals per capita for elementary schools in Arkansas. Third, the purpose of this study was to determine by school-wide poverty level between schools where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the fourth-grade literacy percentage of scores in the Ready and Exceeding categories as measured by the ACT Aspire Summative Literacy Assessment for elementary schools in Arkansas. The independent variables for each hypothesis were school lunch eligibility (schools with 69% or less who were eligible for free or reduced lunch and schools with 70% or more who were eligible for free or reduced school lunch) and school breakfast program (traditional breakfast in the cafeteria or breakfast served in the students start of the day classroom). The dependent variables for the three hypotheses were the average annual school attendance percentage as

reported to the Arkansas Department of Education for elementary schools in Arkansas, the total number of discipline referrals per capita, and the fourth-grade literacy percentage of scores in the Ready and Exceeding categories as measured by the ACT Aspire Summative Literacy Assessment for elementary schools in Arkansas.

The collected data sets were coded for the three hypotheses: school lunch eligibility percentage (0 = 69% or less were eligible for free or reduced lunch, 1 = 70% or more were eligible for free or reduced lunch) and measurable effect variable (average annual school attendance, total number of discipline referrals per capita, fourth-grade literacy percentage of scores in the Ready and Exceeding categories). Using *IBM Statistical Packages for the Social Science (SPSS) Version 27*, each hypothesis was analyzed with a 2 x 2 factorial ANOVA with a between-group design. The school poverty stratification was 186 schools, with 69% or less free and reduced lunch and 251 schools with 70% or more qualifying for free and reduced lunch for each hypothesis. Histograms were used to check for assumptions of normality. The statistics analysis was used to check for assumptions of normality. Levene's test of variance checked the homogeneity of variances.

Hypothesis 1

Hypothesis 1 stated no significant difference will exist by school-wide poverty level between schools where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the average annual school attendance percentage reported to Arkansas Department of Education for elementary schools in Arkansas. A 2 x 2 factorial ANOVA was conducted to test the hypotheses. Before running the factorial ANOVA, data sets were randomly selected and stratified by school

poverty level. The data sets were checked for clerical errors, missing values, and assumptions of independence. Data sets were reviewed for outliers, assumptions of normality, and homogeneity of variances. Table 1 displays the group means and standard deviations for average annual school attendance by school-wide poverty level and school breakfast delivery model.

Table 1

Means, Standard Deviations, Annual School Attendance Percentage, School-Wide Poverty Level, and Type of Breakfast Delivery Model

	S-W Poverty Level						Total		
	69% or less			70% or more			<i>M</i>	<i>SD</i>	<i>n</i>
Type	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>			
BIC	94.70	1.51	28	93.94	1.19	50	94.21	1.35	78
Trad	94.30	1.32	50	94.06	1.43	50	94.18	1.37	100
Total	94.44	1.40	78	94.00	1.31	100			

Note. BIC = Breakfast in the classroom; Trad = Traditional breakfast program.

To test the assumptions of normality, outliers were checked, and no extreme outliers were found. Shapiro-Wilk statistics and histograms were examined for each group. The skewness and kurtosis values were within the 1.0 and -1.0 range. The Shapiro-Wilks test was used to test for normality for the four groups (BIC 69% or less, $p = .643$; BIC 70% or more, $p = .086$; Traditional 69% or less, $p = .320$; Traditional 70% or more, $p = .768$). None of the four groups violated normality. Levene's test of equality of variance, $F(3, 174) = 0.52$, $p = .666$, indicated that the assumption of homogeneity of

variances was not significant and was not violated. A 2 x 2 factorial between-groups ANOVA was performed to test the interaction effect between school-wide poverty level and breakfast serving model on the average annual attendance percentage. Table 2 displays the results of the factorial ANOVA analysis.

Table 2

Factorial Analysis of Variance Results for Average Annual Attendance as a School-Wide Poverty Level and Type of Breakfast Delivery Model

Source	SS	df	MS	F	p	ES
SWPov	0.79	1	0.79	0.44	.510	0.002
Type	10.47	1	10.47	5.76	.017	0.032
SWPov*Type	2.86	1	2.86	1.57	.212	0.009
Error	316.27	174	1.82			

Note. SWPov = School-wide poverty level

Results of the factorial ANOVA analysis indicated no significant interaction between school-wide poverty type and breakfast delivery model, $F(1, 174) = 1.57, p = .212, ES = 0.009$. According to Cohen (1988), this result was a small effect size. School-wide poverty level and breakfast delivery model did not combine to significantly affect average school attendance percentages, and the null hypothesis was retained. Given that no significant interaction between the variables of school-wide poverty level and type of breakfast program existed, the main effect of each variable was examined separately. The main effect for school-wide poverty level was not significant, $F(1, 174) = 0.44, p = .510, ES = 0.002$. In contrast, the main effect for type of breakfast program was significant,

$F(1, 174) = 5.76, p = .017, ES = 0.032$. Neither group had more than a small effect size.

