













SCHOOL BREAKFAST: RESEARCH OVERVIEW

A substantial body of research clearly demonstrates that school breakfast significantly improves academic performance, and physical and emotional health.

After reviewing more than 100 studies and evaluations of the School Breakfast Program, researchers have found that serving breakfast significantly improves students' cognitive abilities, enabling them to be more alert, pay better attention and perform better on 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 and stomachaches, and do significantly better than their non-breakfasted peers in terms of cooperation, discipline and interpersonal behaviors.¹

In the short term, breakfast consumption improves concentration, learning skills and working memory. In the long term, school breakfast programs can improve school attendance and dropout rates. Breakfast programs are most effective when schools are given standards for participation and execution.²

IMPROVED	DECREASED
 Cognitive Function	 Risk for Obesity and Diabetes
 Academic Achievement	 Aggressive Behavior
 School Attendance	 Delinquency
 Diet and Physical Health	 Suspensions
 Emotional Health	 Tardiness

School Breakfast Improves Academic Performance

- Sufficient blood glucose levels, which accompany a nutritious breakfast, significantly improve young children's memory function, including the ability to recall a list of words, memorize stories and repeat facts while distracted.³ On the other hand, fasting overnight has adverse effects on cognition the next morning, particularly the speed of information retrieval.⁴
- According to experimental studies, students who eat breakfast report feeling more motivated at school and have improved cognitive performance. They also have better visual perception and spatial memory ability. Results on short-term memory tests are higher for students who eat a nutritious breakfast, such as oatmeal, than those who do not eat breakfast.⁵
- In a California Department of Education survey of students in grades 7, 9 and 11, schools with a higher percentage of pupils eating breakfast had significantly higher Academic Performance Index (API) scores.⁶
- An analysis of the USDA's School Breakfast Program found that it significantly improves school performance and reduces absenteeism and tardiness, all while improving children's diets overall.⁷
- The School Breakfast Program has a positive effect on children's academic performance with the clearest effects being for mathematics among undernourished children. Some evidence suggests that eating a daily breakfast with a wide variety of foods, as is served at school, contributes to academic performance. School breakfast also has a positive impact on on-task behavior and focus in the classroom.⁸
- Participation in the School Breakfast Program is associated with significant improvements in standardized test scores among low-income elementary school children.⁹
- Breakfast consumption has a positive impact on student literacy, independent of income level or parental education.¹⁰

- Skipping breakfast is highly and disproportionately prevalent among school-aged minority youth and has a negative impact on academic achievement by adversely affecting cognition and attendance. Due to problems with the implementation of the School Breakfast Program today, the majority of American youth do not have breakfast, with even lower rates of participation in minority communities.¹¹

School Breakfast Improves Attendance, Focus, and Classroom Behavior

- Children from families that report multiple experiences of food insecurity and hunger are more likely to show behavioral, emotional and academic problems on a standardized measure of psychosocial dysfunction than children from the same low-income communities that are not food insufficient. Hungry children are also more likely to have repeated a grade, received special education services or mental health counseling,¹² and to be delinquent.¹³
- School breakfast programs have been shown to improve attendance and reduce absenteeism, which translates to improved academic performance due to greater classroom participation. Children who usually go hungry at home benefit the most academically when they receive breakfast at school.¹⁴ On average, school breakfast reduces absenteeism by 1.5 days per child and leads to a 17.5 percent boost in math scores on standardized tests.¹⁵
- Food-insufficient children are more likely to have difficulty getting along with their peers. Food-insufficient teenagers also have an increased likelihood of being suspended from school.¹⁶
- Children experiencing hunger are more likely to lack focus and be hyperactive, distracting other students from learning experiences in the classroom. School breakfast participation positively impacts children's mental health, including reductions in behavioral problems, anxiety and depression.¹⁷

- Children who are at nutritional risk have poorer attendance, punctuality and grades at school, more behavior problems, and are less likely to eat breakfast at school than children who are not at risk. Students who enter a new school breakfast program have been shown to have significant improvements in attendance, math grades and behavior.¹⁸
- The positive impact of breakfast on nutritional status can decrease rates of illness at school, consequently improving school attendance.¹⁹ After the implementation of the School Breakfast Program, schools experience significant improvements in attendance.²⁰ Reduced absenteeism has extraordinary long-term benefits. Students who attend school more often are more likely to have above average grades and graduate from high school.²¹ Students who graduate high school earn \$10,090 per year more on average²² and have a 4 percent lower unemployment rate.²³
- America loses an estimated \$90 billion annually when a segment of its population goes hungry, money that comes in the form of more illness, lethargy, lost productivity, and poorer educational outcomes. Of this amount, nearly \$10 billion represents the costs of poorer education-related outcomes, such as greater absenteeism and delayed graduation as a result of hunger.²⁴

