CHILDHOOD OBESITY: CONFRONTING THE GROWING PROBLEM

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ABSTRACT

Over the past three decades, obesity rates have tripled in the United States. One third of American children are currently overweight or obese, putting them at an increased risk for a multitude of obesity-related health problems. In order to combat the current trend in childhood health, a non-profit organization - Project Healthy Schools (PHS) – began educating students about the importance of healthy eating habits and physical activity. PHS aims to decrease students' future risk of cardiovascular disease and diabetes by educating them how to live heart-healthy lifestyles (Project Healthy Schools, 2010). This leads to the question: is the Project Healthy Schools' intervention model successful in encouraging students to make healthier decisions? To examine this issue, I utilized measurement tools including cafeteria observations, focus groups, semi-structured interviews, and behavioral surveys to assess the impact the program has on student behaviors. The findings reveal that the level of school cooperation with Project Healthy Schools regarding administrative support, staff enthusiasm, and event participation are associated with a positive change concerning level of physical activity in some, but not all, of the populations studied. In addition, although students retained knowledge from the exposure, it is apparent that there are other factors playing a role in successfully changing behavior. By expanding programs to address various other factors of influence, including structure of the cafeteria, administrative support, and family influence, it is likely school-based intervention programs will be more successful in combating this epidemic.

INTRODUCTION

Over the past three decades obesity rates have tripled in the United States. One third of American children are currently overweight or obese, putting them at an increased risk for a multitude of obesity-related health problems including heart disease, high blood pressure, various cancers, type 2 diabetes, osteoarthritis, and respiratory problems (Koh, 2010; Centers for Disease Control and Prevention). Basically, having a "…BMI in the obesity range is equivalent to aging twenty years in terms of chronic conditions you face" (Orszag, 2010). Because this trend in childhood obesity is relatively new, it is unclear whether the health effects later in life will be more severe than anticipated. While American lives are threatened by this disturbing reality, there is also an economic strain. The aggregate cost of obesity to society is $150 billion every year and this figure is predicted to double in a decade (Orszag, 2010).

As this daunting truth looms over our heads, we are able to take comfort in recognizing that obesity and other weight-related conditions are largely preventable. While environmental and genetic factors may play a role in causing obesity, the Centers for Disease Control and Prevention claim behavioral factors, such as dietary patterns and physical activity, have the largest effect at the population level (2009). The current First Lady of the United States, Michelle Obama, has directly acknowledged this epidemic and launched a national campaign in February 2010 to eliminate childhood obesity within one generation. "Make no mistake about it—this problem can be solved," Mrs. Obama said. "This isn't like putting a man on the moon or inventing the Internet. It doesn't take a stroke of genius or a feat of technology. We have everything we need right now to help our kids lead healthy lives" (Stolberg, 2010).

Before Michelle Obama identified childhood obesity as the major issue she would confront as First Lady, a non-profit organization - Project Healthy Schools (PHS) – began

working to educate students about the importance of healthy eating habits and physical activity. It was initially established in the Ann Arbor Public School District in 2004, and has expanded into Corunna, Detroit, Owosso, and Ypsilanti middle schools. Parallel with Michelle Obama's goal, PHS aims to decrease students' future risk of cardiovascular disease and diabetes by educating them about how to live heart-healthy lifestyles (Project Healthy Schools, 2011).

This leads to the question: is the Project Healthy Schools' intervention model successful in encouraging students to make healthier decisions? To be effective, a nutritional education program should lead students to adopt healthier lifestyle choices than they had prior to the intervention. The study will also look for variation in intervention effectiveness that may exist across schools in which the program has been introduced. PHS has been implemented using the same general format in five Ann Arbor middle schools; however, variations amongst the schools in economic characteristics and program implementation are evident. If different results are identified between schools, it will be important to examine the factors contributing to the differing results. Studying the effectiveness of intervention programs and developing a greater understanding of the pieces linked to behavioral change will be essential in curbing the dangerously high obesity rates in our country.

LITERATURE REVIEW

What is an Intervention?

