

Title: School breakfast programs and student outcomes

Date: November 2014

Question: >> Could you provide information on the relationship between school breakfast programs and student outcomes?

Response:

This memo includes reports and articles about school breakfast programs.

- Citations include a link to a free online version, when available.
- Citations are accompanied by an abstract, excerpt, or summary written by the author or publisher of the document.

We have not done an evaluation of the methodological rigor of these resources, but provide them for your information only.

References

Adolphus, K., Lawton, C. L., & Dye, L. (2013). The effects of breakfast on behavior and academic performance in children and adolescents. *Frontiers in Human Neuroscience*. Retrieved on November 5, 2014, from <http://www.ncbi.nlm.nih.gov/pubmed/23964220>

Abstract: Breakfast consumption is associated with positive outcomes for diet quality, micronutrient intake, weight status and lifestyle factors. Breakfast has been suggested to positively affect learning in children in terms of behavior, cognitive, and school performance. However, these assertions are largely based on evidence which demonstrates acute effects of breakfast on cognitive performance. Less research which examines the effects of breakfast on the ecologically valid outcomes of academic performance or in-class behavior is available. The literature was searched for articles published between 1950–2013 indexed in Ovid MEDLINE, Pubmed, Web of Science, the Cochrane Library, EMBASE databases, and PsychINFO. Thirty-six articles examining the effects of breakfast on in-class behavior and academic performance in children and adolescents were included. The effects of breakfast in different populations were considered, including undernourished or well-nourished children and adolescents from differing socio-economic status (SES) backgrounds. The habitual and acute effects of breakfast and the effects of school breakfast programs (SBPs) were considered. The evidence indicated a mainly positive effect of breakfast on on-task behavior in the classroom. There was suggestive evidence that habitual breakfast (frequency and quality) and SBPs have a positive effect on children's academic performance with clearest effects on mathematic and arithmetic grades in undernourished children. Increased frequency of habitual breakfast was consistently positively associated with academic performance. Some evidence suggested that quality of habitual breakfast, in terms of providing a greater variety of food groups and adequate energy, was positively related to school performance. However, these

associations can be attributed, in part, to confounders such as SES and to methodological weaknesses such as the subjective nature of the observations of behavior in class.

Bartfeld, J., Kim, M., Ryu, J. H., & Ahn, H. (2009). *The school breakfast program participation and impacts* (Contractor and Cooperator Report No. 54). Washington, DC: U.S. Department of Agriculture. Retrieved on November 4, 2014, from <http://naldc.nal.usda.gov/download/35895/PDF>

Abstract: Participation in the School Breakfast Program is much less common than participation in the National School Lunch Program, even among children with access to both programs. This report examines the determinants of participation in the School Breakfast Program among third grade public school students, as well as the impacts of the program on food insecurity and children's risk of skipping breakfast. Data are from the Early Childhood Longitudinal Survey—Kindergarten Cohort and from the Wisconsin Schools Food Security Survey. The study found that students are more likely to participate when breakfast is served in the classroom, when time available for breakfast in school is longer, and when they come from lower income or time-constrained households. Children with access to the School Breakfast Program are more likely to eat breakfast in the morning and that program access may enhance food security among families at the margin of food insecurity.

Basch, C. E. (2011). Breakfast and the achievement gap among urban minority youth. *Journal of School Health, 81*(10), 635–40. Retrieved on November 4, 2014, from <http://www.readcube.com/articles/10.1111/j.1746-1561.2011.00638.x>

Abstract: OBJECTIVES: To outline the prevalence and disparities of breakfast consumption among school-aged urban minority youth, causal pathways through which skipping breakfast adversely affects academic achievement, and proven or promising approaches for schools to increase breakfast consumption. METHODS: Literature review. RESULTS: On any given day a substantial proportion of American youth do not eat breakfast. On an average day, less than half (~46%) of children participating in free or reduced-price lunch also participated in the School Breakfast Program for which they were also eligible. In a large study of 9-year-olds, 77% of White girls and 57% of Black girls consumed breakfast on all 3 days assessed; by age 19, the respective rates were 32% and 22%. Neuroscience research has identified the processes by which dietary behavior influences neuronal activity and synaptic plasticity, both of which influence cognitive functions. Participation in School Breakfast Programs has also been associated with reduced absenteeism. Universal School Breakfast Programs and allowing youth to eat breakfast in the classroom (vs. cafeteria) are approaches that have been shown to increase participation. CONCLUSIONS: Skipping breakfast is highly and disproportionately prevalent among school-aged urban minority youth, has a negative impact on academic achievement by adversely affecting cognition and absenteeism, and effective practices are available for schools to address this problem. Despite wide availability, the majority of American youth do not participate in School Breakfast Programs. 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.