School Breakfast Improves Physical Health

- Having a daily breakfast is strongly correlated with lower overweight and obesity rates among children.²⁵ In a nationally representative sample of children in grades 1-12, participation in the School Breakfast Program was significantly associated with healthier body weights and lower BMI.²⁶
- School breakfast participants are less likely to drink sugar-sweetened beverages and more likely to drink nutritious milk.²⁷ Children who eat school breakfast consume less added sugar and more fruit than children who eat a quick breakfast outside of school. Consuming less added sugar may also prevent childhood obesity and type 2 diabetes.²⁸
- Skipping breakfast is associated with decreased physical activity, which significantly contributes to overweight.²⁹
- Children who eat breakfast at school are more likely to reach the Recommended Dietary Allowances of vitamin A, vitamin D, calcium, magnesium, thiamin, riboflavin and zinc than students who don't eat school breakfast³⁰ or eat breakfast elsewhere.³¹
- Breakfast consumption can increase the feeling of fullness throughout the morning. Compared to students who do not eat breakfast, those who eat a breakfast rich in protein, like school breakfast, consume fewer calories at lunch. High-protein breakfasts may also help regulate appetite throughout the day.³² Eating breakfast frequently may help control appetite and blood sugar, which has important implications for the risk of obesity and diabetes.³³

Benefits of Breakfast After the Bell Models

- Classroom breakfast is not associated with higher daily calorie intake and has been shown to significantly improve diet quality. Many studies have shown that it can increase attendance, improve behavior and contribute to academic achievement.³⁴
- A study of the pilot classroom breakfast program in six Maryland school districts found that more than 80 percent of teachers and administrators thought that implementing breakfast in the classroom improved the school learning environment by decreasing tardiness and improving behavior. Principals also reported that disciplinary suspensions decreased at their schools.³⁵
- Another pilot program found that breakfast after the bell programs increased breakfast participation by 35 percent in just one year. Students in the program were 6 percent less likely to be chronically absent and had higher math and reading test scores. Math scores were a full ten percent higher. Overall, breakfast after the bell had the greatest impact on lower-income schools.³⁶

- Many children choose not to eat breakfast in the cafeteria because it comes with the stigma of appearing “poor.” Breakfast in the classroom can prevent this stigma from getting in the way of breakfast while improving students’ emotional health.³⁷
- Serving breakfast in class instead of the cafeteria raises both math and reading achievement scores by about one-tenth of a standard deviation. Moreover, this effect is strongest for low performing, free-lunch eligible, Hispanic and low BMI students.³⁸
- A pilot program that offered all students a free breakfast in the classroom at twenty New York schools found that it increased breakfast participation from 23 to 58 percent. As a result, tardiness, absenteeism and visits to the nurse and to the principal’s office declined significantly. About 80 percent of participating teachers and principals said that the program improved academic performance and behavior, while having little to no interference with classroom teaching.³⁹
- Students are more likely to participate in breakfast when it is served in the classroom. Consuming breakfast at school may enhance food security in families at the margin of food insecurity.⁴⁰

Benefits of School-Wide No Cost Breakfast

- A study on the effects of universal school breakfast, through which all students are offered a school breakfast free of charge, found that math and reading achievement scores increased each year the program was in place. After the implementation of universal school breakfast, school nurses reported a decrease in student complaints of stomachaches and headaches.⁴¹
- Students in schools with universal school breakfast programs are less likely to skip breakfast due to concerns of body image or the stigma of “being poor” that can come with eating in the cafeteria.⁴²
- Implementation of universal classroom breakfast has been shown to improve class attendance.⁴³
- Hungry students tend to have poor attendance, punctuality and grades, more behavior problems, and are also less likely to participate in school breakfast. Offering universal free breakfast to these students, as occurred in Boston’s public schools, significantly improves attendance, school breakfast participation and, consequently, math scores.⁴⁴
- Universal free school breakfast programs have been shown to double breakfast participation. This in turn increased math grades, lowered absence and tardiness rates, and improved teachers’ assessments of student’s behavior, focus and well-being.⁴⁵ A USDA pilot program offering free school breakfast to all students also demonstrated that the universal model nearly doubles breakfast participation in elementary schools. The majority of teachers had a positive opinion of the pilot program for breakfast in the classroom.⁴⁶

