



CHILD NUTRITION FACT SHEET

Food Research & Action Center

1875 Connecticut Ave. NW, Suite 540

Washington, DC 20009

BREAKFAST FOR LEARNING

Recent scientific research on the link between children's nutrition and academic performance

"What we find particularly exciting is that this [school breakfast] is a relatively simple intervention that can significantly improve children's academic performance and psychological well-being."

*J. Michael Murphy, EdD, School Breakfast Program researcher,
Massachusetts General Hospital and Harvard Medical School*

Missing breakfast and experiencing hunger impair children's ability to learn

- Children who skip breakfast are less able to distinguish among similar images, show increased errors, and have slower memory recall.^{1,2}
- Children experiencing hunger have lower math scores and are more likely to have to repeat a grade.³
- Behavioral, emotional and academic problems are more prevalent among children with hunger.⁴
- Children experiencing hunger are more likely to be hyperactive, absent and tardy, in addition to having behavioral and attention problems more often than other children.⁵
- Children who are undernourished score lower on cognitive tests when they miss breakfast.^{6,7}
- Teens experiencing hunger are more likely to have been suspended from school, have difficulty getting along with other children, and have no friends.⁸
- Children with hunger are more likely to have repeated a grade, received special education services, or received mental health counseling, than low-income children who do not experience hunger.⁹

Eating breakfast at school helps children perform better

- Children who eat a complete breakfast, versus a partial one, make fewer mistakes and work faster in math and number checking tests.¹⁰
- Children who eat breakfast at school – closer to class and test-taking time – perform better on standardized tests than those who skip breakfast or eat breakfast at home.¹¹
- Providing breakfast to mildly undernourished students at school improves their speed and memory in cognitive tests.^{12, 13}
- Children who eat breakfast show improved cognitive function, attention, and memory.¹⁴
- Participating in school breakfast is associated with improved math grades, attendance and punctuality.^{15, 16}
- Children perform better on tests of vocabulary and matching figures after eating breakfast.^{17, 18}
- Consuming breakfast improves children's performance on demanding mental tasks and reaction to frustration.¹⁹

School breakfast improves student behavior and learning environments

- Schools that provide breakfast in the classroom to all students show decreases in tardiness and suspensions as well as improved student behavior and attentiveness.^{20, 21}
- Providing students with breakfast in the classroom setting is associated with lower tardy rates and fewer disciplinary office referrals.²²
- School breakfast programs can lower absence and tardiness rates and improve standardized achievement test scores.²³

Universal school breakfast programs yield positive results

- Children who participate in universal school breakfast have lower rates of absence and tardiness.^{24, 25}
- Schools that provide universal school breakfast have higher breakfast participation, especially when breakfast is served in the classroom, and students who significantly increase their breakfast participation are more frequently on time and in attendance.²⁶
- Schools providing all students with free breakfast have greater positive changes in academic performance.²⁷

Breakfast can improve children's diets

- Children who eat breakfast tend to have more adequate nutrient intakes than children who do not.²⁸
- By eating breakfast, students also get more of important nutrients, vitamins and minerals such as calcium, dietary fiber, folate and protein.^{29,30}
- A higher percentage of children who skip breakfast do not meet two-thirds of the Recommended Dietary Allowance (RDA) for vitamins A, E, D, and B₆.³¹

Breakfast may reduce obesity risk

- Adolescents who eat breakfast tend to have a lower body mass index (BMI); higher BMIs can indicate overweight and obesity.³²
- Girls who eat breakfast are more likely to have a lower BMI than girls who skip breakfast.³³
- Adolescents with one or two obese parents who eat breakfast every day are more likely to have BMIs within a healthy range than those who tend to skip breakfast.³⁴
- Low-income elementary school girls who participate in the School Breakfast, School Lunch, or Food Stamp Programs, or any combination of these programs, have significantly less risk of being overweight.³⁵

Beliefs about breakfast can influence participation

- Girls often skip breakfast because they believe it might make them fat and are concerned about gaining weight.^{36, 37}
- Adolescents who skip breakfast are significantly more likely to have fasted to lose weight.³⁸
- Children report that they believe eating breakfast increases their energy and ability to pay attention in school.³⁹

