



Nutrition and Students' Academic Performance

Rising obesity rates, elevated food insecurity, and the growing recognition that nutrition is critical to the healthy development of young students are all raising awareness of the need to improve school food programs and to educate students and families on the importance of healthy eating.

JANUARY 2014

How does nutrition influence students' academic performance?

Youth face a number of food-related concerns, such as poor nutrition, obesity, and hunger. In 2010, more than one-third of U.S. children and adolescents were overweight or obese (Centers for Disease Control, 2013), while nearly 20 percent of Minnesota's 9th and 12th grade students were obese (Minnesota Department of Health, 2012). In addition to obesity, children also encounter food insecurity, or limited access to food due to an absence of money or resources. Ten percent of U.S. households with children faced food insecurity in 2012 (Coleman-Jensen, Nord, & Singh, 2013). In Minnesota, 10 percent of households are classified as food insecure, while it is estimated that 1 in 6 Minnesota children are at risk of hunger (Second Harvest Heartland, 2013).

Recent studies have demonstrated that nutrition affects students' thinking skills, behavior, and health, all factors that impact academic performance. Research suggests that diets high in trans and saturated fats can negatively impact learning and memory, nutritional deficiencies early in life can affect the cognitive development of school-aged children, and access to nutrition improves students' cognition, concentration, and energy levels.

For example, one study found that 5th grade students with less nutritious diets performed worse on a standardized literary assessment (Florence, Asbridge, & Veugelers, 2008). Another study discovered that 5th grade students who ate more fast food fared worse on math and reading



scores (Li & O'Connell, 2012). Similarly, a study that analyzed a healthy eating campaign that banned junk food from schools and introduced healthier, freshly prepared school meals found that participating students scored higher on English and science tests than students who did not take part in the campaign (Belot & James, 2009).

Nutrition also indirectly impacts school performance. Poor nutrition can leave students' susceptible to illness or lead to headaches and stomachaches, resulting in school absences (Brown, Beardslee, & Prothrow-Stith, 2008). Access to nutrition that incorporates protein, carbohydrates, and glucose has been shown to improve students' cognition, concentration, and energy levels (Bellisle, 2004; Sorhaindo & Feinstein, 2006).

In contrast, nutritional deficiencies (particularly zinc, B vitamins, Omega-3 fatty acids, and protein) early in life can affect the cognitive development of school-aged children (Sorhaindo & Feinstein, 2006). Studies also suggest that diets high in trans and saturated fats can negatively impact the brain, influencing learning and memory (Gómez-Pinilla, 2008).

Finally, research has also established a link between nutrition and behavior. Studies have found that access to nutrition, particularly breakfast, can enhance a student's psychosocial well-being, reduce aggression and school suspensions, and decrease discipline problems (Brown et al., 2008).

The impact of school breakfast programs

Schools provide nutritious food throughout the day, including breakfast, lunch, snacks, and after school. School breakfast programs seek to help meet students' nutritional needs. Research suggests that participation in breakfast programs plays a role in student behavior, cognition, and academic performance.

In Minnesota, many low-income children are eligible for free breakfast programs, but cannot get to school early enough to participate or avoid the program because of the stigma associated with eating a free breakfast (Hunger-Free Minnesota, 2013). During the 2009-10 school year, 47 low-income children took part in school breakfast programs for every 100 children who ate free or reduced lunch (Public Health Law Center, 2012). During the 2011-12 school year, low-income children eligible for free and reduced meals missed 29 million school breakfasts, meaning that Minnesota schools missed more than \$53 million in federal funds (Hunger-Free Minnesota, 2013). In addition to lost federal funds, students who do not participate in school breakfast are at risk for increased absences, adverse behavior, reduced concentration, and poor academic performance.



Better attendance — Several studies, including one in Minnesota, have shown that student attendance improves in schools that implement universal-free school breakfast programs (Cook, Ohri-Vachaspati, & Kelly, 1996; Meyers, Sampson, Weitzman, Rogers, & Kayne, 1989; Wahlstrom & Begalle, 1999).