See Figure 1 for the means of breakfast type by school lunch status.

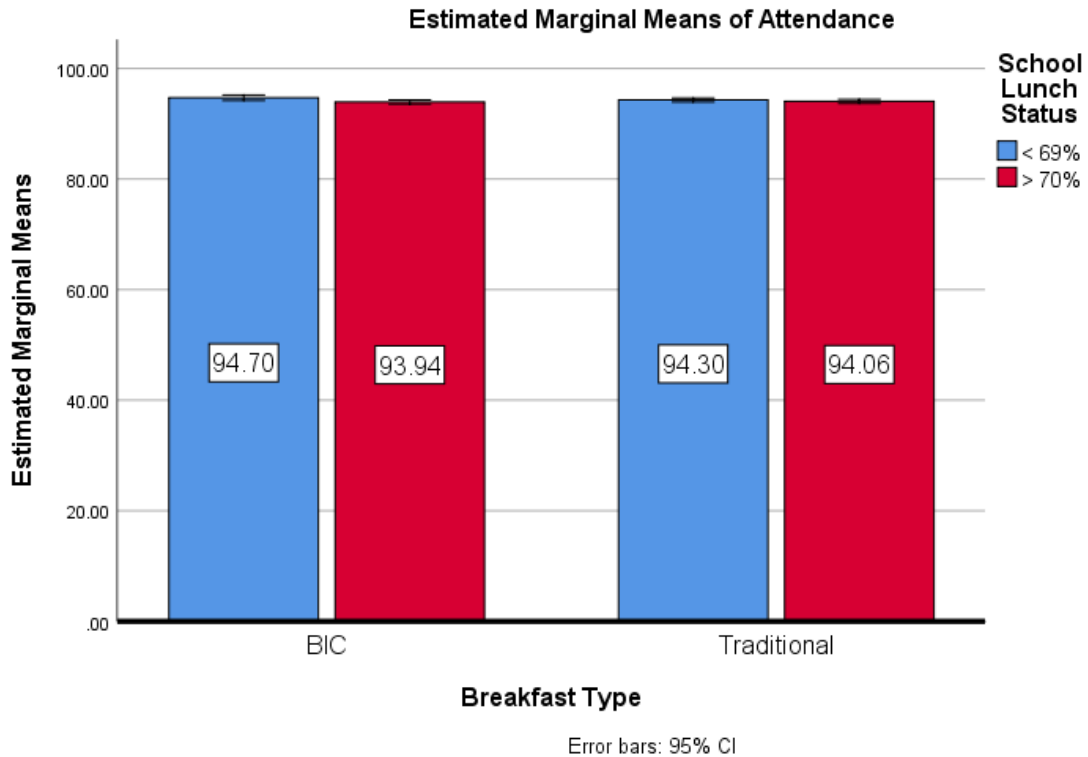


Figure 1. Means for attendance by breakfast delivery type and school lunch status.

Regarding average daily attendance, the mean of the schools with a school-wide poverty level of 69% or less ($M = 94.44, SD = 1.40$) was not significantly different from the mean of the group with a school-wide poverty level of 70% or more ($M = 94.00, SD = 1.31$). However, the mean of the schools serving breakfast in the classroom ($M = 94.21, SD = 1.35$) was significantly higher than the mean of the traditional cafeteria delivery model ($M = 94.18, SD = 1.37$). Although the main effect of breakfast delivery system was significant, the results must be interpreted with caution. Only 0.03% separated the two

means. Because all the percentages were so close together and the standard deviations were so small, very little mean difference was needed to produce a statistically significant result. However, the practical significance of the result was negligible. Therefore, no combined effect or individual effect by school-wide poverty level was found on the average annual school attendance percentage reported to the Arkansas Department of Education for elementary schools in Arkansas. However, type of breakfast program was significant with a very small effect size. Therefore, the null hypotheses for the interaction effect and the main effect of the school-wide poverty level were retained, but the hypothesis for the main effect for type of breakfast delivery was rejected.

Hypothesis 2

Hypothesis 2 stated no significant difference will exist by school-wide poverty level between schools where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the total number of discipline referrals per capita for elementary schools in Arkansas. A 2 x 2 factorial ANOVA was conducted to test the hypotheses. Before running the factorial ANOVA, data were randomly selected and stratified by school poverty level. The data sets were checked for clerical errors, missing values, and assumptions of independence. Data sets were reviewed for outliers, assumptions of normality, and homogeneity of variances. In the pre-analysis, 5 extreme outliers were deleted in disciplinary referrals. For this calculation, the totals included 26 schools offering BIC with a school-wide poverty level of 69% or less (2 were removed), 48 schools with traditional breakfast with a school-wide poverty level of 69% or less (2 were removed), 49 schools offering BIC with a school-wide poverty level greater than 70% (1 was removed), and 50 schools with traditional breakfast with a school-wide

poverty level of 70% or greater. Table 3 displays the group means and standard deviation for total number of discipline referrals per capita by school-wide poverty level and school breakfast delivery model.

