

Better Food, Better Behavior in Schools

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The following report examines the research associating nutrition in school meal programs and student behavior. This project is funded through a grant from the W.K. Kellogg Foundation. Gail Kahovic, Former Office Administrator and Food Systems Program Director at Michael Field Agricultural Institute was the advisor to this project. Additional editors include Margaret Krome Policy Program Director at Michael Fields Agricultural Institute, and Charles Dean of the University of Wisconsin Madison General Library Systems.

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Introduction

Children's dietary habits have greatly changed in the past few decades with cheap and easy access to a plethora of prepackaged, ready to eat, low cost and low nutrition foods. Since 1978 boys have almost tripled their consumption of soda and girls have doubled theirs.¹ Because children consume 40% of their food at school², and because schools are centers of education, schools play an important part in fostering strong, healthful dietary foundations within students. In addition to this, a school's more immediate interest in the food their students consume lays in the effect food has on the behavior of their students. If healthful food promotes good behavior, then schools cultivate more conducive learning environments for their students by developing healthier meal programs.

This report looks at the interplay between our nation's interest in the food students consume, how this has evolved, and our understanding of the affects food has on students' behavior. The section *Food in Public Schools* first briefly looks at what good nutrition means. It then outlines the relationship between government and public school food programs (when and why the relationship began and how it has evolved). The section concludes with a look at the health of our nations children. From there the report looks at the relationship of food consumption and behavior with a historical eye in *A Review of the Historical Link between Nutrition and Behavior*. This section also briefly explores areas of research highlighting nutrition and behavior. Next, in *Corporate Presence in Public Schools*, the effect of corporate influence and presence in public schools is considered. Then, *Current State of Affairs* explores various ways in which schools are working to improve school meal programs. Finally, *Making Better School Meal Programs "Pay"* addresses the question: are improved school meal programs financially feasible? In this report, no assessment on what qualifies as better food has been made. Rather, the meal programs described in this report as "better meal programs" are labeled so because of the effort each school has made to improve their program. Such efforts will be described as well as the behavioral differences that were noted, if any.

¹ Schlosser, Eric. *Fast Food Nation*. New York: Houghton Mifflin, 2001. (54)

² Institute of Medicine's study: *Preventing Childhood Obesity*: <http://www.iom.edu/report.asp?id=22596>

Food in Public Schools

What is a Healthy Diet

Opinions vary as to what composes an optimally nutritious diet. There are diverse types of diets such as the raw foods diet, the Feingold diet, the vegetarian and vegan diet, and the fruitarian diet.³ There are also people that eat mostly local foods or only organic food. In response to increasing numbers of over weight people, diet fads designed to help people lose weight fast are plentiful, including diets such as the grapefruit diet, the Atkins diet, the South Beach diet, and programs like Weight Watchers and Jenny Craig. Many of these diets have cookbooks and entire product lines in grocery stores and ads on television. Messages about what one optimally should or should not eat, even when examined separately from marketing schemes, are often confusing and seem to constantly fluctuate.

Nutritionist Marion Nestle advises that healthy diets must supply enough energy (calories), vitamins, minerals, and essential nutrients to prevent deficiencies and support normal metabolism.⁴ She points out that Mediterranean and Asian populations with long life spans have largely plant-based diets and notes a diet that stresses fruits, vegetables, and grains is linked with the prevention of as many illnesses as quitting smoking.⁵ Though heavily influenced by the food industry⁶, the food pyramid is the United States Department of Agriculture's (USDA) recommendation and guideline for a healthy diet. Much work has gone into setting nutritionally defensible standards in the food pyramid, but these standards are not always translated properly in places such as schools, as we will see below.

USDA Involvement in School Meal Programs

The USDA was established in 1862 with two purposes: to “ensure a sufficient and reliable food supply” and to disseminate information on topics connected to agriculture and consuming agricultural products. In the beginning, these two goals were compatible: farmers needed to produce more food and people needed to eat more. At that time in history the greatest cause of death and disability was infectious diseases associated with malnutrition. Health officials, nutritionists and the food industry were all interested in getting the public to eat more.⁷ Then during the early Twentieth Century, farmers began producing more food than there was demand for in the domestic market and the USDA began offering surplus agricultural goods, known as commodity foods, to public schools.

³ Many times the food choices a person makes is closely linked to their social, political and religious views in addition to being a decision made for health reasons. The Feingold Diet has its participants remove foods that have specific artificial colors and preservatives in them. (<http://www.feingold.org/>) Fruitarians eat only the fruit of the plant from which it grew. This includes nuts and seeds, and foods such as cucumbers, tomatoes, bananas, etc.

⁴ Nestle, Marion. *Food Politics*. Berkeley: University of California Press, 2002. (5)

⁵ Nestle 366.

⁶ “Dietary guidelines necessarily are political compromises between what science tells us about nutrition and health and what is good for the food industry.” Nestle 30.

⁷ Nestle 2.

This involvement by the government in school meal programs began during the Great Depression with two purposes: “to help dispose of surplus agricultural commodities owned by the government as a result of price-support agreements with farmers, and to help prevent nutritional deficiencies among low-income schoolchildren.”⁸ In 1946, the USDA began providing free or reduced priced breakfasts and lunches to low-income students.⁹ Today, 25 million students receive these lunches in more than 99,000 public and private schools as well as residential day-cares. In 1998, the USDA began offering students after-school snacks, which frequently consist of ingredients from surplus agricultural commodities, also called commodity foods.¹⁰

Commodity Foods

As dietary goals veered from “eat more” to “eat less” and farmers continued to produce a surplus of agricultural goods, or commodity food products, the USDA food programs grew to be less complementary. Brownell and Horgen discuss the “major concerns” regarding commodities in schools, as is pointed out by the Physicians Committee for Responsible Medicine.¹¹ They saw a possible conflict of interest between offering healthy food for low-income students and providing a guaranteed market for the agricultural industry, an industry that often produces foods that play a large part in obesity and obesity-related diseases. Another point of contention is that many of the commodity offerings are unhealthy. There are supply problems as well. If there is not sufficient demand from surrounding schools for a particular offering to fill a truck (as is sometimes the case for the healthier options), the item will not be delivered. In addition, it is primarily affluent and corporate farms, rather than small struggling family-farms, that benefit from commodity arrangements the USDA has set up between the farmers and the schools.¹²