Breakfast for Learning

Endnotes

- ¹ Pollitt E, Cueto S, Jacoby ER. "Fasting and Cognition in Well- and Undernourished Schoolchildren: A Review of Three Experimental Studies." *American Journal of Clinical Nutrition* 1998; 67(4):779S-784S.
- ² Pollitt E, Leibel RL, Greenfield D. "Brief fasting, stress, and cognition in children." *American Journal of Clinical Nutrition* 1981; 34:1526-1533.
- ³ Alaimo K, Olson CM, Frongillo EA Jr. "Food Insufficiency and American School-Aged Children's Cognitive, Academic and Psychosocial Development." *Pediatrics* 2001; 108(1):44-53.
- ⁴ Kleinman RE, Murphy JM, Little M, Pagano M, Wehler CA, Regal K, Jellinek MS. "Hunger in Children in the United States: Potential Behavioral and Emotional Correlates." *Pediatrics* 1998; 101(1):E3.
- ⁵ Murphy JM, Wehler CA, Pagano ME, Little M, Kleinman RF, Jellinek MS. "Relationship Between Hunger and Psychosocial Functioning in Low-Income American Children." *Journal of the American Academy of Child & Adolescent Psychiatry* 1998;37:163-170.
- ⁶ Simeon DT, Grantham-McGregor S. "Effects of missing breakfast on the cognitive function of school children of differing nutritional status." *American Journal of Clinical Nutrition* 1989;49:646-53.
- ⁷ Pollitt E. "Does Breakfast Make a Difference in School?" *Journal of The American Dietetic Association* 1995; 95(10):1134-39.
- ⁸ Alaimo K, "Food Insufficiency." 46. (see footnote #3)
- ⁹ Kleinman RE, "Hunger in Children in the United States." (see footnote #4)
- ¹⁰ Wyon D, Abrahamsson L, Jartelius M, Fletcher R. "An Experimental Study of the Effects of Energy Intake at Breakfast on the Test Performance of 10 Year-Old Children in School." *International Journal of Food Science and Nutrition* 1997;48(1):5-12.
- ¹¹ Vaisman N, Voet H, Akivis A, Vakil E. "Effects of Breakfast Timing on the Cognitive Functions of Elementary School Students." *Archives of Pediatric and Adolescent Medicine* 1996 150:1089-1092.
- ¹² Grantham-McGregor S, Chang S, Walker S. "Evaluation of School Feeding Programs: Some Jamaican Examples." *American Journal of Clinical Nutrition* 1998; 67(4) 785S-789S.
- ¹³ Chandler AMK, Walker SP, Connolly K, Grantham-McGregor SM. "School Breakfast Improves Verbal Fluency in Undernourished Jamaican Children." *Journal of Nutrition* 1995; 125(4): 894-900.
- ¹⁴ Wesnes KA, Pincock C, Richardson D, Helm G, Hails S. "Breakfast reduces declines in attention and memory over the morning in schoolchildren." *Appetite* 2003;41(3):329-31.
- ¹⁵ Murphy JM, Pagano M, Nachmani J, Sperling P, Kane S, Kleinman R. "The Relationship of School Breakfast to Psychosocial and Academic Functioning: Cross-sectional and longitudinal observations in an inner-city sample." *Archives of Pediatric and Adolescent Medicine* 1998; 152:899-907.
- ¹⁶ Powell CA, Walker SP, Chang SM, Grantham-McGregor SM. "Nutrition and education: a randomized trial of the effects of breakfast in rural primary school children." *American Journal of Clinical Nutrition* 1998;68:873-9.
- ¹⁷ Pollitt, E. "Fasting and Cognition." 780S, 783S. (see footnote #1)

