

Research



Health and Education Impacts of the School Breakfast Program and National School Lunch Program

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Executive Summary

- In 2010, Congress reformed the nutritional standards of the National School Lunch Program (NSLP) and the School Breakfast Program (SBP) after evidence showed that the meals were contributing to the childhood obesity epidemic.
- Following implementation of the new nutritional standards, evidence indicates these programs—particularly the SBP—may improve nutritional intake and reduce food insecurity and obesity, especially among low-income children, with estimates of obesity reduction ranging from none to as high as 47 percent.
- There is stronger evidence that these programs improve educational performance, with increased participation improving test scores by as much as 40 percent among poor students; this correlation appears to have increased as the nutritional quality of the meals improved.
- As the strongest evidence for positive effects on both health and education stem from the SBP, which has a participation rate roughly half that of the NSLP, efforts to improve SBP participation by making the program more readily available and providing students more time to eat may yield additional gains.

Background and Program Context

Roughly 60 percent of American schoolchildren receive school-provided meals each day through the [National School Lunch Program \(NSLP\)](#) and [School Breakfast Program \(SBP\)](#). Families at or below 130 percent of the federal poverty level (FPL) are eligible for free meals, while those between 130 and 185 percent are eligible for reduced-price meals.

In 2010, after years of rising childhood obesity rates, Congress enacted the Healthy, Hunger-Free Kids Act, which significantly reformed the nutritional standards of the NSLP and the SBP. Following implementation of these reforms, Healthy Eating Index (HEI) scores increased from 58 percent to 82 percent for the NSLP and from 50 percent to 71 percent for the SBP.^[i] Prior to the reforms, studies suggested that these programs, particularly the NSLP, had limited and possibly even negative health benefits, including increasing obesity. Since, however, studies indicate the programs may be improving nutritional intake and weight, and reducing [food insecurity](#) by at least 3.8 percent and obesity by as much as 47 percent.^[ii] Nonetheless, as of the 2017-2018 school year, [one in five school-age children](#) were still considered obese and in 2019, 5.3 million children still faced food insecurity.^[iii]

Improving the nutritional content of these programs improves their educational effects, as well. While educational benefits were found prior to the nutritional reforms, research suggests that benefits are greater as

nutritional content improves. While the provision of meals of any sort motivated children to attend school even before the reforms, greater nutrition is associated with improved ability to concentrate and higher test scores.

This paper summarizes the literature surrounding SBP and NSLP's impacts on health outcomes and educational attainment, both before and after the updated nutrition standards were adopted. It should be noted, however, that implementation of these new standards has been gradual over the past decade, and some have yet to be fully adopted, as explained [here](#).

Health Impacts

Most of the studies assessing health impacts of the SBP and NSLP focus on similar variables: weight, obesity, body mass index (BMI), or adult height. Studies show adult height to be highly positively correlated with childhood nutrition and health.^[iv] Some studies more simply assess nutrient consumption, using nutrition quality itself as a proxy for health. Other studies regard regular consumption of breakfast as either an indication of or reason for better health, as numerous studies have shown the many benefits of regularly eating breakfast, such as better mental function, greater vitamin and mineral intake, and better weight regulation.^[v]

No/Negative Impacts

Studies finding either no impact or negative health impacts from the school meal programs are old and acknowledge that other factors, such as income and a student's living environment as well as others discussed [here](#) and [here](#), are at play, making it difficult for the authors to truly isolate the programs' impact. For example, a 2009 study found obesity rates were higher for participants of NSLP than for those who did not eat school-provided meals, despite having the same obesity rates when entering kindergarten.^[vi] The study suggests, however, that income rather than the school-provided meals were to blame: All who were income-eligible for reduced-price lunches had a higher likelihood of being obese, regardless of whether they actually ate the meals. Further, the additional calories consumed by students participating in the NSLP were all consumed at lunch and enough to account for the level of weight gain observed.^[vii] Since the reforms implemented after this study sought to reduce calorie content, it is possible that higher calorie consumption for such children would no longer be found and thus the weight gain would also disappear.