Table 3

Means, Standard Deviations, Discipline Referrals per capita, School-Wide Poverty Level, and Type of Breakfast Delivery Model

Type	S-W Poverty Level								
	69% or less			70% or more			Total		
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>
BIC	20.50	25.73	26	29.90	32.56	48	26.59	30.49	74
Trad	23.67	26.89	49	35.58	45.53	50	26.69	37.77	99
Total	22.57	26.36	75	32.80	39.61	98			

Note. BIC = Breakfast in the classroom; Trad = Traditional breakfast program.

To test the assumptions of normality, outliers were checked, and the second analysis revealed no extreme outliers. Shapiro-Wilk statistics and histograms were examined for each group. The skewness and kurtosis values were not within the 1.0 and -1.0 range. The Shapiro-Wilks test was used to test for normality for the four groups (BIC 69% or less, $p < .001$; BIC 70% or more, $p < .001$; Traditional 69% or less, $p < .001$; Traditional 70% or more, $p < .001$). All of the groups violated normality. Levene's test of equality of variance, $F(3, 169) = 4.87, p = .003$, indicated that the assumption of homogeneity of variances was significant and was violated. However, according to Leech et al. (2015), factorial ANOVA is robust against assumptions of normality of the

dependent variable. A 2 x 2 factorial between-groups ANOVA was performed to test the interaction effect between school-wide poverty level and breakfast serving model on the total number of discipline referrals per capita. Table 4 displays the results of the factorial ANOVA analysis.

Table 4

Factorial Analysis of Variance Results for Discipline Referrals per Capita as a School-Wide Poverty Level and Type of Breakfast Delivery Model

Source	SS	df	MS	F	p	ES
SWPov	4551.42	1	4551.42	3.80	.053	0.022
Type	786.91	1	786.91	0.66	.419	0.004
SWPov*Type	63.22	1	63.22	0.05	.819	0.000
Error	202657.94	169	1199.16			

Note. SWPov = School-wide poverty level

Results of the factorial ANOVA analysis indicated no significant interaction between school-wide poverty level and breakfast delivery model, $F(1, 169) = 0.05, p = .819, ES = 0.000$. According to Cohen (1988), this result was a small effect size. School-wide poverty level and breakfast delivery model did not combine to significantly affect total discipline referrals per capita, and the null hypothesis was retained. Given that no significant interaction between the variables of school-wide poverty level and type of breakfast program existed, the main effect of each variable was examined separately. The main effect for school-wide poverty level was very close but not significant, $F(1, 169) = 3.80, p = .053, ES = 0.022$. Finally, the main effect for type of breakfast program was not

significant, $F(1, 169) = 0.66, p = .419, ES = 0.004$. The data may reflect a discrepancy in record keeping as discussed previously. Neither group had more than a small effect size. See Figure 2 for the means of breakfast type by school lunch status.