Fundamentally, an effective nutritional intervention makes positive changes to nutrition-related behavior or an aspect of the health status for an individual, target group, or even an entire community ("Nutrition Care Process", 2010). It is comprised of two parts: the transmission and application of information. The disconnect between what people know and what they practice is referred to as the "know-do gap" (Pablos-Mendez, Chunharas, Lansang, Shademani, Tugwell,

2005).

By studying 9 to 13 year old students, Brown, Teufel, and Birch (2007) highlight the difficulties in both aspects of an intervention. Using surveys, they assessed over 1,000 students' interest, understanding, and application of the presented health information. The results suggest that knowledge does not imply application, confirming the existence of the "know-do gap". In addition to emphasizing this discrepancy, one-fourth of the surveyed students confessed difficulty in understanding the majority of the information presented to them regarding health (Brown, Teufel, and Birch, 2007). Lacking a firm grasp of the nutritional information taught is a key issue leaving students unmotivated or unsure of how to adopt healthy lifestyle changes.

Early adolescents less interested in health information, and therefore unlikely to modify their behaviors, confessed that they either did not understand or believe in the power their current actions could have on their health later in life. Brown and colleagues' sample included students from seven different states; this large, diverse geographical sample allowed them to conclude that poor nutritional instruction was not a localized problem.

Although Brown, Teufel, and Birch highlight the importance of providing education in an accessible manner, others argue that the main challenge in nutritional interventions is not providing information but rather motivating learners to utilize this knowledge (Thamlikitkul, 2006). Anderson, Stanberry, Blackwell, and Davidson (2001) evaluated an existing curriculum, revealing the existence of a "know-do gap". This study conducted a pre and post-test among high school students, measuring the impact that 14 hours of nutritional education had on the students' knowledge and their food consumption. The students were evaluated prior to taking Comprehensive Family and Consumer Sciences, a class within the curriculum encompassing a unit on nutrition taught by a certified teacher. After completion of the course, the students were

assessed with a survey including a 57-item test and a one-day food analysis chart. The results from this intervention indicated that while students exhibited increased knowledge after completing the course, they failed to incorporate this information into their diets. It is worth noting that because a 24-hour food recall technique was employed, the results may not have accurately captured the students' eating habits. This example suggests that it is possible for schools to have nutritional education programs that fail to bridge the "know-do gap", and thus, may be ineffective in promoting change. Because increased knowledge does not necessarily lead to healthier behaviors, my study will focus on evaluating students' application of information.

Barriers to Successful Interventions

To begin closing the "know-do gap," it is important to identify any barriers that might hinder an individual's desire or ability to implement changes. Facilitating a focus group comprised of 19 parents with obese children, Sonneville isolated barriers preventing the application of healthier lifestyle recommendations. The range of explanations offered by the parents included: a lack of information regarding how to make appropriate changes, little support from other family members, difficulty monitoring child behavior, economic obstacles such as time and dollar costs, difficulty with changing habits, and child preferences (Sonneville, 2009). Although this list seems rather lengthy, it can be condensed into a few overarching issues. Sonneville suggests that interventions should try to involve the entire family rather than only individuals, motivate the children to be proactive with their own health, and implement programs at a young age. While Sonneville's focus groups involved adults, Gosling, Stanistreet, and Sawmi (2008) used focus groups with 32 younger students to reveal student-identified barriers. The research assessed students' understanding of healthy foods and the benefits of physical activity to gauge their level of knowledge. Afterwards, students acknowledged factors affecting

the application of this knowledge; they specifically highlighted the considerable impact parents have on their dietary patterns.

This sentiment is echoed by Surgeon General Benjamin, who has commented that, "…the parents are the first teachers" (2010). Parents make the decisions about the food their children eat and the amount of time spent doing physical activity; they are role models. The barriers identified by the focus groups can be categorized as follows: individual motivation to change, available resources, and environmental support. While these focus groups concentrate on an array of obstacles in adopting healthy lifestyle practices, the focus groups in my study will differ because I place the majority of the emphasis on environmental support from the students' school. This strategy was adopted because the food that an individual eats is determined by an intersection of various factors, some under an individual young person's control and others not. "In addition to personal preferences, there are cultural, social, religious, economic, environmental, and even political factors" that affect food consumption (Rodriguez, 2010). To reduce the gap between knowledge and application, all factors that may hinder the intervention's success should be taken into consideration. Focusing on conditions existing at each middle school, and the experience of the students at a particular school as a collective group, my research aim is to provide an understanding of the influences that exist in the school setting.