One long-term study from decades ago concluded that there are no long-term health impacts of these nutrition programs when considering adult height and BMI for participants, though the author notes there may have been short-term impacts, including better self-perceptions of health.^[viii] The author also speculates that the reason no health effects were found was because participants did not consume any additional calories, contradicting the finding of the previous study.

Mixed Results: SBP More Beneficial than the NSLP

Another 2009 study similarly found that participation in either school meal program was generally associated with increased weight from kindergarten to third grade and a greater likelihood of being overweight, though there were differences in the effect of each program depending on whether the child entered kindergarten at a normal weight or overweight or obese.^[ix] After accounting for selection bias, the authors conclude that the SBP is not contributing to the increase in childhood obesity—and may even be beneficial in the fight to reduce obesity—while the NSLP likely is contributing to the increase in obesity.^[x] The authors speculate the reason for the difference is primarily related to the differences in the nutritional quality of the two meals—finding that school lunches were much less likely to meet nutritional standards—as well as the benefits of simply eating

breakfast. Another study from 2009 found somewhat similar results with a similar rationale: While there was no link between NSLP and students' body mass index, the SBP was associated with lower BMI, and the authors suggest the SBP may contribute to reduced obesity by encouraging students to eat breakfast more regularly.[\[xi\]](#)

These findings follow those of a study from 2004 which showed the SBP improved nutrition quality not just of students participating but also other members of their household; participation in the NSLP was not considered.[\[xii\]](#) Relative to times when school was not in session and the SBP was thus not available, participating students consumed fewer calories from fat, were less likely to have insufficient consumption of fiber, Vitamin C, Vitamin E, or folate, and were more likely to meet the recommendations for potassium and iron intake.[\[xiii\]](#) Further, younger children and adults in the households of children participating in SBP had healthier diets and consumed less fat compared to when school was not in session, likely as a result of the ability to shift resource allocation.[\[xiv\]](#)

A 2014 study regarding universal breakfast and the Breakfast-in-Classroom program found little evidence of improvements to a child's daily nutritional intake and health across the broader population, though some improvements to health and behavior were seen in some highly disadvantaged subpopulations, including greater consumption of a nutritionally substantive breakfast, a decrease in the rate of overweight children, and an increased health index in high-poverty schools.[\[xv\]](#) Girls were found to consume more nutritional breakfasts and minority students had improved behavior.[\[xvi\]](#) Nevertheless, while there were more children taking breakfast at school under universal free breakfast policies, much of this increase was a result of children switching from home to school breakfast or consuming multiple meals each morning rather than students receiving a meal they otherwise were not getting.[\[xvii\]](#)

Positive Impact

Other studies found positive associations between the school food programs and health outcomes, primarily related to obesity. One of the most recent studies examining survey data of 173,000 students found that while the updated nutrition standards had no impact on obesity overall, there were significant reductions in obesity among children in poverty (those most likely to consume school meals).[\[xviii\]](#) The probability of obesity for such children decreased from 25 percent in 2012 to 21 percent in 2018; based on the trend from the prior 10 years, the study estimated that without the new nutrition standards, the probability of obesity among poor children would have been 31 percent (or 47 percent higher) in 2018.[\[xix\]](#)

In 2011, a study using National Health and Nutrition Examination Survey data found evidence that the NSLP improved the health outcomes of children when accounting for differences between eligible and non-eligible children by reducing parental-reported poor health by at least 3.5 percentage points, food insecurity by at least 7.6 percentage points, and obesity by at least 9.4 percentage points.[\[xx\]](#) Another study using the same 2011 National Health and Nutrition Survey found that NSLP reduced obesity rates by 17 percent and led to a 29 percent decline in poor general health in its participants.[\[xxi\]](#)

A 2017 study found that universal free meals increased participation in school lunch programs among both poor and non-poor students, similar to the findings of the study assessing universal breakfast programs, with twice the increase among non-poor students as poor students.[\[xxii\]](#) There was no evidence that the program led to an increase in average BMI, and some evidence suggested that participation in the school lunch program improved weight outcomes for non-poor students, contradicting earlier findings that NSLP led to weight gain.[\[xxiii\]](#) Because this study was conducted after updated nutrition standards had been in effect for several years, it supports the conclusion that the earlier studies' findings were affected by the nutritional quality of the meals.