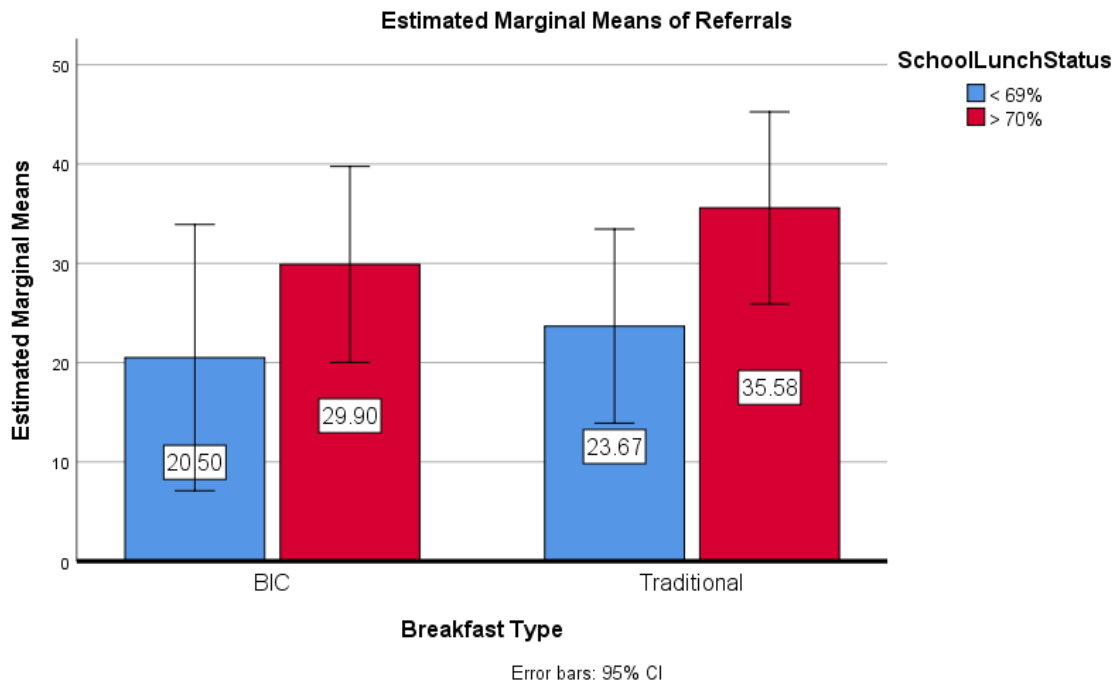


Figure 2. Means of referrals for breakfast delivery type and school lunch status.

Regarding total discipline referrals per capita, the mean of the schools with a school-wide poverty level of 69% or less ($M = 22.57, SD = 26.36$) was lower but not significantly lower than the mean of the group with a school-wide poverty level of 70% or more ($M = 32.80, SD = 39.61$). Regarding the breakfast delivery model, the mean of the schools serving breakfast in the classroom ($M = 26.59, SD = 30.49$) was not significantly different from the mean of the traditional cafeteria delivery model ($M = 26.69, SD = 37.77$). Although the means for school-wide poverty level varied greatly

(10.23), the standard deviations were also very large. The large variance coupled with the significantly skewed distribution of data provided results that were difficult to interpret. Overall, the students indicated no combined or individual main effects on the total discipline referrals per capita reported to the Arkansas Department of Education for elementary schools in Arkansas. Therefore, the null hypotheses for the interaction effect and the two main effects were retained.

Hypothesis 3

Hypothesis 3 stated no significant difference will exist by school-wide poverty level between schools where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the percentage of scores for fourth-grade literacy in the Ready and Exceeding categories as measured by the ACT Aspire Summative Literacy Assessment for elementary schools in Arkansas. A 2 x 2 factorial ANOVA was conducted to test the hypotheses. Before running the factorial ANOVA, data sets were randomly selected and stratified by school poverty level. The data sets were checked for clerical errors, missing values, and assumptions of independence. Data sets were reviewed for outliers, assumptions of normality, and homogeneity of variances. Table 5 displays the group means and standard deviation for total number of discipline referrals per capita by school-wide poverty level and school breakfast delivery model.

Table 5

Means, Standard Deviations, Combined percentage meeting Ready or Exceeding, School-Wide Poverty Level, and Type of Breakfast Delivery Model

Type	S-W Poverty Level								
	69% or less			70% or more			Total		
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>
BIC	47.25	15.64	28	29.36	15.55	50	35.78	17.73	78
Trad	51.72	14.33	50	32.26	14.47	50	41.99	17.35	100
Total	50.12	14.87	78	30.81	15.01	100			

Note. BIC = Breakfast in the classroom; Trad = Traditional breakfast program.

To test the assumptions of normality, outliers were checked, and no extreme outliers were found. Shapiro-Wilk statistics and histograms were examined for each group. The skewness and kurtosis values were within the 1.0 and -1.0 range, except for the BIC 69% or less group. The Shapiro-Wilks test was used to test for normality for the four groups (BIC 69% or less, $p = .015$; BIC 70% or more, $p = .231$; Traditional 69% or less, $p = .144$; Traditional 70% or more, $p = .812$). Only the BIC 69% or less group violated normality. Levene's test of equality of variance, $F(3, 174) = 0.22, p = .884$, indicated that the assumption of homogeneity of variances was not significant and was not violated. A 2 x 2 factorial between-groups ANOVA was performed to test the interaction effect between school-wide poverty level and breakfast serving model on the percentage of scores for fourth-grade literacy in the Ready and Exceeding categories as measured by the ACT Aspire Summative Literacy Assessment for elementary schools in Arkansas. Table 6 displays the results of the factorial ANOVA analysis.