SOURCES

- 1 Brown JL, Beardslee WH, Prothrow-Stith, D. Impact of School Breakfast on Children's Health and Learning: an Analysis of the Scientific Research. Gaithersburg, MD: Sodexo Foundation; 2008.
- 2 Cueto S. Breakfast and performance. *Public Health Nutr.* 2001;4(6A):1429-31.
- 3 Benton, D., Parker, P. (1998). Breakfast, blood glucose, and cognition. *The American Journal of Clinical Nutrition*, 67(4), 772S-778S.
- 4 Pollitt E. Does breakfast make a difference in school? *J Am Diet Assoc.* 1995;95:1134-1139.
- 5 Mahoney, C. R., Taylor, H. A., Kanarek, R. B., & Samuel, P. (2005). Effect of breakfast composition on cognitive processes in elementary school children. *Physiology & Behavior*, 85: 635-645.
- 6 Hanson, T.L. & Austin, G.A. (2002). Health risks, resilience, and the Academic Performance Index. (California Healthy Kids Survey Factsheet 1). Los Alamitos, CA: WestEd.
- 7 Kennedy E, Davis C. US Department of Agriculture School Breakfast Program. *Am J Clin Nutr.* 1998;67(4):798S-803S.
- 8 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*.
- 9 Meyers, A. F., A. E. Sampson, M. Weitzman, B. L. Rogers, and H. Kayne. "School Breakfast Program and School Performance." *Archives of Pediatrics and Adolescent Medicine* 143.10 (1989): 1234-239.
- 10 O'dea, J. A., and A. C. Mugridge. "Nutritional Quality of Breakfast and Physical Activity Independently Predict the Literacy and Numeracy Scores of Children after Adjusting for Socioeconomic Status." *Health Education Research* 27.6 (2012): 975-85.
- 11 Basch, C. E. (2011). Breakfast and the achievement gap among urban minority youth. *Journal of School Health*, 81(10), 635-640.
- 12 Kleinman, R. E., J. M. Murphy, M. Little, M. Pagano, C. A. Wehler, K. Regal, and M. S. Jellinek. "Hunger in Children in the United States: Potential Behavioral and Emotional Correlates." *Pediatrics* 101.1 (1998): E3.
- 13 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*.
- 14 Hoyland A, Dye L, Lawton CL. A systematic review of the effect of breakfast on the cognitive performance of children and adolescents. *Nutr Res Rev* 2009;22:220-243.
- 15 Murphy, J. "Breakfast and Learning: An Updated Review." *Current Nutrition & Food Science* 3.1 (2007): 3-36.
- 16 Alaimo K, Olson CM, & Frongillo EA Jr (2001). Food insufficiency and American school-aged children's cognitive, academic and psychosocial development. *Pediatrics*,108(1):44-53.
- 17 Murphy JM, Wehler CA, Pagano ME, Little M, Kleinman RF, Jellinek MS. (1998) "Relationship Between Hunger and Psychosocial Functioning in Low-Income American Children." *Journal of the American Academy of Child & Adolescent Psychiatry*, 37:163-170.
- 18 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.
- 19 Cueto, Santiago (2001). Breakfast and dietary balance: The enKid Study. *Public Health Nutrition*: 4(6A):1430.
- 20 Pollitt, E., & Mathews, R. (1998). Breakfast and cognition: an integrative summary. *American Journal of Clinical Nutrition*, 67 (Suppl.): 804S±13S.
- 21 Pinkus, Lyndsay. Alliance for Excellent Education. "Using Early-Warning Data to Improve Graduation Rates: Closing Cracks in the Education System." August 2008.
- 22 United States Department of Commerce. Census Bureau. "Table A-3: Mean Earnings of Workers 18 and Over, by Educational Attainment, Race, Hispanic Origin and Sex: 1975-2012.
- 23 United States Department of Labor. Bureau of Labor Statistics. "Economic News Release: Table A-4 Employment status of the civilian population 25 years and over by educational attainment." August 2012.
- 24 Brown JL, Shepard D, Martin T, Orwat J, "The Economic Cost of Domestic Hunger: Estimated Annual Burden to the United States," 2007.
- 25 Szajewska H, Rusczyński M. Systematic review demonstrating that breakfast consumption influences body weight outcomes in children and adolescents in Europe. *Crit Rev Food Sci Nutr.* 2010;50:113-119.