Competitive Foods

The National School Lunch Program is regulated for its nutritional content, but a la carte items such as chips and desserts are not. The USDA termed these “competitive foods” as they compete with the regulated, and often healthier, food offerings. Since 1985, the Federal government has attempted to regulate competitive foods. A USDA report on competitive foods submitted to Congress in 2001 included several notable observations. This included a discrepancy between USDA dietary recommendations and what children actually eat. They noted that competitive foods are “relatively low in nutrient density and relatively high in fat, added sugars, and calories”. The report indicated that the availability of competitive foods in schools conveys a mixed message about the importance of nutrition.¹³ Rectifying this mixed message should be a major concern to schools as they are our nation’s primary institutions of education. It is important that schools’ educational messages are well thought out and consistent.

⁸ Nestle 192.

⁹ Nestle 192.

¹⁰ Brownell, Kelly. *Food Fight*. Chicago: Contemporary Books, 2004. (132)

¹¹ Brownell 133.

¹² Brownell 133.

¹³ Brownell 134.

Childhood Malnutrition: Obesity and Under-Nutrition

“For all children, wealthy and poor alike, the principal nutritional concerns are eating too much of the wrong kinds of foods in particular, and consuming too many calories in general. Obesity . . . is now the most serious dietary problem affecting the health of American children.”

Nestle, Marion¹⁴

The mid-Twentieth Century saw new nutritional health concerns realized in the United States with obesity and under-nutrition. In addition to nutritional deficiencies caused by consuming inadequate amounts of food, malnutrition, or under-nutrition, was now understood to also be caused by excessive or unbalanced eating.¹⁵ In 1977, dietary recommendations for the first time asked people to reduce the amount of food (calories) they consumed and to redirect the ones they do consume by eating foods higher in essential nutrients and less fat, saturated fat and cholesterol (meat, dairy, fried foods, grain dishes with added fat), sugar (soft drinks, juice drinks, desserts), and salt (snack foods). It was recommended that people eat more fruit, vegetables, whole grains, poultry and fish but less red meat, eggs and food high in fat, butterfat, sugar and salt. These recommendations spurred many objections from farmers, ranchers, and food industry spokespersons whose product sales would be affected.¹⁶

Flunking Healthy Eating Habits

A program created by the USDA called “Healthy School Nutrition Environments” declared that students are “flunking healthy eating”. According to this group, only 2% of youth meet all the recommendations of the food guide pyramid while 16% meet none of the recommendations.¹⁷ The Institute of Medicine’s publication *Preventing Childhood Obesity: Health in Balance* states that over 9 million children and youth over 6 years old are obese. The rates of obesity since the 1970s has doubled for preschool children 2-5 years old and adolescents 12-19 and tripled for children 6-11 years old. The Institute of Medicine’s report also details some economic, social, medical, and emotional consequences associated with obesity. The economic cost of obesity for the U.S. in the three years from 1979 to 1981 was \$35 million. This rose to \$127 million in the period of 1997-99. In the social realm, obese children are negatively stereotyped, discriminated against, teased, bullied, and marginalized. Obese children can develop medical conditions such as glucose intolerance and insulin resistance, type 2 diabetes, hypertension, dyslipidemia, hepatic steatosis, cholelithiasis, sleep apnea, and orthopedic problems. Emotionally, obese children may suffer from low self-esteem, negative body image, and depression.¹⁸

¹⁴ Nestle 174.

¹⁵ Nestle 31.

¹⁶ Nestle 40. Ever since, there has been a constant struggle between the food industry and the health industry in how the federal government advises the American people. For a comprehensive and in depth chronicle of this struggle see Nestle’s book *Food Politics*.

¹⁷ Brownell 141. For more USDA information about nutrition education see www.fns.usda.gov/fns/nutrition.htm.

The Center for Disease Control and Prevention and the World Health Organization have labeled obesity both a crisis and an epidemic.¹⁹ In 1985, the National Institutes of Health recognized obesity as a chronic disease. By 2001, 5 million children were overweight or obese, doubling the number from 1991.²⁰ Obesity is the leading cause of death in America after smoking.²¹

¹⁸ Some of these statistics are also found in: Dalton, Sharron. Our Overweight Children. Berkeley: University of California Press, 2004. (2)

¹⁹ Brownell 284, 41.

²⁰ http://webdietitians.org/Public/GovernmentAffairs/98_childhoodobesity.cfm

²¹ Schlosser 241.

A Review of the Historical Link between Nutrition and Behavior

An empirical understanding of the link between nutrition and behavior is still in its infancy but has some historical foundation. In pre-literate times it is shown that early humans' concern with food was primarily survival-based.²² In ancient Greece, food was used to treat both physical and psychological illnesses, and a physician giving diet inadequate attention was reason enough for a malpractice suit.²³ Eventually, this connection between food, body and mind became estranged. Investigation into the body alone grew to be the focus of the 17th century, when Descartes invented the reductionistic methodology of studying the most basic units feasible, a type of science that has since dominated the medical field. Reductionistic investigation allowed for the foundations of modern chemistry to be laid in the 18th century, establishing the laws of nutrition.²⁴ The science of nutrition began after WWII with research on nutritional deficiencies and the chronic diseases such deficiencies cause. It was not until this time that the influence of diet on physical ailments such as heart disease was again acknowledged.²⁵