Table 6

Factorial Analysis of Variance Results ACT Aspire Summative Literacy Assessment as a School-Wide Poverty Level and Type of Breakfast Delivery Model

Source	SS	df	MS	F	p	ES
SWPov	14574.86	1	14574.86	65.40	.000	0.273
Type	567.49	1	567.49	2.55	.112	0.014
SWPov*Type	25.75	1	25.75	0.12	.734	0.001
Error	38776.47	174	222.85			

Note. SWPov = School-wide poverty level

Results of the factorial ANOVA analysis indicated no significant interaction between school-wide poverty type and breakfast delivery model, $F(1, 174) = 0.12, p = .734, ES = 0.001$. According to Cohen (1988), this result was a small effect size. School-wide poverty level and breakfast delivery model did not combine to significantly affect the percentage of scores for fourth-grade literacy in the Ready and Exceeding categories, and the null hypothesis was retained. Given that no significant interaction between the variables of school-wide poverty level and type of breakfast program existed, the main effect of each variable was examined separately. The main effect for school-wide poverty level was significant with a large effect size, $F(1, 174) = 65.40, p < .001, ES = 0.273$. However, the main effect for type of breakfast program was not significant, $F(1, 174) = 2.55, p = .112, ES = 0.014$. See Figure 3 for the means of breakfast type by school lunch status.

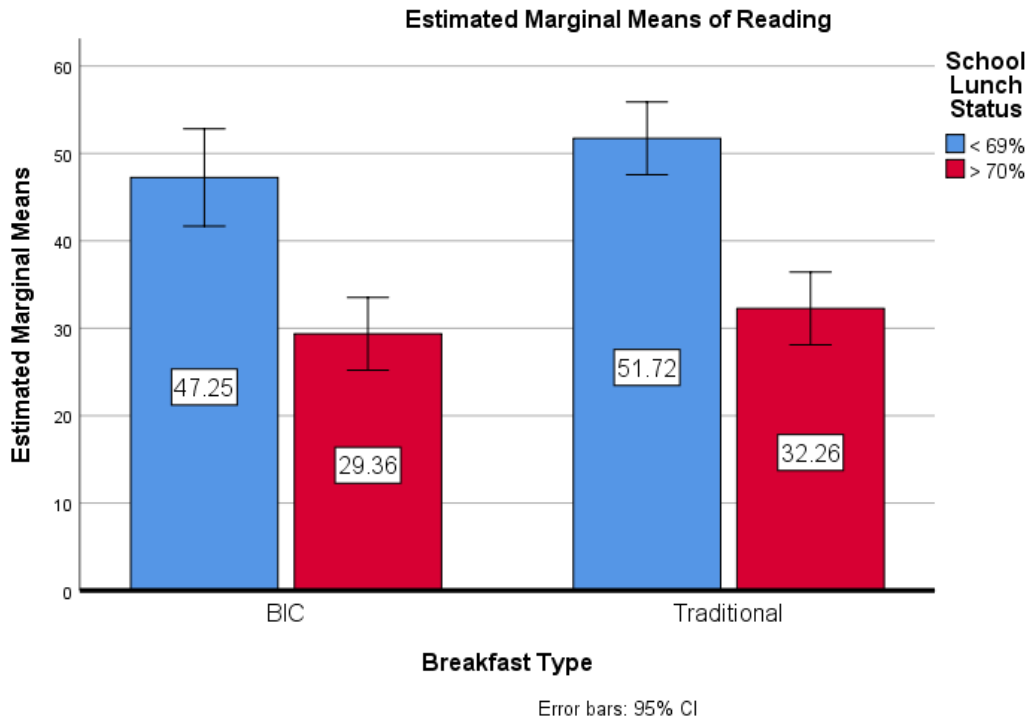


Figure 3. Means of literacy scores by breakfast type and school lunch status.

Regarding the total percentage of scores for fourth-grade literacy in the Ready and Exceeding categories, the mean of the schools with a school-wide poverty level of 69% or less ($M = 50.12$, $SD = 14.87$) was significantly higher than the mean of the group with a school-wide poverty level of 70% or more ($M = 30.81$, $SD = 15.01$). The difference between the two means yielded a large effect size. Regarding the breakfast delivery model, the mean of the schools serving breakfast in the classroom ($M = 35.78$, $SD = 17.73$) was not significantly different from the mean of the traditional cafeteria delivery model ($M = 41.99$, $SD = 17.35$). Overall, the students indicated no combined or individual effect on the percentage of scores for fourth-grade literacy in the Ready and Exceeding categories as measured by the ACT Aspire Summative Literacy Assessment for elementary schools in Arkansas. Therefore, the null hypotheses for the interaction

effect and the main effect of type of breakfast delivery were retained, but the hypothesis for the main effect for school-wide poverty level was rejected.

Summary

The purpose of this study was to determine the effects of BIC on attendance, discipline referrals, and fourth-grade literacy in the Ready and Exceeding categories as measured by the ACT Aspire Summative Literacy Assessment for elementary schools in Arkansas. Table 7 summarizes the results of the interaction and main effects of the three hypotheses.