Improved behavior — Inner-city students participating in a universal-free school breakfast program had fewer behavior problems six months after the program started (Kleinman et al., 2002). Disciplinary actions also have been shown to decrease in schools that offer a universal-free school breakfast program (Murphy, Drake, & Weineke, 2005; Wahlstrom & Begalle, 1991). Children whose parents report they often do not get enough to eat are more likely to have been suspended from school, have seen a psychologist, and have difficulty getting along with other children (Alaimo, Olson, & Frongillo, 2001).

Improved concentration — A Minnesota study found that a school breakfast program improved

concentration and alertness among children (Wahlstrom & Begalle, 1999). Similarly, children in schools with universal breakfast programs reported having more energy and better attention than those attending schools without universal breakfast programs (Redden, Wahlstrom, & Reicks, 2002). An experimental study with 9 through 11-year-old children showed that those who were not served breakfast had slower memory recall (Pollitt & Matthews, 1998).

Better academic performance — Many studies indicate that school breakfast programs improve academic performance. Children who do not get sufficient meals are more likely to repeat a grade (Alaimo et al., 2001; Kleinman et al., 1998). Elementary children who participated in a school breakfast program in Massachusetts did better on standardized tests than those who qualified but did not participate (Meyers et al., 1989). Similarly, students in a universal-free school breakfast program at an inner-city school showed improved math grade six months after the start of the program (Kleinman et al., 2002).

What is being done in Minnesota to improve school nutrition?

In 2011, the U.S. Department of Agriculture released new school meal guidelines intended to improve nutrition, reduce obesity, and improve access to lunch and breakfast programs. The new guidelines went into effect at the start of the 2012-13 school year and stipulate that nutrition services programs engage in food-based menu planning. The guidelines call for increased servings of fruits, vegetables (including dark green, red/orange, beans/legumes, and starch), and whole grains. In addition, schools must offer a meat/meat alternative (e.g., tofu), reduce sodium, limit saturated fat, and introduce standards for caloric intake for various age ranges (Hartline-Grafton, Henchy, & Levin, 2012).

In Minnesota, efforts are underway to improve students' access to healthy foods and support the capacity of school nutrition services programs. **The Great Trays Partnership** was formed in 2010 with funding from a 2-year grant from the Centers for Disease Control and Prevention. This partnership, which included representatives from state agencies, as well as the Minnesota School Nutrition Association, Minnesota School Food Buying Group, and the University of Minnesota School of Public Health, set out to help schools meet the USDA's proposed National School Lunch Program nutrition standards. Through the partnership's work, 500 school food service professionals across the state received training to help them plan healthy meals, manage the costs of healthy foods, and market their lunch programs (Minnesota Department of Health, 2012). In addition, 163 equipment grants were awarded to improve schools' ability to efficiently prepare and serve healthy foods, such as new types of



fruits and vegetables, and meet the standards included in the new USDA rule (Minnesota Department of Health, 2012).

Improved school nutrition has also been a major component of **Minnesota's Statewide Health Improvement Program (SHIP)**. Beginning in 2008, schools across the state have implemented policies and practices to improve access to healthy foods in school vending machines, concession stands, and school meals. During the first three years of SHIP, 440 schools across the state worked on Farm to School efforts that increase student access to locally grown fresh fruits and vegetables (Minnesota Department of Health, 2013).

In addition to state programs, a number of nonprofit organizations and multi-sector collaborations focus on alleviating hunger and improving school nutrition. **Second Harvest Heartland** runs the Meals for Minds program in partnership with Target, which distributes groceries monthly through a mobile food pantry to elementary schools in Minneapolis and St. Paul. Each child receives 30 pounds of groceries through the program. One of **Hunger-Free Minnesota's** programs seeks to increase the number of children participating in school breakfast programs. It recently launched the School Breakfast Challenge, in which 30 schools will be awarded a ten-cent-per-meal incentive (up to 25,000 meals) for each breakfast they serve above the number

served the previous year. Hunger-Free Minnesota is also working to increase the number of meals served through the federal Child and Adult Care Food Program by 4.5 million. The program provides healthy meals and snacks to children through after-school programs.