The 1950s saw the establishment of the behavioral sciences. Behavioral scientists were initially psychologists, a few sociologists, and other social scientists working with access to patients with emotional problems.²⁶ By the 1960s scientists were recognizing that nutritional inadequacies have behavioral impacts.²⁷ In 1964, a study was conducted in which a group of volunteer subjects were semi-starved for 6 months. These subjects displayed the behavioral effects of "anxiety and feelings of insecurity, irritation, lack of emotional control, moodiness, depression, apathy, boredom, lack of interest in the ideas or activities of others, and [the] inability to make decisions. There was a gradual blunting of perception and a dulling of consciousness. They were obsessed with thoughts of food and did not often have original ideas." Although this may seem extreme, it significantly validates the idea that a person's nutritional health has an effect on their psychological, social, and emotional reactions.²⁸

Today an association between food and behavior is commonly acknowledged by the general public. Some of this acceptance may be the result of mass advertising campaigns for various nutritional products like vitamins and other nutritional supplements. Yet empirical evidence from studies about the connection between food and behavior has not been consistently conclusive, and so the medical community has been cautious to recognize such connections. The design of these studies and the interpretation of data produced by them have been criticized. There are recognized problems in separating out the variables being studied as well. These include identifying placebo effects, measuring

²² Todhunter, E. Neige. "The Evolution of Nutrition Concepts – Perspectives and New Horizons." The American Dietetic Association MCMXVII. Chicago, Ill. 1967.

²³ Christensen, Larry. Diet-Behavior Relationships: Focus on Depression. Washington, DC: American Psychological Association, 1996.

²⁴ Todhunter.

²⁵ Helsing, Elisabeth. "The History of Nutrition Policy." Nutrition Reviews 55:11 (2) (1997): S1-3.

²⁶ Pattishall, Evan G., Jr. "Presidential Address." The Society of Behavioral Medicine Ninth Annual Scientific Sessions. Boston, MA. April 28, 1998.

²⁷ Todhunter.

²⁸ Todhunter.

a subject's prior nutritional status and personal sensitivities, and understanding the crossover between whole foods and single nutrients.²⁹

Some popular claims have, in later research, proved unsubstantiated. The claim Feingold made in 1975 initially fell into this category. Feingold asserted that a diet free of additives and preservatives would benefit 50% to 70% of hyperactive children. Support for this claim consisted mostly of anecdotal observations. Later investigators found that such a diet improved behavior in 2-3% of hyperactive children.^{30,31} Then a 2004 study finally substantiated Feingold's earlier claims.³² Using a sample of 1,873 children taken from the general population, rather than a subject group of specifically hyperactive children, the authors came to a noteworthy conclusion. They found that, according to parental ratings, children's level of hyperactivity declined substantially once artificial colorings and sodium benzoate were eliminated from their diet. This finding was independent of the level of hyperactivity or atopic condition ("a genetically determined state of hypersensitivity to environmental allergens"³³) the children exhibited initially.

A still unsubstantiated popular belief is that sugar causes hyperactivity, and also that in a naturally hyperactive child it causes him or her to act more out of control.³⁴ Nothing conclusive can be stated about sugar or even caffeine in this regard. Replicable and statistically-significant studies are hard to come by.³⁵ However, the link between nutrition and behavior is being explored in new and promising areas. Recent empirical research has investigated areas such as neurotransmitter synthesis, the post-lunch dip, effects of vitamin deficiencies, and student nutritional status:

Neurotransmitter Synthesis:

Research on neurotransmitter synthesis has found that nutrient intake through foods like protein and carbohydrates affects the levels of neurotransmitter precursors (such as tryptophan, choline and tyrosine), which in turn affect the levels of neurotransmitters and resulting behavior. Studies have found increased amounts of tryptophan reliably lead to increased feelings of drowsiness and lethargy, yet have little to no effect on performance.^{36, 37} However, these effects are subtle, and difficult to detect, and a definite relationship to behavior has not been established. There are several variables which remain to be examined, such as stress, vulnerability, and the pre-existing health of the test subjects.³⁸

²⁹ Christensen.

³⁰ Christensen.

³¹ Bateman, B.; Warner, J. O.; Hutchinson, E.; Dean, T.; Rowlandson, P.; Gant, C.; Grundy, J.; Fitzgerald, C.; Stevenson, J. "The effects of a double blind, placebo controlled, artificial food colourings and benzoated preservative challenge on hyperactivity in a general population sample of preschool children." *Disease in Childhood* 89 (June 2004): 506-511.

³² Bateman et al. 506-511.

³³ <http://www.med.uwo.ca/ecosystemhealth/education/glossary.htm>

³⁴ Christensen.

³⁵ Lieberman, Harris R.; Spring, Bonnie J.; Garfield, Gail S. "The Behavioral Effects of Food Constituents: Strategies Used in Studies of Amino Acids, Protein, Carbohydrate and Caffeine." *Nutrition Reviews* supplement (May 1986): 61-70.

³⁶ Christensen.

³⁷ Bateman et al. 506-511.

Post-Lunch “Dip”:

Studies show that after lunch there occurs, in real life as well as the laboratory, a post-lunch “dip” in performance on a variety of tasks. A study investigating the role of fat and carbohydrates in the post-lunch “dip” found that low-fat, high-carbohydrate (LFHC) and high-fat, low-carbohydrate (HFLC) lunches, when compared to medium-fat and medium-carbohydrate (MFMC) lunches, have significant effects on mood and performance. After the LFHC and HFLC lunches, subjects felt more drowsy, uncertain, muddled, and less cheerful.³⁹ However, it is important to note that independent of meal composition, a dip normally occurs after eating any meal. The dramatization of the post-lunch dip may have more to do with the size of the meal consumed in comparison to the normal meal size the subject eats.

Vitamin Deficiencies:

In *Diet-Behavior Relationships: Focus on Depression*, Christensen maintains that research into vitamin B deficiencies has revealed a link to many psychological symptoms. Psychiatric treatments that stressed vitamins in the diet were more prevalent from the 1930s to the 1950s. However, after this emphasis and the national food enrichment program requiring bread and flour to be enriched with thiamin, riboflavin, niacin and iron (implemented during the Roosevelt administration), vitamin treatment of disorders declined.