Table 7

Summary of Statistical Significance of School-Wide Poverty Level and Type of Breakfast Program on School Attendance (H1), Discipline Referrals (H2), and Fourth Grade Reading (H3)

Variables by H ₀	H1	H2	H3
School Poverty Level	.510	.053	.000
Type of Breakfast Program	.017	.419	.112
Poverty*Program	.212	.819	.734

Note. Poverty level = School-wide poverty level

Overall, no significant interaction effect by school-wide poverty level existed for the three hypotheses. In addition, the main effect of breakfast delivery system was not significant for discipline referrals and fourth-grade reading but was significant for school attendance. However, as stated earlier, the significant main effect of breakfast delivery system on school attendance must be interpreted with caution. With only 0.03%

separating the two means, a closer inspection revealed that all the percentages were very close, and the standard deviations were quite small. Therefore, the practical significance of the result was negligible. In contrast, school-wide poverty level significantly affected the percentage of scores for fourth-grade literacy in the Ready and Exceeding categories as measured by the ACT Aspire Summative Literacy Assessment for elementary schools in Arkansas with a large effect size. Students in schools with higher poverty rates scored significantly lower compared to students in lower-poverty schools. Chapter V includes a discussion of the findings for each hypothesis, implications within the larger context of the literature, and recommendations for practice and further research.

CHAPTER V

DISCUSSION

The purpose of this study was to determine the effects by school-wide poverty level between schools where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the average annual school attendance percentage, the total number of discipline referrals per capita, and percentage of scores for fourth-grade literacy in the Ready and Exceeding categories for elementary schools in Arkansas. Basic human needs must be met before students can adequately participate in the learning process. Maslow (1943) proposed that meeting the basic needs of nutrition would better allow individuals to satisfy other, more advanced needs, like healthy development and withstand future adversity. Still, limited research is available to guide schools on breakfast delivery options and their effect on poverty.

This chapter summarized the results of the three hypotheses regarding the effect of school breakfast delivery method on schools with poverty levels at 69% or below and schools with 70% or higher on annual school attendance percentage, the total discipline referrals per capita, and the percentage of students reaching ready or exceeding on the ACT Aspire Summative Literacy Assessment. The circumstances and reasons schools choose between the delivery options vary and are outside the purpose of this study. Based on the results and the literature review, breakfast in the classroom and traditional breakfast learning implications were presented. Next, recommendations for stakeholders

to consider when implementing school breakfast programs were provided. Finally, recommendations were offered for future research considerations.

Findings and Implications

For Hypotheses 1-3, 2 x 2 factorial ANOVAs were conducted using the method of breakfast delivery (BIC versus Traditional) and school-wide poverty level (69% or less versus 75% or more) as the independent variables. The dependent variables were schools' average attendance, discipline referrals per capita, and the percentage of fourth-grade students who scored Ready or Exceeding on the ACT Aspire Summative Assessment.

Hypothesis 1

Hypothesis 1 stated no significant difference will exist by school-wide poverty level between schools where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the average annual school attendance percentage reported to Arkansas Department of Education for elementary schools in Arkansas. No significant interaction effect was found on student attendance percentage. However, statistically, there was a main effect of the breakfast delivery method on attendance. Those schools where BIC was in place showed a slight increase in attendance rates. However, the practical significance of the result was negligible. Kleinman et al. (2002) and Murphy et al. (1998) found that food-insecure children have higher absences because of reported headaches, stomachaches, colds, and fatigue. However, the delivery method did not affect the number of absences for this study. No comparison was made to those who chose not to eat breakfast. Daniels (2008) found that obese students who suffered from low self-esteem, social anxiety, and discipline problems had increased absenteeism by skipping school more frequently than non-obese students. No attempt was

made to review the mean body mass indexes of schools. However, neither delivery system resulted in a practically discernible increase in absenteeism. Neither BIC nor traditional breakfast had an adverse effect on absenteeism, and both meal program types could serve as viable ways to meet nutrition goals and improve the learning capacity of students.

BIC quickly expanded through Arkansas because of vendor promises of better attendance and less confusion at the start of the day. The study's findings did not support the first promise, and the second was not explored. However, BIC is applied differently at each school with unique solutions to serving times, food delivery, supervision, and waste disposal. The stakeholder buy-in also varies from school to school. Some districts adopt the change for all their schools, and some implement pilot programs. The circumstances and needs of the school and stakeholders now have another option to improve nutrition in BIC as a breakfast delivery model since no adverse effects were determined compared to traditional breakfast delivery.