Personal Motivation to Change

When delving into the elements potentially impeding the effectiveness of an intervention, the study will start on the most basic level, the individual. One of the leading issues with nutrition programs is that while they impart knowledge to students, they may fail to instill a sense of responsibility for eating habits and the consequences of these choices. Providing information does not guarantee that students are learning. Even if they acquire knowledge, the

program is not successful unless it spurs positive changes in their lives. Not fully comprehending the role that they play in their own health, students are unlikely to enact changes in established patterns. Therefore, nutritional information should be taught in a manner that raises awareness and develops a sense of empowerment in children regarding their health (Brown, Teufel, and Birch, 2007). Many researchers argue that it is important to have a successful intervention when students are young because dietary habits are difficult to change once they are established (Douglas, 1998). Mikkila, Rasanen, Raitakari, Pietien and Viikari (2005) conducted research studying dietary patterns from childhood to adulthood. Their findings "suggest that food behavior and concrete food choices are established already in childhood or adolescence and may significantly track into adulthood." Dr. David Ludwig, Director of the Child Obesity Program at Children's Hospital in Boston echoes a similar view, stating: "Childhood is the ideal time to address this problem for a lot of reasons. The lifestyle habits that cause the problem [poor diet and lack of exercise] haven't been entrenched as long with children as they have with adults" (Parker-Pope, 2008). Patterns in food consumption and physical activity are enormously relevant because both are learned at a young age and major contributors to being overweight and obese (Boyle, Maria, 2000).

The literature advocates for early health education but also recognizes that many people lack motivation to transform knowledge into action. To better comprehend this inconsistency it is helpful to have a basic understanding of human motivation. Curtis and Aunger define motivation as the distance we will go to get something we need (2007). This definition immediately elicits the question: what do we need? Adopting an evolutionary lens to comprehend motivation, Curtis and Aunger state that humans have two basic needs: to survive and to reproduce. They argue that to successfully motivate an individual, one must exploit our

desire to meet these needs through our drives, emotions, and aspirations to learn. Therefore, existing health promotion strategies may need to be modified. Many interventions fail to recognize the significance of motivation and are founded on the idea that individuals are rational beings with a conscious cost-benefit analysis approach to behavior change, which it not necessarily the case. If some interventions do incorporate motivation, Curtis and Aunger contend they isolate the desire to be healthy, thus omitting the spectrum of motivational tools that could be used. Because humans are able to compare the anticipated reward of future acts, health promotion should focus on motivating individuals by emphasizing reasons to be healthy that will resonate with our instinctual needs. One example is increasing an individual's physical activity; addressing the motivation of thirst and cooperation, one might focus on how refreshing water is after exercise and the enjoyment of being part of a team. Many of these motivations interact with the individual on a subconscious level; therefore the decision maker is often unaware of the exact reasons behind making their choice (Curtis and Aunger, 2007).

Gender

When considering an individual's decision to make healthier choices, it is important to appreciate the moderating role that gender plays in the process. Worldwide, females have a greater frequency of obesity than males (Kumanyika, 2007). This higher prevalence of obesity in females is an overarching factor suggesting the importance of looking beyond an individual to understand why people make unhealthy choices. Kirchengast and Marosi explored this relationship using questionnaires to study gender differences in behaviors among adolescents; in addition to examining eating behaviors, they included questions regarding physical activity and body image (2008). Their study included 354 females and 280 males between the ages of 11 and 18 years old. To assess changes over time, both genders were divided into a younger (11-14)

and older age group (15-18). One aspect of the study was body image; females were significantly more likely than males to describe "their own body as unattractive and non-athletic" (Kirchengast and Marosi, 2008). Along with poor body image, the findings also suggested that both age groups of females were more likely to use weight loss methods. In regard to physical activity, males were more active at all ages. It is interesting to note, however, that the females' physical activity decreased as they became older while the males' slightly increased. This research suggests that a societal trend exists causing males and females to adopt different attitudes and approaches to their health.