There is an important, established link between specific vitamins and behavior. Christensen lists seven vitamins (thiamin, riboflavin, niacin, pyridoxine, cyanocobalamin (B12), folic acid and ascorbic acid) and the corresponding psychological symptoms a deficiency in each may cause. The symptoms range from depression and apprehension to increased irritability and a lack of stamina.

Student Nutritional Status:

Research has shown students from food-insufficient families (families who report not having an adequate supply of food) have lower test scores in arithmetic, are more likely to be held back a grade, have more difficulty getting along with their peers, and are more likely to have seen a psychologist.⁴⁰ The USDA Fruit and Vegetable Pilot Program found that the teaching staff perceived an increase in students’ attention during class as a result of consuming an increased amount of fruits and vegetables.⁴¹ Similarly, studies of the School Breakfast Program Pilot Project found associations between participation in the breakfast program and better student behavior.⁴²

³⁸ Markus, Rob; Panhuysen, Geert; Utiten, Adriaan; Koppeshaar, Hans. “Effects of food on cortisol and mood in vulnerable subjects under controllable and uncontrollable stress.” *Physiology and Behavior* 70: 3-4 (Aug-Sep2000): 333-342.

³⁹ Lloyd, Helen M.; Green, Michael W.; Rogers, Peter J. “Mood and Cognitive Performance Effects of Isocaloric Lunches Differing in Fat and Carbohydrate Content.” *Physiology and Behavior* 56: 1 (1994): 51-57.

⁴⁰ AlaimoK, Olson C M, Frongillo E A Jr. “Food Insufficiency and American School-Aged Children’s Cognitive, Academic, and Psychosocial Development.” *Pediatrics* 108: 1 (Jul 2001): 44-53.

⁴¹ Buzby JC, Guthrie JF, Kantor LS. “Evaluation of the USDA Fruit and Vegetable Pilot Program.” *Report to Congress*. May 2003. <http://www.ers.usda.gov/publications/efan03006.pdf> (Sept. 2004).

⁴² McLaughlin JE, LS Bernstein, MK Crepinsek, LM Daft, JM Murphy. “Evaluation of the School Breakfast Program Pilot Project: Findings from the First Year of Implementation,” *Nutrition Assistance Program Report Series*, No. CN-02-SBP, Project Officer: Anita Singh. U.S. Department of Agriculture,

In conclusion, the historical link between nutrition and behavior was established long ago, dating as far back as ancient Greece. In more recent times this link was recognized through the behavioral sciences. Although the research is still in its infancy, we now have a better understanding about how certain nutrients or the lack of particular nutrients and additives affect the functioning and development of the nervous system. Studies on starvations, additives and preservatives, neurotransmitter synthesis, the post-lunch dip, effects of vitamin deficiencies, and student nutritional status have found links between what the test subjects consume and their behavior, through their psychological, social, and emotional reactions.

Food and Nutrition Service, Office of Analysis, Nutrition, and Evaluation, Alexandria, VA: 2002.

Corporate Presence in Public Schools

As federal concern regarding the nutritional value of school meals grew throughout the 1990s, laws were enacted that required school lunches to meet USDA dietary guidelines. These laws were passed amid protests from groups who asserted that the requirements would be too difficult to enact without increased funding and from commodity producers who would lose market shares. Compromises were made as special concessions were given to the food industry, creating loopholes in legislation that encourage large corporations such as Marriott, Aramark and Daka to run the school food service.⁴³ By taking the responsibility for operating the food service, these companies ease part of public schools “extraneous” financial concerns.⁴⁴

With increasingly tight budgets and cuts in tax dollars allocated for public education, schools hardly have the money needed for standard educational expenses in addition to revenue for school lunch programs. With little money allocated to fund lunch programs, the meals served at schools do not always rouse the participation needed to fund the program. In attempts to increase lunch sales, some schools set up food courts, often housing fast food chains such as Taco Bell. As a result, such schools found less food waste, and increased sales. Schools have also found opportunities to make additional revenue by forming alliances with corporations such as soft drink companies. These corporations help alleviate some of the financial burdens placed on schools, in exchange for marketing opportunities with a captive student audience.

According to the Institute of Medicine, a Congressional health policy adviser, over half of all U.S. high schools and junior highs have signed frequently binding contracts, with soft-drink companies or vendors, for often exclusive rights to sell their products at the school.⁴⁵ Schools may receive hundreds of thousands of dollars, and some spend this much needed money on, for example, school computers, SAT testing fees for low-income students, or sports-related program expenses. These contracts may have stipulations tying the amount of money schools receive to the vendors’ targeted sales goals.⁴⁶

Captive Audience

Corporations have a captive audience of subjects to advertise to in schools. In some cases, students are obligated to view advertisements as part of their classroom experience.⁴⁷ Nestle lists several marketing methods soft drink companies use to target children at school. These include:

⁴³ Nestle 193.

⁴⁴ Greg Bretthauer, Dean of Students, Appleton Central Alternative Charter High-School, reports that some schools consider lunch an interruption to the educational day rather than an intrinsic educational opportunity. Greg Bretthauer, Dean of Students, Appleton Central Alternative Charter High-School.

⁴⁵ <http://www.philly.com/mld/inquirer/news/nation/10074008.htm>

⁴⁶ The results of such contracts are that students are buying more sodas and fewer beverages such as milk. “From 1985 to 1997, school districts decreased the amounts of milk they bought by nearly 30% and increased their purchases of carbonated sodas by an impressive 1,100%.” Nestle.

⁴⁷ Channel One television airs short programs which some schools require teachers to show. Each program contains corporate sponsored commercial breaks. Eight million middle, junior and high school student are subjected to Channel One almost every school day. Schlosser.