Bernstein, L. S., McLaughlin, J. E., Crepinsek, M. K., & Daft, L. M. (2004). *Evaluation of the school breakfast program pilot project: Summary of findings from the final report* (Nutrition Assistance Program Report Series, No. CN-04-SBP). Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service, Office of Analysis, Nutrition, and Evaluation. Retrieved on November 4, 2014, from <http://www.fns.usda.gov/sites/default/files/SBPPSummary.pdf> [For the full report, see <http://www.fns.usda.gov/sites/default/files/SBPPFinal.pdf>]

Excerpt: The aim of this pilot was to study the impact of the availability of universal-free school breakfast on breakfast participation and measures related to elementary school students' nutritional status and academic performance. The two main objectives of the evaluation were to: (1) Assess the effects of the availability of universal-free school breakfast on breakfast participation and selected student outcome measures including dietary intake, cognitive and social/emotional functioning, academic achievement, school attendance, tardiness, classroom behavior and discipline, food insecurity, and health; and (2) Document the methods used by schools to implement universal-free school breakfast and determine the effect of participation in this program on administrative requirements and costs... The availability of universal-free school breakfast significantly increased school breakfast participation but had little impact on other outcomes measured over the course of the evaluation including academic achievement test scores, attendance, tardiness, health, and discipline. Although treatment school students were more likely to consume a nutritionally substantive breakfast than control school students, there was almost no difference in average food and nutrient intakes at breakfast or over the course of the day. It should be noted that these findings do not negate the importance of eating breakfast. What these findings suggest is that simply offering free school breakfast to all elementary school students would not, on average, be expected to improve academic or behavior outcomes beyond what occurs in schools already offering the SBP.

Brown, J. L., Beardslee, W. H., & Prothrow-Stith, D. (2008). *Impact of school breakfast on children's health and learning: An analysis of the scientific research*. Cambridge, MA: Harvard School of Public Health. Retrieved on November 4, 2014, from http://www.sodexofoundation.org/hunger_us/Images/Impact%20of%20School%20Breakfast%20Study_tcm150-212606.PDF

Excerpt: The body of evidence, drawn from more than 100 published research articles, provides the scientific basis for concluding that the School Breakfast Program (SBP) is highly effective in terms of providing children with a stronger basis to learn in school, eat more nutritious diets, and lead more healthy lives both emotionally and physically. Participation in the SBP is also economically desirable for our nation, the research shows. While no single study necessarily provides a uniquely definitive assessment of the SBP's benefits, and while some studies occasionally reach differing conclusions, the combined and quite consistent message of this body of research is that serving breakfast to those schoolchildren who don't get it elsewhere significantly improves their cognitive or mental abilities, enabling them to be more alert, pay better attention, and to do better in terms of reading, math and other standardized test scores. Children who eat breakfast also are sick less often, have fewer problems associated with hunger, such as dizziness, lethargy, stomachaches and earaches, and do significantly better than their non-breakfasted peers in terms of cooperation, discipline and inter-personal behaviors. Protecting the ten million low-income children who are eligible for the SBP, but who do not receive it, is a goal that the nation can achieve. Funding is not an impediment since Congress provides reimbursement to local school districts who offer the program. Moreover, facilities and equipment pose no hurdles since virtually all school districts in the nation already offer the National School Lunch Program. Achieving more participation by schools in the SBP is the key challenge. Full utilization of the SBP in U.S. school districts also increases cost efficiency. When schools do not provide breakfast to children, the loss of return on educational investment becomes a hidden tax paid by the local district and community. Some states, for example, lose tens of millions of dollars a year in federal funding by not fully utilizing the SBP. Altogether, states lose an estimated half a billion dollars annually in school breakfast funding from Congress. A second hidden tax that is paid when schools do not provide children with a school breakfast comes in the form of poorer educational outcomes. America pays an estimated \$90 billion annually when some of its people go hungry; money that comes in the form of more illness, lethargy, lost productivity, and poorer educational outcomes on the part of children. Of this amount, nearly \$10 billion represents the costs of poorer education-related outcomes such as greater

absenteeism and more grade retention related to hunger. More than \$65 billion of the \$90 billion total is paid for poorer health and psychosocial dysfunction, a significant proportion of it for conditions among children from households that do not get enough to eat. The researchers conclude that the scientific evidence indicates that full participation by all U.S. school districts in the federally funded SBP would be a win for children and a win for the nation.