Hypothesis 2

Hypothesis 2 stated no significant difference will exist by school-wide poverty level between schools where students participate in the BIC School Breakfast Program versus a traditional school breakfast program on the total number of discipline referrals per capita for elementary schools in Arkansas. No significant interaction effect or main effect of the breakfast delivery model or school-wide poverty level was found on discipline referrals. While Krueger et al. (2018) reported concerns from stakeholders that moving breakfast to the classroom would potentially increase discipline issues, no notable change was found. Similarly, Deasy (2012) indicated that increased breakfast

participation would improve academic achievement, attention span, and decrease school nurse visits leading to less acting out in the classroom and improved discipline. No determination was made that either method increased participation more than the other.

Hypothesis 3

Hypothesis 3 stated no significant difference will exist by school-wide poverty level between schools where students participate in the BIC school breakfast program versus a traditional school breakfast program on the percentage of scores for fourth-grade literacy in the Ready and Exceeding categories as measured by the ACT Aspire Summative Literacy Assessment for elementary schools in Arkansas. No significant interaction effect or main effect of the breakfast delivery model was found on literacy achievement. However, a statistically significant difference in the main effect of the school-wide poverty level was found on fourth-grade literacy scores, though the effect size was small. In a review of multiple national studies, Oaks et al. (2019) found that high poverty schools do far less well in providing students a solid fundamental education, as evidenced by low achievement scores and other outcomes. The findings of this study of Arkansas schools align with prior researchers.

Some have proposed that academic achievement is positively affected when schools have breakfast programs. Taras (2005) noted that school-provided meal programs appeared to result in improved student attendance records and a decrease in student tardiness, thereby improving student academic achievement results. No comparison was made between those eating versus those not eating the morning meal. Bartfeld et al. (2019) found that low-income students in the BIC program had lower mathematics scores than in schools that served a traditional breakfast. However, results from this study

regarding literacy did not affirm those findings. Other researchers contended that having BIC may take time away from schoolwork, resulting in students falling behind in their classwork (Adolphus et al., 2013; Krueger et al., 2019). Again, the current study results did not align with those findings. Varying the delivery method had no significant effect on achievement scores.

Breakfast Delivery Model

This study had only one main effect significance in breakfast delivery systems, with that difference being slight. Finding no difference in the delivery methods may result from many aspects of the provision of school-based meals. The data for this research was collected from large urban areas. School cafeterias in many rural areas of Arkansas are different from big-city districts with large interchangeable teams or possible outsourced cafeteria services. Cafeteria workers are among the longest-serving and most popular staff members in many Arkansas schools. Moving breakfast away from these familiar food providers may be uncomfortable or even unpreferred by students who miss the cafeteria staff. It is also possible that many of the schools studied are not offering free breakfast for all, so students may be reluctant to participate in school breakfast programs where their peers will all know they are getting free or reduced meals. The stigma of school lunch programs would be even more magnified in the classroom, where students would have to indicate they need a meal in front of their peers. In addition, programs studied in large urban areas served the same nutritional content. They just changed the location of the service. Many school cafeterias shifted their nutritional content to pre-packaged selections in Arkansas, which were less labor-intensive to deliver to classrooms. While scrambled eggs and fresh biscuits are easy to serve through the food

line, they are too labor-intensive when they have to be individually packaged for classroom delivery.

One more consideration is the lack of voice in the studied student population. Elementary students have little say on their school arrival time or when they are allowed to be absent. It is frequent for students to arrive late, miss breakfast, or be at school after taking a fever reducer because mom or dad has to go to work. It is possible middle school or high school programs would yield more meaningful results as students are more likely to have a voice in their attendance. Finally, crucial stakeholder buy-in was not measured. This bias could influence greatly the effect of BIC on learning.

School-Wide Poverty Level

One variable that was investigated was the school-wide poverty level. While attempts were made to study a broader gap in school-wide poverty levels, it was difficult to find enough low poverty schools to make a valuable comparison. Schools with low poverty have little incentive to offer BIC as few students need morning breakfast, opting instead for breakfast at home or on the way to school. A cross-sectional survey of schools with and without the BIC program found that elementary school students using the BIC program were more likely to consume breakfast than children at non-BIC schools (Van Wye et al., 2013). According to that research, the implementation of BIC would have a greater effect on student nutrition and possibly attendance, office referrals, and literacy scores. Although a statistical difference was seen between low and high poverty schools on literacy achievement, the effect size (0.273) was large.

Recommendations

Potential for Practice and Policy

Based on the findings of this study, the following recommendations were offered. This study attempted to examine the links between the breakfast delivery model, school-wide poverty, and their effect on attendance, discipline, and literacy scores. The variations in implementation, stakeholder buy-in, and nutritional relevance may have influenced or limited the results. The Arkansas Department of Education and policymakers may want to consider publicly making student meal participation numbers available. If participation can be tracked, it could be studied and correlated to learning, attendance, and discipline.