- Sponsoring commercials on Channel One Network
- Soft drink “pouring-rights” agreements⁴⁸
- Logos on vending machines, supplies, and sports facilities
- Hallway advertising
- Advertisements on free book covers
- Advertisements on school buses, sports uniforms, and scoreboards
- Sponsoring contests
- Offering free samples
- Giving out coupons for fast food outlets
- Club and activity sponsorship
- And product placements in teaching materials.⁴⁹

Teaching materials offered by corporations are often slanted in the corporations’ favor. At times, this is revealed in teaching manuals when companies promote brand loyalty by prompting teachers to bring brand name junk food into the classroom for educational and reward purposes.⁵⁰ At other times, corporations skew the lessons taught in their educational materials.⁵¹

The Ability to Sell

Soft drinks are allowed in schools because of 50 years of tinkering with government-school food regulations and amendments such as the Child Nutrition Act of 1966, which amended provisions of the National School Lunch Act of 1946.⁵² There has been a constant struggle over proposed legislation to ban vending machines in schools. The USDA attempted such a ban in 1983, but the legislation was rejected in the federal appeals court.⁵³ Legislation to empower the Secretary of Agriculture to “prohibit sales of soft drinks, candy, and foods high in fats” come before Congress from time to time but have been opposed by lobbyists such as the National School Boards Association and the National Association of Secondary School Principals.⁵⁴ The need for the revenue obtained from selling foods of minimal nutrition is so great that even organizations that have the best interests of students in mind become proponents for selling junk foods at school. In some schools there exist regulations for student access to vending machines

⁴⁸ These are exclusive, contractual agreements between schools and soft drink companies. Such agreements mandate that the school sells only the companies brand of soft drink. These companies anticipate that this exclusive brand exposure in schools will promote brand loyalty among students outside of school and perhaps for the rest of their life.

⁴⁹ Nestle 187.

⁵⁰ Example: an activity in an arithmetic book may have the students add and subtract (insert brand name of junk food), followed then by the reward of eating said junk food.

⁵¹ Procter & Gamble’s *Decision Earth* school curriculum taught students that clear-cut logging was good for the environment; the Exxon Education Foundation denied the existence of many environmental problems stemming from fossil fuels and explained that alternative energy would be too expensive, in their curriculum; and the American Coal Foundation taught students that there are positive side effects of increased carbon dioxide emissions. Schlosser, Eric.

⁵² Nestle 207.

⁵³ Brownell 174.

⁵⁴ Brownell 162.

during school hours. These schools may have a policy that vending machines are to be turned off surrounding the lunchtime hours. Often such regulations are ignored.⁵⁵

⁵⁵ Nestle 212.

Current State of Affairs: Response to Low Nutritional Standards and Corporate Involvement in Schools

Spurred by epidemic rates of childhood obesity, childhood onset of type 2 diabetes, high cholesterol and hypertension,⁵⁶ and in response to low nutritional standards, corporate involvement, student behavioral problems and the desire to improve the school learning environment, public school food programs have received increased attention by the public and the media. Public schools have the ability to touch the lives of almost all of the nation's children. Nutritionists, school faculty and staff, parents, community members and public officials have begun a process of changing the way schools offer food choices to their students. There is a shift toward viewing food served in schools as a moral issue and educational opportunity, not just an opportunity for cash-strapped schools to make money.

In June 2004 Congress passed Section 204 of Public Law 108-265 of the Child Nutrition and WIC Reauthorization Act of 2004⁵⁷ mandating that states create nutrition and physical activity policies for their schools by June 30, 2006.⁵⁸ These policies are to address the composition of vended, à la carte, and fried foods sold within the school, as well as the nutrition education and the amount of physical activity offered at the school. Bills are continually being introduced in many states seeking to reform nutritional offerings of schools, what is sold in school vending machines, and the advertising of junk food to students. Such legislation also seeks to make fresh, healthy food and water available at school.⁵⁹

Corporate Contracts and Vending Machines

Even before the Section 204 legislation passed, schools and school districts began to regulate what was being sold in vending machines, and began to question the morality of vending contracts with companies selling less than nutritionally sound products. Some schools have decided against renewing contracts with corporate vendors. In California a coalition of parents, students and pro-nutrition groups won a statewide ban on soft drinks in elementary and middle schools.⁶⁰ Other schools have decided to continue with contracts or buy their own vending machines and switch to selling healthier options such as water, 100% fruit juice (often making a gradual switch), yogurt and fruit.⁶¹

⁵⁶ <http://www.eatbettermovemore.org>

⁵⁷ For an overview of this legislation see FRAC's (Food Research and Action Center) highlights: http://www.frac.org/html/federal_food_programs/cnreauthor/cnrc_highlights.htm.

⁵⁸ For examples of state policies see: http://www.fns.usda.gov/tn/Healthy/wellness_samplepolicies.html.

⁵⁹ See <http://www.commercialalert.org/pcoasum.pdf> for a summary of Senator Kennedy's Prevention of Childhood Obesity Act.

⁶⁰ This site based out of Los Angeles is a healthy school resource with policy updates (extending beyond California), fundraising suggestions, student activism ideas, and more: <http://www.nojunkfood.org>.

⁶¹ See Colorado's "Step-By-Step Guide to Implementing Colorado Senate Bill 04-103". This guide chronicles their planned transition to healthy vending machines and offers implementation suggestions, sample nutrition calculation worksheets, an online spreadsheet that automatically calculates the nutritional value of foods, and links to online databases (the Action for Healthy Kids and the USDA's Food and Nutrition Service site) with numerous success stories:

<http://www.cde.state.co.us/cdenutritran/download/pdf/VendingGuide.pdf>.

Lunchroom as a Classroom

“What people do with food is an act that reveals how they construe the world.”

Marcella Hazan⁶²

In his article “The Nature and Purpose of Education,” Maurice Holt questions what school meals such as reheated hamburgers and chips imply about our nation’s conception of the world and our children’s education.⁶³ Such food does not showcase lunchtime as an important educational opportunity where life long healthy habits may be learned.