Imberman, S. A., & Kugler, A. D. (2014). The effect of providing breakfast in class on student performance. *Journal of Policy Analysis and Management*, 00, 1–31. Retrieved on November 4, 2014, from <https://aefpweb.org/sites/default/files/webform/imberman%20kugler%202012.pdf>

Abstract: In response to low take-up, many schools have experimented with moving breakfast from the cafeteria to the classroom. We examine whether such a program increases performance as measured by standardized test scores, grades and attendance rates. We exploit quasi-random timing of program implementation that allows for a difference-in-differences identification strategy. Our main identification assumption is that schools where the program was introduced earlier would have evolved similarly to those where the program was introduced later. We find that providing breakfast in-class relative to the cafeteria raises both math and reading achievement by about one-tenth of a standard deviation. Moreover, we find that these effects are most pronounced for low performing, free-lunch eligible, Hispanic, and low BMI students. However, a lack of differential impacts by time of exposure and no change in course grades suggest that these improvements in test performance do not translate into increased learning.

Kleinmann, R. E., Hall, S., Green, H., Korzec-Ramirez, D., Patton, K., Pagano, M. E., & Murphy, J. M. (2002). Diet, breakfast and academic performance in children. *Annals of Nutritional Metabolism*, 6(suppl 1), 24–30. Retrieved on November 4, 2014, from <http://www.feingold.org/Research/PDFstudies/Kleinman2002-open.pdf>

Abstract: Objective: To determine whether nutrient intake and academic and psychosocial functioning improve after the start of a universal-free school breakfast program (USBP). Methods: Information was gathered from 97 inner city students prior to the start of a USBP and again after the program had been in place for 6 months. Students who had total energy intakes of <50% of the recommended daily allowance (RDA) and/or 2 or more micronutrients of <50% of RDA were considered to be at nutritional risk. Results: Prior to the USBP, 33% of all study children were classified as being at nutritional risk. Children who were at nutritional risk had significantly poorer attendance, punctuality, and grades at school, more behavior problems, and were less likely to eat breakfast at school than children who were not at nutritional risk. Six months after the start of the free school breakfast programs, students who decreased their nutritional risk showed significantly greater: improvements in attendance and school breakfast participation, decreases in hunger, and improvements in math grades and behavior than children who did not decrease their nutritional risk. Conclusion: Participation in a school breakfast program enhanced daily nutrient intake and improvements in nutrient intake were associated with significant improvements in student academic performance and psychosocial functioning and decreases in hunger.

Leos-Urbel, J., Schwartz, A. E., Weinstein, M., & Corcoran, S. (2013). Not just for poor kids: The impact of universal free school breakfast on meal participation and student outcomes. *Economics of Education Review*, 36, 88–107. Retrieved on November 5, 2014, from [http://steinhardt.nyu.edu/scmsAdmin/media/users/ggg5/Leos-Urbel et al Not Just for Poor Kids The Impact of Universal Free School Breakfast on Meal Participation and Student Outcomes.pdf](http://steinhardt.nyu.edu/scmsAdmin/media/users/ggg5/Leos-Urbel%20et%20al%20Not%20Just%20for%20Poor%20Kids%20The%20Impact%20of%20Universal%20Free%20School%20Breakfast%20on%20Meal%20Participation%20and%20Student%20Outcomes.pdf)

Abstract: This paper examines the impact of the implementation of a universal free school breakfast policy on meals program participation, attendance, and academic achievement. In 2003, New York

City made school breakfast free for all students regardless of income, while increasing the price of lunch for those ineligible for meal subsidies. Using a difference-in-difference estimation strategy, we derive plausibly causal estimates of the policy's impact by exploiting within and between group variation in school meal pricing before and after the policy change. Our estimates suggest that the policy resulted in small increases in breakfast participation both for students who experienced a decrease in the price of breakfast and for free-lunch eligible students who experienced no price change. The latter suggests that universal provision may alter behavior through mechanisms other than price, highlighting the potential merits of universal provision over targeted services. We find limited evidence of policy impacts on academic outcomes.