Analysis from Deloitte estimates that the programs' ability to reduce food insecurity and BMI, and thus the prevalence of certain chronic conditions such as diabetes and obesity, may contribute to fewer childhood hospitalizations.^[xxiv]

Educational Impacts

Studies suggest good nutrition leads to better productivity and focus in school and thus greater educational attainment.^[xxv] The effects of dietary factors on cognitive development and function are well established, and certain dietary choices can promote mental fitness, including better concentration and memory.^[xxvi] Studies consistently find that school meal programs have a positive impact on educational outcomes.

Many studies focusing on the consumption (i.e., quantity of food) of breakfast and lunch suggest that access to these meals has sizable impacts on educational attainment. Providing breakfast in classrooms has been shown to improve attentiveness and reduce disciplinary problems and tardiness.^[xxvii] Research indicates these programs are a more cost-effective way to improve student learning and test scores than, for example, developing smaller class sizes, which pose higher implementation costs.^[xxviii]

The long-term study mentioned earlier, which found no health impacts from the NSLP, did find a positive association with educational attainment (increasing by four months for women and a year for men).^[xxix] The study's author attributes the educational gain to an increased incentive to attend school as a result of the cheap or no-cost meal, and found that the meal provided an even greater attendance incentive than mandatory attendance policies.^[xxx] More recent studies have similarly found school breakfast programs to be a motivating factor, reducing absenteeism, particularly among low-income inner-city students.^[xxxi] Other studies show that those in food-insecure households are more likely to be absent from school, though this is primarily due to illness, and illness is more likely among children with nutritional deficiencies.^[xxxii] This suggests that providing nutritionally rich meals is particularly important.

A [Brookings Institution study](#) sought to determine the impact of the quality of school lunch nutrition on educational achievement by evaluating end-of-year test scores at California public schools over five academic years. This study did not specifically focus on NSLP but rather on the HEI of the meals provided by companies with which schools were contracting, focusing on the quality of food rather than caloric count. The results suggest that when students ate healthier lunches (i.e. those having higher HEI scores), their test scores were, on average, 4 percentile points higher.^[xxxiii] For those qualifying for NSLP programs, test score increases were approximately 40 percent greater.^[xxxiv]

The previously mentioned 2017 study reviewing academic performance through test scores following the adoption of universal free lunch programs in New York City (where children received meals regardless of income) found that there were generally increases in test scores in math and English language arts for all students, though the academic improvements were greater for non-poor students than they were for poor students.^[xxxv] Specifically, the authors estimate that the increase in lunches consumed leads to increased performance in math by the equivalent of seven to ten weeks of learning for non-poor students and three to four weeks for poor students; for English Language Arts, the increases represent six to nine weeks and three to four weeks, respectively. The authors note that the policy led to greater increases in participation in the school lunch program among non-poor students than poor students, possibly explaining the greater impact on performance among non-poor students.

The impact of these programs can also be assessed by examining education and health trends for students in the

summer when they do not have access to these programs. Low-income students face much more significant “summer slides” (learning loss) than peers, having a cumulative effect over time that contributes to a widening achievement gap between low- and high-income students by the fifth grade.[xxxvi] A Deloitte report estimates that if all children receiving free or reduced-price meals during the school year had access to these meals in the summer, there could be as many as 81,600 more kids who graduate high school each year.[xxxvii] These numbers underscore the importance of the programs during the school year, as well.

Opportunities for Increased Participation

Given the positive health and educational benefits associated with school meal programs, particularly the SBP, gaps in participation offer opportunities for additional gains.

Children in families experiencing hunger are more likely to repeat a grade and receive special education resources.[xxxviii] School meal programs aim to eliminate the barrier of hunger, yet there are still issues with participation. Of those eating school lunches, only 46 percent of students also eligible for the SBP participated in it, according to a study from 2011.[xxxix] While SBP participation has been steadily increasing, there are still roughly just 60 percent as many students receiving a free breakfast as a free lunch.[xl]

Further, overall increases in participation mask differences among age groups and races. The number of students consuming breakfast decreased dramatically with age, with elementary school students much more likely to eat breakfast than high school students, and Black girls much less likely to eat breakfast than White girls.[xli] It is estimated that approximately 25 percent of high school students do not eat breakfast, a number that has been increasing over time. A study of Minnesota high school students found that the most common reasons for skipping the meal were students were too busy or didn’t have enough time to eat breakfast, or they were not hungry in the mornings; 15 percent of students worried that eating breakfast may cause weight gain.[xlii] Given the positive findings related to the SBP, these findings are worrisome and suggest that overall academic performance could rise if the SBP reached these students who are not eating breakfast.