Alice Waters, acclaimed chef and food activist, notes:

“In school cafeterias, students learn how little we care about the way they nourish themselves—we’ve sold them to the lowest bidder. Soda machines line the hallways. At best we serve them government-subsidized agricultural surplus, at worst we invite fast food restaurants to open on school grounds. Children need only compare the slickness of the nearest mall to the condition of their school and the quality of its library to learn that they are more important as consumers than as students.”⁶⁴

A growing movement recognizes the cafeteria as a critical opportunity for education. There students can learn what constitutes healthy food, practice preparing it, taste new foods, and begin to understand the cycles of the seasons. Many organizations are developing experiential curriculum that integrates traditional lessons with food – whether growing, cooking or tasting it.⁶⁵ Students may learn about countries, flavor first, math by baking or economics by studying local food commerce. By immersing students experientially in their education through their meals, the school intellectually excites and stimulates students beyond a two dimensional education. And thus the lessons are learned at a deeper level.

Reinventing Lunchtime

Beyond food itself, aspects of the lunch experience are being modified by schools, from the timing of lunch to the actual atmosphere:

*Recess Before Lunch*⁶⁶: Details such as the rhythm of the day (the actual timing of when students eat and what they do before and afterwards) are essential to consider. Central Middle School in Whitefish, Montana holds recess before lunch. When students go to lunch, they have released their energy, are hungry and eat more of their lunch - creating less waste and more fully nourishing themselves, explains Principal Anderson. Anderson has seen a drop in discipline problems (problems that began about 90 minutes after lunch) from 10 to 12 problems everyday to about 4 to 8 discipline problems a week. Teachers report that this schedule has made a difference in students’ behavior and ability to concentrate during class. They estimate 10-15% additional teaching time is gained as a

⁶² Hazan, Marcella. *The Classic Italian Cookbook: the art of Italian cooking and the Italian art of eating*. Ballantine: 1984.

⁶³ <http://www.ecoliteracy.org/rethinking/rsl-viewpoints/maurice-holt.html>

⁶⁴ http://www.edibleschoolyard.org/alice_message.html

⁶⁵ The Center for Ecoliteracy created a systems approach guide titled “Rethinking School Lunch” that focuses on experiential learning and sustainability. <http://www.ecoliteracy.org/rethinking/rsl-guide.html>

⁶⁶ For a recess before lunch guidebook see: <http://www.opi.state.mt.us/schoolfood/recessBL.html>.

result of better behavior from the students.⁶⁷ Such positive results have been claimed by schools throughout the nation.

North Ranch Elementary School in Scottsdale, Arizona was the first to make the switch to recess before lunch in their district in 2001. Because of this switch they have seen fewer referrals to the nurse (as they speculate full stomachs and high heat did not mix well), students eat more during lunch and teachers don't have to spend important classroom time calming the students down before beginning a lesson. Now, all 31 schools in that district schedule recess before lunch.⁶⁸

Lunch Environment: Schools throughout the nation are experimenting creatively with the lunchroom atmosphere. Some have changed to round tables, full spectrum lighting and other aspects of mood and aesthetics to promote a more natural, pleasant and calming ambiance. Students respond positively to the additional option of salad bars in the lunch line as they enjoy the fresh produce and the sense of empowerment that comes with the ability to choose what and how much to put on their plate. Prepaid lunch cards remove the stigmatization likely felt by individuals who receive free or reduced price meals. And students learn the importance of shared meal times when they are given sufficient time to finish their food, with time to socialize. Lunch time is an important opportunity where students may learn appropriate social behavior as modeled by school staff and community members that join them. All these aspects make lunch a more pleasing time in the school day which carries over into the classroom.

School Breakfast and the USDA Fruit and Vegetable Pilot Programs

Many schools are attempting to increase the nutritional intake of students by offering breakfast before school or free fruit and vegetables at various times of the day. "On a typical day during the 2002-03 school year, 8.2 million children in more than 76,000 schools and institutions participated in the School Breakfast Program. Of these children, 6.8 million, or 79 percent, received free or reduced-price breakfasts."⁶⁹ These programs help children daily to obtain needed calories and nutrition. Students may eat school breakfast because they do not receive a nutritious breakfast at home (or any at all), or they may have not been hungry in the early morning. Some students must eat early, resulting in a long time passing between meals, so school breakfast helps bridge the gap. Depending on their families' income level, some students are able to receive reduced-price or free meals. Also during the 2002-03 school year, 107 pilot schools offered free fruits and vegetables to their students. Each of the schools that participated in this pilot project could choose how to make the fresh and dried fruits and fresh vegetables available.⁷⁰ Some schools handed them out in class, while others used hallway kiosks or

⁶⁷ In addition to switching the order of recess and lunch, Whitefish Central Middle School also switched to a healthier meal program and vending machines.

http://www.educationworld.com/a_admin/admin/admin389.shtml; <http://www.feingold.org/montana.html>

⁶⁸ http://www.educationworld.com/a_admin/admin/admin389.shtml

⁶⁹ <http://www.frac.org/pdf/cnsbp.PDF>

⁷⁰ Of the 107 elementary and secondary school that participated in this pilot project 25 were each in Indiana, Iowa, Michigan and Ohio, and 7 were in New Mexico in the Zuni Indian Tribal Organization. <http://www.ers.usda.gov/publications/efan03006/>

lunchroom stands. As mentioned above, the USDA Fruit and Vegetable Pilot Programs and the School Breakfast Program have resulted in teachers' perception of an increase in students' attention during class, and generally better student behavior.^{71,72} This same perception was revealed during an investigation into Apple Central Alternative High School in Appleton, WI.⁷³

Sustaining Local Foods: Farm-to-School and School Garden Programs

As family farms disappear, fewer students have the opportunity to visit farms, finding themselves disconnected from the source of what they eat. Farm-to-school and school garden programs are an effort to rekindle this connection, foster appreciation of food, nature, farmers, and promote sustainable food systems. Experiences from these programs empower students and impart an understanding and respect for the natural world. When added to students' conventional classroom education, farm-to-school and school garden programs provide an opportunity to learn through hands-on experiences. Such experiences have been found to increase confidence and improve behavior in students.