- 26 Gleason, P. M., & Dodd, A. H. (2009). School Breakfast Program but not School Lunch Program participation is associated with lower body mass index. *Journal of the American Dietetic Association*,109:S118-S128.
- American Dietetic Association, 109:S67-S78.
- 28 Gleason, P., & Sutor, C. (2001). Children's Diets in the Mid-1990s: Dietary Intake and Its Relationship with School Meal Participation. *Nutrition Assistance Program Report Series*, No. CN-01-CD1. Alexandria, VA: USDA, FNS, Office of Analysis, Nutrition and Evaluation. p149.
- 29 Schembre, S. M., Wen, C. K., Davis, J. N., Shen, E., Nguyen-Rodriguez, S. T., Belcher, B.R., Hsu, Y. W., Weigensberg, M. J., Goran, M. I., & SpruijtMetz, D. (2013). Eating breakfast more frequently is cross-sectionally associated with greater physical activity and lower levels of adiposity in overweight Latina and African American girls. *American Journal of Clinical Nutrition*, 98(2), 275-281.
- 30 N Rampersaud GC, Pereira MA, Girard BL, et al. Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. *J Am Diet Assoc.* 2005;105:743-760.
- 31 Nicklas T.A., O'Neil, C., & Myers, L. (2004). The Importance of Breakfast Consumption to Nutrition of Children, Adolescents, and Young Adults. *Nutrition Today.* 39(1):30-39.
- 32 Leidy H. J., & Racki E. M. (2010). The addition of a protein-rich breakfast and its effects on acute appetite control and food intake in 'breakfast-skipping' adolescents. *International Journal of Obesity (Lond)*, Feb 2: 1-9.
- 33 Pereira, M. A., Erickson, E., McKee, P., Schrankler, K., Raatz, S. K., Lytle, L. A., & Pellegrini, A. D. (2011). Breakfast frequency and quality may affect glycemia and appetite in adults and children. *Journal of Nutrition*, 141(1), 163-168.
- 34 Ritchie, Lorrene D., Nila J. Rosen, Keenan Fenton, Lauren Goldstein, and Tia Shimada. "School Breakfast Policy: Is Breakfast in the Classroom Associated with Dietary Intake of Students." *Nutrition Policy Institute & Atkins Center for Weight and Health, University of California.* (2014)
- 35 Murphy, J. M., & Pagano, M. (2001). Effects of a universally free, in-classroom school breakfast program, final report from the third year of the Maryland Meals for Achievement Evaluation. Boston, MA: Massachusetts General Hospital.
- 36 Augustine-Thottungal, R. Kern, J., Key, J. & Sherman. (2013). Ending Childhood Hunger: A Social Impact Analysis. Deloitte.
- 37 Governance Brief: Starting a Breakfast After the Bell Program. August 2014, California School Board Association.
- 38 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.
- 39 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.
- 40 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.
- 41 Wahlstrom, K. L., & Begalle, M. S. (1999). More than test scores: results of the Universal School Breakfast Pilot in Minnesota. *Topics in Clinical Nutrition*, 15(1):17-29.
- 42 Reddan, J., Wahlstrom, K., & Reicks, M. (2002). Children's perceived benefits and barriers in relation to eating breakfast in schools with or without universal school breakfast. *Journal Nutrition Education and Behavior*, 34:47-52.
- 43 Briefel, R., Murphy, J. M., Kung, S., Devaney, B. (1999). Universal-Free School Breakfast Program Evaluation Design Project. Review of literature on breakfast and learning: Final report. Princeton, NJ: Mathematica Policy Research, Inc.
- 44 Kleinman, R.e., S. Hall, H. Green, D. Korzec-Ramirez, K. Patton, M.e. Pagano, and J.m. Murphy. "Diet, Breakfast, and Academic Performance in Children." *Annals of Nutrition and Metabolism* 46.Suppl. 1 (2002): 24-30.
- 45 Murphy JM, Pagano ME, Nachmani J, Sperling P, Kane S, Kleinman RE. The relationship of school breakfast to psychosocial and academic functioning: cross-sectional and longitudinal observations in an inner-city school sample. *Arch Pediatr Adolesc Med.* 1998 Sep;152(9):899- 907.
- 46 Bernstein LS, JE McLaughlin, MK Crepinsek, LM Daft, JM Murphy." Evaluation of the School Breakfast Program Pilot Project: Summary of Findings from the First Year of Implementation. October 2002.