In addition to tracking student meal participation, researchers could also examine why some schools are achieving greater participation. In this case, it may be a financial decision to move from a traditional program to a BIC program to achieve a better return of payback funds. School vendors may also use this information to develop meal programs targeted to help improve meal participation, nutrition, attendance, discipline, and achievement. Most school feeding programs are based on a military feeding model; detailed consumer data may reveal more efficient and more desirable delivery and nutrition options. It remains likely that student nutrition is an under-valued tool to affect student learning. The study did not look at whether the schools that implemented BIC increased the number of students served breakfast. This number could be an important indicator of a successful BIC implementation.

Second, further data should be gathered on stakeholder perceptions and attitudes toward BIC and traditional breakfast. This data could help form a comparative structure

to improve breakfast offerings. This study should also include a survey of students to improve efforts at reducing social stigma and more desired food offerings for elementary, middle, and high school separately. Solutions may vary for school-age groups, school size, poverty level, and even community norms, all of which should be cataloged and studied. This data could also be used when making purchasing decisions and determining where to use limited resources. Vendors may use these data to tailor offerings more widely to schools instead of converting wider market bulk offerings to school packaging.

Third, there were possible holes in the current self-reported data. Some schools, even some districts, reported zero discipline referrals. While possible, this is highly unlikely. No known attempts were made to verify attendance data. Since attendance data are used in funding, some consideration should be made to verify actual attendance. This is also true in counting meals served. How many meals are served to students and to staff at no cost or discarded as waste should be a consideration. Safeguards would help guarantee that the data are accurate.

Finally, the food delivery model is a financial decision for some districts seeking to raise the number of students participating in breakfast programs and increase their federal repayment dollars. These districts can capture savings by reducing morning supervision since students report directly to classrooms, and buses can arrive later because breakfast is no longer before the bell. In many rural areas of Arkansas, teachers and school staff are often the school bus drivers. This financial calculation may determine how to implement BIC over traditional breakfast. It may not improve attendance, but BIC is proven not to hurt attendance and can possibly save money or allow for the reallocation of funds for a district to better serve its students.

Future Research Considerations

The research study provided sufficient evidence that one type of breakfast delivery option has no significant benefit over the other. The research also revealed potential cost savings or expenditure recovery options for schools that increase breakfast participation. Finally, the research revealed potential commercial opportunities to mine data and tailor school delivery and packaging options. The following recommendations were offered for future research considerations:

1. The present study used self-reported publicly available data. The data did not reflect the effectiveness of the school breakfast delivery system. Comparing the number of breakfast meals served with the number of students would give a better idea of the program's effectiveness.
2. The use of fourth-grade achievement data reflected only the elementary school breakfast delivery models. An examination of achievement scores across the spectrum or combined school achievement scores may yield a different result.
3. This study did not account for the differences in 100% of students offered free breakfast and the more common paid meal or reduced meal funding program. Students who wanted breakfast in the classroom lost much of the anonymity of going through a line in the cafeteria, increasing social stigma. Research in this area could better predict what methods reduce stigma. If everyone eats free, there is no stigma.
4. Stakeholder perceptions data should be gathered on BIC and traditional breakfast. These data could help form a comparative structure to improve breakfast offerings.

5. An investigation of the percentage of students who take advantage of free/reduced-price meal programs, including those who eat breakfast and lunch, might be profitable. This would likely lead to a better understanding of what programs effectively serve student needs. If participation can be tracked, it could be studied and correlated to learning, attendance, and discipline. School vendors may also use this information to develop meal programs targeted to help improve nutrition, attendance, discipline, and achievement. Although it was outside of the scope of this study, more research is needed to identify the determining factors of a successful BIC program.
6. Further data should be gathered on stakeholder perceptions and attitudes toward BIC and traditional breakfast. This data could help form a comparative structure to improve breakfast offerings. Studies could also include a survey of students to improve efforts at reducing social stigma and more desired food offerings. Future research should also identify the needs of elementary, middle school, and high school programs. Differences in attendance are more likely to be based on student perceptions instead of parent schedules. Solutions will likely vary for school-age groups, school size, poverty level, and even community norms, all of which should be cataloged and studied. Data could be used when making purchasing decisions and determining where to use limited resources. Vendors may use this data to tailor offerings more widely to schools instead of converting wider market bulk offerings to school packaging.

Conclusion

This study aimed to determine the effects of schools' breakfast delivery model and school-wide poverty level on attendance, discipline referrals, and fourth-grade literacy achievement on the ACT Aspire. Much more comprehensive research is needed. Chapter V included implications and recommendations for future practice and research. The findings of this study have contributed to expanding knowledge regarding students and the effects of breakfast delivery on school performance.

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