In addition to enriching students' education, improving the nutritional status of the food they consume and improving student behavior, farm-to-school programs support local farms and food processors, creating a more sustainable food system. Farm-to-school projects vary widely in their planning and implementation and in the integrated curriculum offered to students. Farm-to-school programs typically involve at least a few of these elements: field visits to local farms, visits from farmers in the classrooms, taste tests within the class or during lunch, education about nutrition and the growing season, and involvement in food preparation.

Farm-to-school programs are growing across the nation.⁷⁴ Politicians are aiding this effort by proposing legislation to fund farm-to-school projects throughout the country. One example is U.S. Rep. Tom Udall's recently announced plan to propose legislation that would rid junk food from the schools in New Mexico and fund farm-to-school projects.⁷⁵

School gardens are not a new phenomenon, but have been around for hundreds of years. They were promoted by many early philosophers and leaders in education as well as

⁷¹ Buzby JC, Guthrie JF, Kantor LS. "Evaluation of the USDA Fruit and Vegetable Pilot Program." *Report to Congress*. May 2003. <http://www.ers.usda.gov/publications/efan03006.pdf> (Sept. 2004).

⁷² McLaughlin JE, LS Bernstein, MK Crepinsek, LM Daft, JM Murphy. "Evaluation of the School Breakfast Program Pilot Project: Findings from the First Year of Implementation," *Nutrition Assistance Program Report Series*, No. CN-02-SBP, Project Officer: Anita Singh. U.S. Department of Agriculture, Food and Nutrition Service, Office of Analysis, Nutrition, and Evaluation, Alexandria, VA: 2002.

⁷³ See the appended Appleton Central Alternative High School Case Study.

⁷⁴ For farm-to-school internet resources and examples of such projects see the Community Food Security Coalition (CFSC) page: http://www.foodsecurity.org/farm_to_school.html, and a site from Occidental College: <http://www.farmtoschool.org/>. CFSC published a guide: *Feeding Young Minds: Hands-on Farm to School Education Programs* in July of 2005 sighting experientially based educational activities from farm-to-school programs through out the United States.

⁷⁵ <http://www.abqjournal.com/news/xgr/apudall01-19-05.htm>

educational philosophers from the twentieth century.⁷⁶ Records from 1525 tell of an Italian university planting a botanical garden for educational purposes. In 1869, Austria, followed by Germany, Sweden, Belgium, France, Russia and England, mandated that all schools must have gardens. The first official school garden in the United States was established at the end of the nineteenth century at the George Putnam School in Roxbury, Massachusetts. School gardens quickly gained popularity and began popping up throughout the United States in the early twentieth century. Then during World War I and then in WWII, gardens became signs of patriotism (Victory Gardens), after which their popularity began to dwindle.⁷⁷

School gardens are valuable tools that challenge and transform any notion of food as dead matter used to fill empty stomachs. They present an opportunity to experientially learn how food is planted, cared for, cultivated, prepared, served, eaten, how it nourishes the body, and how it is returned back to the earth. A school garden internet resource at Texas A&M lists many advantages of the garden for students, among them an increase in self-esteem and self-worth recognized by the students. Other advantages include:

- Addressing multiple learning styles
- Improving environmental attitudes
- Promoting good nutrition
- Increasing physical activity
- Teaching patience and responsibility
- Teaching students to work cooperatively
- Improving social skills
- Building classroom relationships and school spirit
- Supporting interdisciplinary education
- Creating an appreciation for team work
- Beautifying the school environment.⁷⁸

Examples of school gardens in the United States are abundant, whether large or small. Perhaps the best-known school garden is Alice Waters' Edible Schoolyard in Berkeley, California. With the help of community members and students, a blacktop lot was transformed into an organic garden that is integrated into students' curriculum, including a kitchen classroom.⁷⁹ Crenshaw High School, an inner-city school in Los Angeles, is notable in that its school garden is making a profit. These students began *Food from the Hood (FFTH)*, a company that sells entirely student grown and marketed produce and value-added foods. Their salad dressing is distributed to stores nationwide. Company profits feed the scholarships fund for the student-owners.⁸⁰

Nutrition and Wellness Programs

⁷⁶ Early educational philosophers who promoted school gardens: Amos Comenius, Jean-Jacques Rousseau, Johann Heinrich Pestalozzi and Friedrich Froebel; Twentieth century educational philosophers whose promoted school gardens: Maria Montessori, John Dewey and Mahatma Gandhi. For a good historical review of garden based learning see: [http://ucce.ucdavis.edu/freeform/4hcyd/documents/CYD_Monograph_\(Focus\)2609.pdf](http://ucce.ucdavis.edu/freeform/4hcyd/documents/CYD_Monograph_(Focus)2609.pdf).

⁷⁷ <http://www.hort.vt.edu/HORT6004/network/schoolgardens.html>

⁷⁸ <http://aggie-horticulture.tamu.edu/nutrition/schoolgardens/benefits/appschg.html>

⁷⁹ <http://www.edibleschoolyard.org>

⁸⁰ <http://www.foodfromthehood.com/2004-2005/food/Home/home.htm>

For the last several years, schools have been implementing nutrition and wellness programs. More schools will follow suit with the passage of Public Law 108-265, mentioned above, and the encouragement of physical activity in the new USDA Food Guide Pyramid. Nutritional policies which omit foods with artificial additives and encourage healthful nutrients and fresh and organic food are being adopted nation-wide. These policies are making their way through school boards with support from parents, community members, non-profit organizations, nutritionists, public advocates and politicians. New examples of nutrition education and physical activity policies are constantly being developed. Some schools are acquiring passes to the local YMCA or incorporating exercise equipment in the schools.⁸¹ Other schools creatively promote healthy before and after school activities such as walking trains.⁸²

A Holistic Picture

It is important to improve health, wellness and behavior through a multifaceted approach of providing enough nourishing food and physical activity, connection to the land, and nutrition and wellness education. By bringing together all these various facets, our nations schools would become more solid and wholesome avenues of education and our nation's children would benefit by becoming healthier, more grounded students.