School districts in Minnesota are also employing strategies to encourage students to eat healthier food and increase participation in their nutrition programs. In 2011, the South Washington County School District, in consultation with the Minnesota School Nutrition

Association, identified six schools with successful approaches to organizing their nutrition programs. Wilder Research interviewed the nutrition services directors of these schools and identified some common approaches, such as: creating an annual marketing plan; engaging district Parent Advisory Committees in recipe planning; integrating social media to provide information to students and parents; working with community members to develop ethnic food dishes; and designing pilots to test new dishes and gather feedback from students and parents.

Promising approaches to encourage healthy eating in schools

Increasingly, states and schools are considering different approaches to encourage the consumption of healthy foods and increase students' participation in school meal programs. These approaches encompass public policies (such as the use of monetary incentives for involvement in school meal programs) and behavioral economics, which focus on redesigning lunchroom environments to foster healthy eating.

Designing spaces and crafting choices for students to eat healthier

Recent research combines knowledge from the fields of behavioral economics, psychology, and food marketing to analyze how people decide what to eat. In New York, researchers conducted an experiment at a local high school to test whether making healthier foods more convenient would lead to their increased consumption. The researchers worked with the school to create a convenience line in the lunchroom that served healthier foods. After a 16-week period, the sales of healthier foods rose by 18 percent and the number of grams of unhealthy foods consumed decreased by almost 28 percent. In addition, the amount of healthier foods eaten as a percent of total consumption increased from 33 to 36 percent (Hanks, Just, Smith, & Wansink, 2012).

Local approaches to influencing student choice

Minnesota schools' nutrition programs are experimenting with how food is placed and served. Some have more prominently displayed fruits and vegetables to encourage consumption, while others offer students up to three fresh fruit and vegetable options on lunchroom trays.

In an earlier study, some of the same researchers observed that simply moving the salad bar from a corner of the school lunchroom to the center led to increased sales and consumption of items from the salad bar (Just & Wansink, 2009).

These studies demonstrate that straightforward, relatively low-cost changes to a lunchroom's physical environment can impact the type of foods students choose to eat. In addition to redesigning space, researchers identified the positive effects of other strategies such as:

- Offering students a choice between two vegetable options, for example carrots and celery, as opposed to being required to eat one type of vegetable (Just & Wansink, 2009).
- Having students pay cash for unhealthy items, like desserts and soft drinks, by restricting prepaid debit cards to healthier foods. In their experiments and analysis, researchers noted that this restriction did not lead to reduced revenue or participation in school lunch. Alternatively, it yielded higher sales of healthier food (Just & Wansink, 2009).

A public incentive to remove unhealthy foods

In 2006, Connecticut implemented a Healthy Food Certification (HFC) that offers schools participating in the National School Lunch Program a ten-cent-per-lunch incentive (including paid, free, and reduced lunches) to eliminate unhealthy foods. Certification was associated with more students participating in school lunch programs, with researchers documenting an increase between 7 and 23 percent for middle- and high-school programs. Annual revenue for an average school district increased by approximately \$30,000 (Long, Luedicke, Dorsey, Fiore, & Henderson, 2013).

This study demonstrated that HFC increased participation in school meal programs, while also reducing students' access to unhealthy foods, potentially leading to the long-term impact of enhanced health outcomes in terms of reduced levels of obesity and access to adequate nutrition. The Connecticut incentive model could inform other states or multi-sector, collaborative efforts that want to encourage participation in school meal programs and decrease the presence of unhealthy foods.

Multiple approaches to influence student nutrition

Minnesota's schools, nonprofits, businesses, and government have many opportunities to positively impact students' academic performance through increased access to healthy foods and improved nutrition. Schools can take a strategic approach to their nutrition programs by implementing annual marketing plans, piloting new healthy dishes, and redesigning lunchroom spaces to encourage students to select healthier options. State government has the capacity to offer guidance and resources to schools as they implement new federal policies, seek to provide nutritious food, and create healthier school environments. Nonprofit service organizations play a vital role in food distribution, research, and advocacy, while the for-profit and philanthropic sectors can collaboratively work with nonprofit and public organizations to spur policy change and fund efforts focused on improved nutrition. There are multiple approaches organizations and sectors can employ to influence students' nutrition and promote academic success.