Mhurchu, C. N., Gorton, D., Turley, M., Jiang, Y., Michie, J., Maddison, R., & Hattie, J. (2013). Effects of a free school breakfast programme on children's attendance, academic achievement and short-term hunger: Results from a stepped-wedge, cluster randomised controlled trial. *Journal of Epidemiology and Community Health*, 67(3), 257–264. Retrieved on November 5, 2014, from <http://www.ncbi.nlm.nih.gov/pubmed/23043203>

Abstract: Free school breakfast programs (SBPs) exist in a number of high-income countries, but their effects on educational outcomes have rarely been evaluated in randomized controlled trials. *Methods:* A 1-year stepped-wedge, cluster randomized controlled trial was undertaken in 14 New Zealand schools in low socioeconomic resource areas. Participants were 424 children, mean age 9 ± 2 years, 53% female. The intervention was a free daily SBP. The primary outcome was children's school attendance. Secondary outcomes were academic achievement, self-reported grades, sense of belonging at school, behavior, short-term hunger, breakfast habits and food security. *Results:* There was no statistically significant effect of the breakfast program on children's school attendance. The odds of children achieving an attendance rate < 95% was 0.76 (95% CI 0.56 to 1.02) during the intervention phase and 0.93 (95% CI 0.67 to 1.31) during the control phase, giving an OR of 0.81 (95% CI 0.59 to 1.11), $p = 0.19$. There was a significant decrease in children's self-reported short-term hunger during the intervention phase compared with the control phase, demonstrated by an increase of 8.6 units on the Freddy satiety scale (95% CI 3.4 to 13.7, $p = 0.001$). There were no effects of the intervention on any other outcome. *Conclusions:* A free SBP did not have a significant effect on children's school attendance or academic achievement but had significant positive effects on children's short-term satiety ratings. More frequent program attendance may be required to influence school attendance and academic achievement.

Murphy, J. M., Drake, J. E., & Weineke, K. M. (2005). *Academics & Breakfast Connection pilot: Final report on New York's classroom breakfast project*. Albany, NY: Nutrition Consortium of New York State. Retrieved on November 4, 2014, from http://frac.org/wp-content/uploads/2010/10/bic_ny_final_report.pdf

Excerpt: During the 2003/2004 school year, twenty schools in upstate New York implemented the Academics & Breakfast Connection (ABC) Pilot – a program designed to produce replicable classroom breakfast models that reduce childhood hunger and improve academic performance. Funded by a grant from the Nutrition Consortium of New York State, elementary and secondary students of varying income levels participated in the Pilot in rural, urban and suburban schools throughout the state. Funding for the Academics & Breakfast Connection Pilot was secured from the Indirect Vitamins Purchases Antitrust Litigation Settlement administered by the New York State Attorney General. As ABC Pilot participants, Pilot schools served breakfast to all students at no charge (regardless of income) and students consumed their meals in the classroom setting. The following are some highlights of ABC Pilot results:

1. School Breakfast Program participation increased dramatically:
 - Program participation more than doubled — the percentage of enrolled students eating breakfast at school increased from 23% to 58%

- During the ABC Pilot school year, over 5,000 students received breakfast on an average day compared to the 1,883 who ate breakfast during the previous year
2. School-wide data on student performance showed improvement in all areas studied: From the year before Pilot implementation to the year of Pilot operation:
 - Tardiness declined from 3.0 to 2.6 days per student per year, a statistically significant difference
 - Disciplinary office referrals decreased significantly, from 1.3 to 1.1 referrals per student per year
 - Absenteeism rates fell from 7.9 to 7.4 days per student per year, though this result did not reach statistical significance
 - Visits to the school nurse declined from 9.3 to 8.7 per student per year, though this difference did not reach statistical significance
 3. The ABC Pilot had a positive impact on education:
 - 100% of the Principals of ABC Pilot schools believe the Pilot made an important contribution to the education process
 - Nearly all Principals (87%) reported that they believed the ABC Pilot classroom breakfast program contributed to improvements in academic performance
 - Teachers (nearly 80%) agreed that the Pilot made an important contribution to the education process
 - 72% of teachers reported that the Pilot did not interfere with teaching
 - Most teachers (85%) reported fewer complaints of hunger from students
 4. Teachers and principals expressed strong support for the ABC Pilot:
 - 79% of teachers supported continuation of the Pilot
 - 75% of principals reported plans to continue the Pilot in the next school year.