Reported Barriers to Eating Breakfast				
Food Components	Strongly Disagree	Disagree	Agree	Strongly Agree
I am too busy to eat breakfast	12.6%	42.5%	32.8%	12.2%
Eating school breakfast takes too much time	12.7%	47.9%	32.8%	6.7%
The bus arrives too late for me to eat breakfast	24.1%	53.4%	16.1%	6.4%
I skip breakfast because I am not hungry in the morning	11.2%	32.9%	40.6%	15.3%
I skip breakfast because it may cause me to gain weight	33.2%	51.4%	10.4%	5.0%

Source: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4825869/>

A study from 2009 found that students were more likely to eat breakfast when it was served in the classroom and when more time was provided for breakfast at school.[xliii] Research has also shown that students are more likely to eat breakfast at school when it is universally available for free, not just to those with low income, largely because it reduces the stigma that children feel.[xliv] While the decline in SBP participation following the elimination of universally free meals was greatest among students not otherwise eligible for a subsidized

meal, participation also dropped by 7 percent among students who were eligible for a free or reduced-price meal. [xlv] Similarly, when a universally free meal policy was newly adopted, participation among students who had already been eligible for a free or reduced-priced breakfast increased 13.1 percent and 22.8 percent, respectively; participation among students paying full price increased 28.3 percent. [xlvi]

Another barrier limiting student participation in the SBP is the lack of availability. Schools are somewhat less likely to offer breakfast programs than lunch programs: Only 85 percent of schools provide breakfast, while 91 percent of schools participate in the NSLP. [xlvii] One likely reason for this discrepancy is that the reimbursement rate for breakfast is \$0.78 less than the cost to provide it, while the loss on lunches is nearly 60 percent less at \$0.32 per meal. [xlviii]

Conclusion

Overall, the NSLP and SBP work to reduce food insecurity and obesity and improve educational achievement. While older studies were less likely to find positive health impacts of the programs, particularly regarding the NSLP, studies conducted after implementation of the revised nutritional standards adopted in 2010 generally show positive (or at least neutral) impacts, particularly for lower-income individuals. The SBP was more consistently found to yield positive health impacts, both before and after the nutritional standards were revised. Further, those early studies that did find negative health impacts of these programs indicated such findings were likely correlated to a number of other factors based on students' income level. As for the educational benefits, the research more strongly indicates the positive impacts of these programs. Research suggests that policy targeting student nutrition, particularly through the increased provision of breakfast, may be one of the more cost-effective policy approaches to improve student learning outcomes and test scores.

[i] <https://www.mathematica.org/news/school-meals-are-healthier-after-major-nutrition-reforms>

[ii] <https://frac.org/programs/national-school-lunch-program/benefits-school-lunch>

[iii] <https://www.americanactionforum.org/research/food-insecurity-and-food-insufficiency-assessing-causes-and-historical-trends/>

[iv] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4892290/>,
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2809930/>

[v] https://www.hopkinsmedicine.org/johns-hopkins-childrens-center/what-we-treat/specialties/nephrology/programs-centers/obesity-hypertension-clinic/_documents/eating-right-wake-up-benefits-breakfast2.pdf

[vi] <https://www.sesp.northwestern.edu/docs/publications/982412224551ec93458609.pdf>,
<https://www.jstor.org/stable/20648913?seq=1>

[vii] <https://www.sesp.northwestern.edu/docs/publications/982412224551ec93458609.pdf>

[viii] <https://www.jstor.org/stable/40802085?seq=1>

[ix] <https://faculty.smu.edu/millimet/classes/eco7377/papers/millimet%20et%20al.pdf>

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