⁸¹ See the appended Appleton Central Alternative High School Case Study.

⁸² See <http://www.cdc.gov/nccdphp/dnpa/kidswalk/resources.htm> for a walk to school resource.

Making Better School Meal Programs “Pay”

Schools and school districts, administrators and dining service vendors may fear a loss of revenue should students discontinue patronizing the school food services if and when healthier food is served. Often, to facilitate student buy-in, schools offer nutrition education and experiential learning⁸³ opportunities to complement the healthy meal program. There are many schools that successfully serve healthier options in an economically viable program. If a school offers quality, fresh and healthy food, students will buy it.⁸⁴ LIST WEBSITE OF THE STUDY IN FOOTNOTES The key factors are that the food is fresh and, when served raw, cooked or processed, that it tastes good. Schools have found buying fresh food from local farmers costs about the same as buying from major food suppliers.⁸⁵ Some schools that buy natural or organic food, which is more costly, have come up with creative revenue generators that help pay for the extra cost.

Examples of Viable Healthy School Meal Programs

- Ross School, a private school in New York, serves gourmet style food, including sushi from a local restaurant, and is able to do so in a financially viable way.⁸⁶
- When Aptos Middle School in San Francisco eliminated soda, chips and junk food from the school food shop, predictions were that sales would decline for several weeks, then rise back to normal levels. The first week did see sales decline, but not significantly, then rise back to normal levels.⁸⁷
- Denver Public Schools, with all open campus high schools, found no significant change in either sales or profits after they changed their vending machines (which the school district owns) to healthier options, eliminating some snacks high in fat and sugar and replacing regular chips with baked ones.⁸⁸
- North Community High School in Minneapolis made \$4,000 a year more by increasing the number of vending machines from 4 to 16, placing them in high traffic areas and offering healthy choices. Thirteen machines sell water at \$.75, two machines sell sports drinks and 100% juice at \$1.00, and one machine sells soda at \$1.25, with limited hours of operation.⁸⁹
- Central School in Whitefish, Montana removed unhealthy vending machine food and replaced it with school-owned nutritiously stocked vending machines, and switched to healthier options in the lunch line. Many believed the students would not buy the new, healthy foods. However, the income generated has been

⁸³ i.e. hands on experiences often outside the classroom such as growing, harvesting and cooking the produce offered in the lunch room, visiting local farmers, etc.

⁸⁴ Gail Feenstra’s (a food systems analyst at the UC Davis-based Sustainable Agriculture Research and Education Program) study of what exactly students piled on their plate at farm-to-school salad bar programs in California found that students prefer to eat fresh produce when a variety of fruits and vegetables are offered as a salad bar. She reported that the ability for children to choose what they wanted to put on their plate was empowering and students like how fresh produce tastes. See overview of this study at: http://www.ucdavis.edu/spotlight/0505/school_lunches.html.

⁸⁵ <http://www.billingsgazette.com/index.php?id=1&display=rednews/2005/01/29/build/business/25-college-farmers.inc>

⁸⁶ <http://www.ross.org/>

⁸⁷ <http://pasaorg.tripod.com/nutrition/pdfs/science.pdf>

⁸⁸ <http://www.cde.state.co.us/cdenutritran/download/pdf/VendingGuide.pdf>

⁸⁹ http://cspinet.org/new/pdf/school_vending_machine_case_studies.pdf

comparable to the profits made from the additive-laden foods they were previously selling.⁹⁰

- Hopkins School District in Hopkins, Minnesota introduced whole grains and discontinued selling drinks with high-fructose corn syrup in 14 of their schools. They started offering gourmet, natural, and organic foods from local companies. Because organic and natural foods are more expensive, they created outlets to generate more revenue in addition to healthy vending offerings, such as an “On the Go Café” (a service from which staff can order ready-to-eat dinners), a concession business serving the athletic department and booster clubs and a restaurant quality catering service for school functions (which was previously outsourced).^{91,92}

⁹⁰ <http://www.feingold.org/montana.html>

⁹¹ <http://www.bizjournals.com/twincities/stories/2004/10/18/story2.html?page=2>

⁹² www.Royal-cuisine.org

Conclusion

Schools, as critical players in the education of our nations students, have varied responses to the epidemic of childhood obesity and wide spread under-nutrition. Many of these responses focus on improving school meal programs. Since better food may also improve student behavior, some schools also see better meal programs as methods of promoting a more conducive learning environment. The healthier the learning environment schools create, the easier it is for schools to fulfill their mission to educate our nation's children.

Anecdotal evidence that strongly supports this argument is found in other reports such as the USDA Fresh Fruit and Vegetable Pilot Programs and claims made by students, teachers and school administrators in schools such as Appleton Central Alternative in Appleton, WI and Chelsea Elementary in Chelsea, Vermont. As it stands now mostly anecdotal evidence and some research, on specific vitamins' and minerals' effects on behavior, supports the argument that nutrient laden food improves behavior. Empirical research designed specifically to track correlations between improved school meal programs and improved student behavior would help to solidify our understanding of such a relationship. Schools could help such researchers by documenting their discipline problems before, during and after the switch to better meal programs.

The prospect exists for schools to re-evaluate and improve their meal programs. As seen in this report, it is financially feasible for schools to convert to healthier meal programs. In return for such a conversion, schools may create better learning environments by improving the behavior and overall health of their students, and reclaim the educational opportunities found within lunchtime.