Cultural and Environmental Influences

Beyond gender, it is evident that other patterns exist in society; not only does obesity have a higher prevalence in women but also among Black, Hispanic, and Native American populations (Benjamin, 2010). This tendency can be partially explained by cultural influences within different societal groups, such as traditional foods, food-related rituals, norms surrounding body image, and attitudes toward physical activity (Kumanyika, 2007). It is important to note that "food deserts" also play a significant role in creating racial differences in health; this topic is discussed in a following section.

African American women, specifically, have an extremely high prevalence of obesity; data gathered from 1988-1994 revealed that 65.8 percent of black women over 20 years of age were obese or overweight compared to 49.2 percent of white women (Kumanyika, 2007). Baturka, Hornsby, and Schorling employed a qualitative approach to study this trend examining African American women's perceptions of body image (2007). They conducted 24 interviews with women 21 to 47 years of age, including a mix of obese, overweight, and healthy weight women.

Their results indicated that the women felt a strong cultural pressure to be self-accepting and that having a larger body was a norm encouraged by their family members and significant others. One respondent noted that: "Most of the girls I see now [are] just as big as I am, that's why I don't feel bad… I look at them and feel better" (Baturka, Hornsby, and Schorling, 2007). The women expressed an understanding of the relationship between weight and health; however, they frequently compared themselves to their peers and as a result did not feel inclined to make lifestyle changes. Additionally, they vocalized a lack of social support and resources to successfully achieve a healthier weight. A majority of the women attributed being over-weight to factors outside of their control including family history, traditional eating habits, and poor exercise programs or facilities in their area. The authors suggest that health promotion can be improved by encouraging programs to consider cultural and environmental variations in order to better address the needs of individuals.

Beyond race, an examination of the prevalence of obesity on a global scale indicates that cultural and environmental influences contribute to the epidemic. Among countries in the same region, large variations in obesity rates exist suggesting that geographical location is not a large influence on the occurrence but rather separate factors are involved (Kumanyika, 2007). Another study suggests the importance of environmental factors by studying trends concerning obesity rates within a cohort of immigrants upon arriving in the United States. After living in the United States for fifteen years, the proportion of obesity among the immigrants had increased significantly, becoming remarkably similar to obesity rates of individuals born in the U.S. Additionally, the immigrants' ability to maintain a normal weight slowly declined with the duration of their time in the U.S. (Kumanyika, 2007). This study highlights the extensive influence culture has on the obesity epidemic.

Socioeconomic Status

From 1985 to 2000, fresh fruit and vegetable prices have increased at a faster rate than prices for high fat and high sugar food items (Food CPI and Expenditures, 2010). This common complaint is echoed often in the literature: implementing a healthier diet is more expensive (Rawlins, 2009). Drewnowski's research supports this reality by comparing the prices of 370 foods sold at Seattle area supermarkets in 2007. "The study showed that 'energy dense' junk foods, which pack the most calories and fewest nutrients per gram, were far less expensive than nutrient-rich, lower-calorie foods like fruits and vegetables. The prices of the most healthful foods surged 19.5 percent over the two-year study period, while the junk food prices dropped 1.8 percent" (Parker-Pope, 2008). Although this suggests it is cheaper to buy less nutritious foods, the Nutrition Services affiliated with the Schools of Health Sciences at the University of Pittsburgh provides guidelines to avoid sacrificing good nutrition on a tight budget. Some recommendations include: eating at home, planning meals in advance, and making food from scratch (Eating Healthy on a Budget, 2010). While these guidelines exist to assist people in eating healthy diets at a low cost, the implementation of these changes is contingent on having sufficient time to do so. Buying raw materials demands more preparation time and for a family in a troubled financial situation, money and time might both be limited resources (Parker-Pope, 2008).