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For more information

There is a growing body of resources and research that can provide information about developing healthier school lunch menus, implementing programs and practices that increase student access to healthy foods, and addressing the cost of implementing changes to nutrition service programs:

Great Trays

Great Trays is the name of all of the Minnesota Department of Health's school nutrition efforts. The program provides information and guidance to school districts on how to incorporate more nutritious foods. A number of resources and informational materials can be found on the Great Trays website:

<http://www.health.state.mn.us/divs/hpcd/chp/cdrr/nutrition/greattrays/>

The Minnesota School Food Buying Group (MSFBG)

MSFBG is composed of school districts from around Minnesota that work together to save money on frequently purchased foods, address food costs, and build purchasing power. The group also created product specifications to address the amount of sodium and saturated fat in foods. More information about MSFBG can be accessed here:

<http://www.anoka.k12.mn.us/education/components/docmgr/default.php?sectiondetailid=317999>

A presentation about MSFBG from the School Nutrition Association can be found here:

http://www.schoolnutrition.org/uploadedFiles/School_Nutrition/105_Meetings/CurrentandPastMeetings/IndividualMeetingPages/ChildNutritionIndustryConference/SessionHandouts/CNIC2010-Purchasing_and_Operations-Bradford_and_Owens.pdf

The Minnesota Statewide Health Improvement Program (SHIP)

SHIP incorporates a variety of strategies aimed at improving nutrition for children, including Farm to School, and increasing nutritious foods in school stores, vending machines, and concessions. More information about SHIP can be accessed at the Minnesota Department of Health website:

<http://www.health.state.mn.us/ship/>

The Public Health Law Center at William Mitchell College of Law

The Public Health Law Center contains various resources focused on the legal and policy contexts that impact school nutrition service programs, such as Farm to School, collective purchasing, and implementation of the new federal school nutrition standards. Publications and briefs can be accessed at the Center's website:

<http://publichealthlawcenter.org/topics/healthy-eating/farm-school>

University of Minnesota Extension

Extension is active in creating resources and trainings focused on student nutrition and integration of Farm to School. They produced a "toolkit" for school foodservice staff that focuses on growing and sustaining Farm to School programs. The toolkit along with additional information can be accessed at the Extension website:

<http://www1.extension.umn.edu/food/farm-to-school/>

United States Department of Agriculture (USDA)

The USDA provides updated information on the new national standards for school meals, including policy memos, regulatory information, and technical assistance documents. This information can be accessed at the USDA website:

<http://www.fns.usda.gov/cnd/governance/legislation/nutritionstandards.htm>

Hunger-Free Minnesota

Hunger-Free Minnesota is a statewide campaign to fight hunger. It is supported by a coalition of businesses, community leaders, public policy specialists, faith communities, food banks, food shelves, and community members. Part of Hunger-Free Minnesota's research and advocacy supports increased participation in the school breakfast and after school meal programs.

More information can be accessed at the Hunger-Free Minnesota website: <http://hungerfreemn.org/>

Second Harvest Heartland

Second Harvest Heartland is a hunger relief organization that distributes food across the Upper Midwest. Their work encompasses reducing hunger and food insecurity for families and children. More information can be accessed at the Second Harvest Heartland website:

<http://www.2harvest.org/site/PageServer?pagename=homepage>

Smarter Lunchrooms Movement

Smarter Lunchrooms provides information and resources (e.g., research articles and training materials) on lunchroom-based principles that foster healthy eating behaviors. More information can be accessed at the Smarter Lunchrooms Movement website: <http://smarterlunchrooms.org/>



Special thanks to Cargill Foundation for providing generous funding and support to produce this report.

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JANUARY 2014

Learn more about obesity and other issues that affect Minnesota's quality of life at www.mncompass.org, an indicators project led by Wilder Research.