Ribar, D. C., & Haldeman, L. A. (2013). Changes in meal participation, attendance, and test scores associated with the availability of universal free school breakfasts. *Social Service Review*, 87(2), 354–385. Retrieved on November 5, 2014, from http://libres.uncg.edu/ir/uncg/f/D_Ribar_Changes_2013.pdf

Abstract: This study investigates student outcomes associated with changes in the availability of universal free breakfasts at elementary schools in the Guilford County Schools (GCS) in North Carolina, in 2007–8. The GCS offered universal free breakfasts in schools with high proportions of economically disadvantaged students. In 2008–9, the GCS reduced its universal free programs, with the affected schools returning to eligibility-based programs. We examine how breakfast and lunch participation, attendance, and reading, math, and science test scores changed across years at affected and unaffected schools. We find that the switch from a universal free to an eligibility-based School Breakfast Program reduced breakfast participation substantially with the largest changes occurring among students who were not eligible for free or reduced-price meals. The changes to eligibility-based provision were associated with decreases in lunch participation for paid-eligible students but not for other students. The changes to eligibility-based provision did not harm test scores or attendance.

Schanzenbach, D. W., & Zaki, M. (2014). *Expanding the school breakfast program: Impacts on children's consumption, nutrition and health*. Cambridge, MA: National Bureau of Economic Research, Inc. Retrieved on November 5, 2014, from <http://www.nber.org/papers/w20308>

Abstract: School meals programs are the front line of defense against childhood hunger, and while the school lunch program is nearly universally available in U.S. public schools, the school breakfast program has lagged behind in terms of availability and participation. In this paper we use experimental data collected by the USDA to measure the impact of two popular policy innovations aimed at increasing access to the school breakfast program. The

first, universal free school breakfast, provides a hot breakfast before school (typically served in the school's cafeteria) to all students regardless of their income eligibility for free or reduced-price meals. The second is the Breakfast in the Classroom (BIC) program that provides free school breakfast to all children to be eaten in the classroom during the first few minutes of the school day. We find both policies increase the take-up rate of school breakfast, though much of this reflects shifting breakfast consumption from home to school or consumption of multiple breakfasts and relatively little of the increase is from students gaining access to breakfast. We find little evidence of overall improvements in child 24-hour nutritional intake, health, behavior or achievement, with some evidence of health and behavior improvements among specific subpopulations.

METHODS

Keywords and Search Strings Used in the Search

("School breakfast" OR "school breakfast program") AND ("student outcomes" OR "student achievement").

Search of Databases

EBSCO Host; Google; and Google Scholar

Criteria for Inclusion

When REL West staff review resources, they consider—among other things—four factors:

- **Date of the Publication:** The most current information is included, except in the case of nationally known seminal resources.
- **Source and Funder of the Report/Study/Brief/Article:** Priority is given to IES, nationally funded, and certain other vetted sources known for strict attention to research protocols.
- **Methodology:** Sources include randomized controlled trial studies, surveys, self-assessments, literature reviews, and policy briefs. Priority for inclusion generally is given to randomized controlled trial study findings, but the reader should note at least the following factors when basing decisions on these resources: numbers of participants (Just a few? Thousands?); selection (Did the participants volunteer for the study or were they chosen?); representation (Were findings generalized from a homogeneous or a diverse pool of participants? Was the study sample representative of the population as a whole?).
- **Existing Knowledge Base:** Although we strive to include vetted resources, there are times when the research base is limited or nonexistent. In these cases, we have included the best resources we could find, which may include newspaper articles, interviews with content specialists, organization websites, and other sources.

This memorandum is one in a series of quick-turnaround responses to specific questions posed by educators and policymakers in the Western region (Arizona, California, Nevada, Utah), which is served by the Regional Educational Laboratory West (REL West) at WestEd. This memorandum was prepared by REL West under a contract with the U.S. Department of Education's Institute of Education Sciences (IES), Contract ED-IES-12-C-0002, administered by WestEd. Its content does not necessarily reflect the views or policies of IES or the U.S. Department of Education nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.