Martikainen and Marmot's research involving over 10,000 men and women evaluated the large-scale impact socioeconomic status has on BMI (1999). Placing participants into three categories based on salary, the study drew comparisons between the groups. The questionnaire used included self-reports of four health-related behaviors including smoking habits, alcohol consumption, assessment of diet, and physical activity. Participants also answered questions

measuring their work decision authority, skill discretion, and the degree they felt in control over their health. Physical measurements such as blood pressure, cholesterol, and body mass index were also taken. The results reveal that for both men and women, socioeconomic status was strongly related to BMI and, furthermore, individuals with lower salaries gained considerably more weight than those with higher incomes over the three-year time span of the study. While the determinants of these differences are not fully known, the study does provide evidence that this relationship exists (Martikaninen and Marmot, 1999). While this relationship has been well established among adults, it "appears weaker and less consistent in children"; the overlapping nature of socioeconomic status and race/ethnicity on the pervasiveness of childhood obesity creates difficulty in separating the confounding variables (Bishop, Middendorf, Babin, Tilson, 2005).

Accessibility

Regardless of knowledge, motivation, financial resources and time, there is still the issue of availability. In order to make nutritious meals, people need to be able to purchase fresh fruits and vegetables at a reasonable cost. A "food desert" is the term used to describe an area where supermarkets are typically nonexistent, fresh produce is unavailable or extremely expensive, and the area is heavily populated with convenient stores and fast food chains. The reality is that roughly 23.5 million Americans currently live in an area labeled as a food desert, which includes 6.5 million children (Croft, 2010). Furthermore, racial/ethnic minority communities as well as low-income communities are disproportionately affected by disparities in supermarket access (Powell, Slater, Mirtcheva, Bao. and Chaloupka, 2007).

The UCLA Center for Health Policy Research conducted a quantitative study that explored the overlap of cultural influences and accessibility. This statewide survey examined

fast food consumption among California adolescents (2005). The data revealed that almost half of adolescents surveyed consumed fast food every day; this value was over 50 percent for Latino, Asian, and African American adolescents while white children consumed at a much lower rate of 38 percent (Hastert, Babey, Allison, Diamant, and Brown, 2005). This study underlines the reality that without adequate alternatives, unhealthy meals become the only convenient and viable option for families living in food deserts.

Another factor to consider is "recreational deserts". Similar to food deserts, these are areas that lack resources to provide a safe opportunity to be physically active whether due to inadequate facilities, poor outdoor lighting, or a limited amount of open space (Duncan, 2010). When considering nutritional education programs on a national level, these are principal issues. However, because my research is limited to students and their families living in the Ann Arbor area, food and recreation deserts are not relevant barriers in this study. Within the city there are numerous areas available for physical activity as well as many large chain grocery stores, farm markets, or food co-ops that offer healthy food items (Find Grocery Stores, 2009).

Supportive Environment: Home and School

> "I don't think parents knew more than they do today in the 1960's when we didn't have a childhood obesity epidemic. What's changed since that time is the environment in which parents are trying to raise their children…part of empowering parents is to give them a supportive environment in which to rear their children" (Bauer, 2010).

Though the literature highlights a whole host of societal influences that impact an individual's decision to make healthy choices, we should not resign ourselves to believing that childhood obesity is inevitable. Through collaboration between an individual, their family, and community, a supportive environment can be created where adoption of a healthy lifestyle is an easy option (Satcher, 1996). Children participating in focus groups with Gosling, Stanistreet, and Sawmi (2008) highlight this reality. When asked how they might be helped to eat healthier,

several children identified parents as having ultimate authority regarding their diets, determining what and where they eat. Parent-based focus groups vocalized a similar appreciation for the influence they held over their child's diets (Sonneville, 2009). Variyam, Lin, Ralston, and Smallwood who utilize quantitative surveys reveal further support for this relationship. Their findings indicate that mothers' general knowledge and health has a significant influence on their children's diets (1999). Knowing that young children's consumption is a reflection of the knowledge and patterns of their parents, a successful intervention program needs to target both parents and the young children (Variyam, Lin, Ralston, Smallwood, 1999).