-
- ¹⁸ Jacoby E, Cueto S, Pollitt E. "Benefits of a school breakfast program among Andean children in Huaraz, Peru." *Food and Nutrition Bulletin* 1996; 17:54-64.
- ¹⁹ Bellisle F. "Effects of diet on behaviour and cognition in children." *British Journal of Nutrition* 2004;92 (Suppl 2), S227-S232.
- ²⁰ Murphy JM, Pagano ME, Patton K, Hall S, Marinaccio J, Kleinman R. "The Boston Public Schools Universal Breakfast Program; Final Evaluation Report." Massachusetts General Hospital, Boston, MA, 2000.
- ²¹ Murphy JM et. al. "Maryland Meals for Achievement Year III Final Report." Massachusetts General Hospital, Boston, MA, 2001.
- ²² Murphy JM, Drake JE, Weineke KM. "Academics & Breakfast Connection Pilot: Final Report on New York's Classroom Breakfast Project." Nutrition Consortium of New York State. Albany, New York. July 2005.
- ²³ Meyers A, Sampson AE, Weitzman M, Rogers BL, Kayne H. "School Breakfast Program and School Performance." *American Journal of Diseases of Children* 1989;143:1234-39.
- ²⁴ Cook JT, Ohri-Vachaspati P, Kelly GL. "Evaluation of a Universally-Free School Breakfast Program Demonstration Project, Central Falls, Rhode Island." Center on Hunger, Poverty and Nutrition Policy, Tufts University, Medford, MA, 1996.
- ²⁵ Murphy JM, Pagano M, Nachmani "The Relationship of School Breakfast to Psychosocial and Academic Functioning." (see footnote #15)
- ²⁶ McLaughlin JE, Bernstein LS, Crepinsek MK, Daft LM, Murphy JM. "Evaluation of the School Breakfast Program Pilot Project: Findings from the First Year of Implementation." U.S. Department of Agriculture, Food and Nutrition Service. October 2002. Report No. CN-02-SBP.
- ²⁷ Murphy JM, Pagano M, Bishop SJ. "Impact of a Universally Free, In-Classroom School Breakfast Program on Achievement; Results from the Abell Foundation's Baltimore Breakfast Challenge Program." Massachusetts General Hospital, Boston, MA, 2001.
- ²⁸ Rampersaud GC, Pereira MA, Girard BL, Adams J, Metz J. "Breakfast Habits, Nutritional Status, Body Weight, and Academic Performance in Children and Adolescents." *Journal of the American Dietetic Association* 2005;105:743-760.
- ²⁹ Affenito SG, Thompson DR, Barton BA, Franko DL, Daniels SR, Obarzanek E, Schreiber GB, Striegel-Moore. "Breakfast Consumption by African-American and White Adolescent Girls Correlates Positively with Calcium and Fiber Intake and Negatively with Body Mass Index." *Journal of the American Dietetic Association* 2005; 105:938-945.
- ³⁰ Wilson NC, Parnell WR, Wohlers M, Shirley P. "Eating breakfast and its impact on children's daily diet." *Nutrition & Dietetics* 2006; 63:15-20.
- ³¹ Nicklas TA, Bao W, Webber LS, Berenson GS "Breakfast consumption affects adequacy of total daily intake in children." *Journal of the American Dietetic Association* 1993; 93(8):886-891.
- ³² Fiore H, Travis S, Whalen A, Auinger P, Ryan S. "Potentially Protective Factors Associated with Healthful Body Mass Index in Adolescents with Obese and Nonobese Parents: A Secondary Data Analysis of the Third National Health and Nutrition Examination Survey, 1988-1994." *Journal of the American Dietetic Association* 2006;106:55-64.
- ³³ Barton BA, Elderidge AL, Thompson D, Affenito SG, Striegel-Moore RH, Franko DL, Albertson AM, Crockett SJ. "The relationship of breakfast and cereal consumption to nutrient intake and body mass index: the National Heart, Lung, and Blood Institute Growth and Health Study." *Journal of the American Heart Association* 2005; 105(9):1383-1389.
- ³⁴ Fiore, H. "Potentially Protective Factors" 60. (see footnote #31)

³⁵ Jones SJ, Jahns L, Laraia BA, Haughton B. "Lower Risk of Overweight in School-aged Food Insecure Girls Who Participate in Food Assistance: Results from the Panel Study of Income Dynamics Child Development Supplement." *Archives of Pediatric and Adolescent Medicine* 2003; 157:780-84.

³⁶ Reddan, J. "Children's perceived benefits." 50. (see footnote #1)

³⁷ Cohen B, Evers S, Manske S, Bercovitz K, Edward HG. "Smoking, physical activity and breakfast consumption among secondary school students in a southwestern Ontario community." *Can J Public Health.* 2003; 94:41-44.

³⁸ Zullig K, Ubbes VA, Pyle J, Valois RF. "Self-Reported Weight Perceptions, Dieting Behavior, and Breakfast Eating Among High School Adolescents." *Journal of School Health* 2006; 76(3):87-92.

³⁹ Reddan J, Wahlstrom K, Reicks M. "Children's perceived benefits and barriers in relation to eating breakfast in schools with or without Universal School Breakfast." *J Nutr Educ Behav.* 2002;34:47-52.