While parents have a large responsibility concerning the health of their children, schools also need to acknowledge their influence. Outside of their homes, children spend more time in school than any other environment (Babey, Hones, Yu, Goldstein, 2009). Snelling and Kennard reveal how the items a school cafeteria offers can impact the purchases made by students (2009). Using a three-category labeling method, they analyzed the nutritional value of competitive foods offered both before and after the installment of stricter cafeteria standards. Nutritious, low-calorie foods that are rich in vitamins, minerals, and fiber were labeled green; these items should be eaten with every meal. Foods moderate in calories and generally lower in fat were labeled yellow because although healthy, they should still be consumed in moderation. Lastly there were red foods, which have a large amount of calories and minimal nutrient value; some examples include fried foods, full-fat potato chips and foods with rich sauces. After comparing the rate that these foods were offered and purchased, Snelling and Kennard reevaluated the amounts two years later once stricter regulations were installed. Once the standards had been implemented, only 30 percent of the items offered were red foods compared to the previously higher figure of 48 percent. This correlated with a considerable decline in the amount of red foods purchased,

from 83 to 47 percent. The purchase of yellow foods also increased from 6 to 34 percent. It is unknown the exact number of students that purchased the exact number of healthier options and it is also unknown how much of these purchases were consumed. Another limitation of the study is that it was not known if changes in the health curriculum occurred during the two-year time period. Regardless, Snelling and Kennard (2009: 545) argue that offering healthier foods in cafeterias: "…appears to have a direct and immediate impact on the nutritional value of the foods purchased by students."

The Centers for Disease Control asserts that for nutrition programs to be successful the schools need to integrate the nutritional education with the food service in order to reinforce the messages of healthy eating (1996). Snelling and Kennard have provided an example of an effective policy change that enabled schools to become a supportive environment for healthy dietary patterns. This suggests that with 31 million children eating school lunch every day and 11 million consuming school breakfast, it is important that schools are providing nutritious options (Merrigan, 2010). A study conducted by Project Healthy School staff analyzing the behaviors and physical measurements of over 1,000 sixth graders found that students who purchased the school lunch regularly were 29 percent more likely to be obese compared to their peers who brought lunch from home (2010).

Schools have the ability to create supportive environments for the implementation of nutritional programs. One approach adopted by a school in Alabama suggests that increased teacher involvement and school support results in a higher success rate of the program. The goal of the "experimental learning approach" was to "increase fruit and vegetable knowledge, preference, and consumption among second-grade students" (Parmer, 2009). In order to properly assess the achievement of this goal, students were divided into three categories. The

first group received nutritional education and was involved with the garden, the second group only received the nutritional education, and the control was not exposed to either component. The nutrition lessons were taught every other week for one hour and garden lessons were also one hour on the alternative weeks for students participating in both. The duration of the intervention program was 28 weeks and measurements were taken with self-reported questionnaires and lunchroom observations both before and after the program. Students also had a tasting session rating their preference of selected fruits and vegetables. The results of this study revealed that students who were taught nutrition in the classroom and involved with the gardens ate significantly more vegetables compared with their consumption prior to the program. This intervention reveals that the more exposure to nutrition lessons the students had, the more likely they were to implement the changes into their own lives. The school utilized in-class instruction concomitantly with gardening to create a supportive environment for the students to learn and understand the material presented. This learning experiment encapsulates the Centers for Disease Control recommendation for school health programs to involve fun participatory activities that incorporate social learning strategies (Satcher, 1996).

Study Context: Project Healthy Schools

Incorporating many of the CDC's guidelines, Project Healthy Schools (PHS) strives to form a strong relationship with schools of implementation to achieve positive change in students' behaviors. The program is based on five goals: "eat more fruits and vegetables, make better beverage choices, include at least 150 minutes of physical activity each week, eat less fast and fatty foods, and spend less time in front of the TV and computer" (Project Healthy Schools, 2010). PHS aims to achieve these goals by presenting ten nutrition-focused lessons to each sixth grade class during their thirty-minute advisory period. Revolving around the five goals, these

short lessons have a variety of themes and include interactive activities such as having students participate in physical activities or sampling healthy foods.

While the main emphasis is placed on the education aspect, there are also secondary components to the intervention. Throughout the year there are events such as kick-off assemblies, volleyball tournaments, after-school boot camps, and many other programs. The schools themselves determine the quantity of programs implemented at each school. Along with offering diverse opportunities for students to be physically active, there is also a research component. With consent from their guardian, students are able to participate in health screenings and complete behavioral surveys before and after exposure to the intervention. The program relies on funding from numerous foundations, non-profit organizations, and private donors (Project Healthy Schools, 2011).

SOCIOLOGICAL SIGNIFICANCE

Today's conversation about childhood obesity is not complete without acknowledging the tension resulting from the juxtaposition of views about the breadth of personal responsibility. The public discourse identifies two prevailing ideas: 1) one's health, specifically their weight, is derived entirely from individual behaviors and choices or 2) individuals interact with their environment operating within boundaries which in turn influences their health. Brownell and colleagues (2010) argue that the belief of complete personal responsibility perpetuates the "just world" belief in our society, "that people get what they deserve, that they are responsible for their life situation, and that to behave in ways contrary to expectations is immoral". Furthermore they assert this "just world" belief echoes:

> "Max Weber's Protestant work ethic, reflecting beliefs that hard work, determination, and self-discipline create success (for example, weight loss); that failure reflects personal weakness; and that obese people are lazy, gluttonous, and

undisciplined" (Brownell et al. 2010: 381).

This tendency to 'blame the victim' spurs the development of negative stereotypes and discrimination thus hindering our ability to effectively confront and resolve this health issue.

Supplementing the "just world" belief, some argue that dietary choices and amount of physical activity are determined by individual choices made by rational beings on the basis of a simple cost-benefit analysis (Smith, 1999). This formulation is problematic when considering the influence families, schools, socioeconomic status, race, and gender can have on one's health; ignoring the confluence of forces on an individual leads to a flawed understanding of the problem. Although individual choice is an essential piece, it is only a minor component of an entire social world in which one exists; this may be particularly true among children. The reality is that society constantly perpetuates social norms; these beliefs and practices are external yet constraining to an individual that lives within that society (Durkheim, 1982). These societal norms are enacted and reinforced when individuals engage in social interaction; examples include traditional foods or food-related rituals.

Kumanyika (2002) dissects this view utilizing a causal web to identify all the different levels of influence that shape an individual regardless of their awareness. She acknowledges that an action, such as food consumption or physical activity, is an individual choice, but expands the influence to the surrounding environment (work/school/home), the community, even escalating to national and international factors that interact to impact an individual. These forces have been highlighted in the literature review and reinforce the idea that an individuals' choice is actually manipulated by a massive web of interconnected social structures. A deeper understanding of how the related factors achieve varying levels of influence on an individual is essential in successfully addressing the issue of childhood obesity.

HYPOTHESES

Project Healthy Schools targets the individual and school-level factors that influence making healthier decisions. I hypothesize that PHS achieves its goal of making positive behavioral change in students' lives concerning diet and level of physical activity. Knowing that a supportive environment enables the success of an intervention, I hypothesize that the more involved and cooperative the school is in their collaboration with Project Healthy Schools, the greater will be its ability to effectively alter the behaviors of its students.

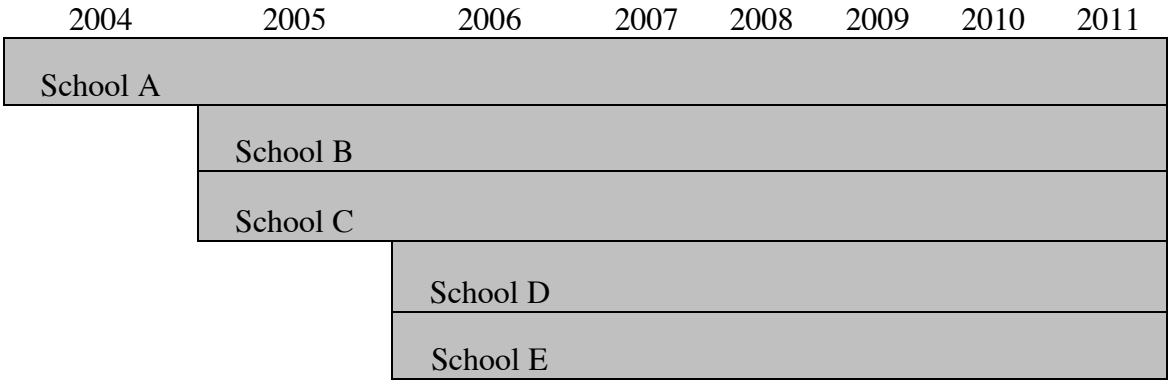
METHODS

Background

My interest in evaluating Project Healthy School (PHS) stemmed from my exposure to the program as a volunteer during the 2009-2010 school year. I began presenting nutritional education lessons to sixth grade students in Fall 2009 after learning about the organization from an event held on campus. A desire to better understand the impact the program had on the students prompted this project. Prior to beginning my research, Project Healthy Schools had begun their own data collection to assess the effects of the program. These measurement tools included physical measurements of students and behavioral surveys administered pre and post exposure to Project Healthy Schools. They began these health screenings for 6th graders and also followed a cohort of students to gather longitudinal data. When PHS began recruiting for the program, all parents of sixth graders in all Ann Arbor middle schools were informed about the study and received a consent form for their child to participate. All sixth grade students that received parental consent participated in both the measurements and surveys, which were conducted by staff and volunteers. There is variability regarding the year Project Healthy

Schools was implemented in each of the schools. All program start dates were in the fall of their respective years.

Figure 1. Year of Program Implementation



Due to my volunteer experience, I was able gain permission to use data collected last school year to supplement my own data, which was collected between May and November 2010. All of the data I collected has been with the support of the Project Healthy Schools team; they facilitated access with the schools making it possible to conduct my research.

In order to study the impact of Project Healthy Schools in the five Ann Arbor middle schools, I utilized numerous measurement tools including cafeteria observations, focus groups, semi-structured interviews, and behavioral surveys. With the exception of behavioral surveys, I was responsible for data collection. Each component offered a different contribution, which together formed a deeper understanding of the impact of the program and the differences between schools.

Behavioral Surveys

My research 1) assesses the impact of Project Healthy Schools and 2) examines variations existing amongst the five Ann Arbor middle schools. I use behavioral survey data

collected by the Project Healthy Schools team from the 2009-2010 cohort to address these questions. These data were collected, using an identical measurement tool, administered at the schools pre and post exposure to the intervention. It is important to note that the composition of sixth graders varies between schools in regard to race, gender, and socioeconomic status of the students.

The data collected through behavioral surveys form the basis of determining the scope of the program's impact, if any, on students. All students that received parental consent to participate in the study completed the survey. Consisting of 35 multiple choice type questions, the survey is broken down into three main categories: food and beverage consumption, physical activity, and quantity of "screen time" defined as time spent watching television, playing video games, or using the computer for non-school related activities.

Specific information regarding 24-hour food recall, physical activities participated in during the past seven days, and estimates of how long students usually partake in screen time per day were obtained. My research focuses on a portion of the questions, the list of exact questions included in the study can be found in the Appendix, Item I. Comparing these items from the pre and post surveys reveals if positive behaviors, such as fruit consumption or levels of physical activity, changed over the duration of the PHS program. Because the same survey was administered to students before and after the program, the data provide a straightforward assessment of changes in students' behaviors. A professional statistician involved with the Project Healthy Schools program did all of the statistical analyses associated with behavioral surveys (ANOVA, Wilcoxon Signed Ranks Test, Paired Samples Test, T-Test, and Nonparametric Tests) used in my research.

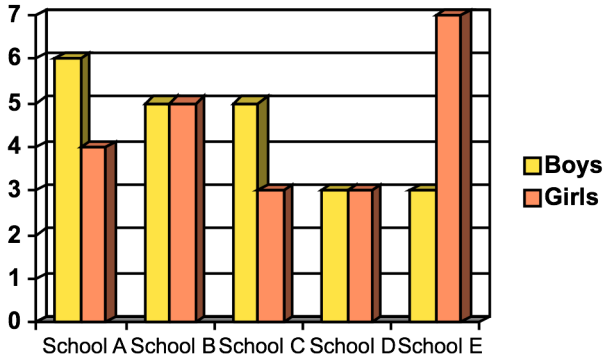
An advantage of using this survey format to measure behavioral changes is a high response rate. While recall bias might generate an overestimation of behaviors students view as positive or an inaccuracy due to variation based on the date of survey completion, these effects are randomly distributed across the schools. These potential issues are minimized because they would impact both the pre and post survey data, so should not strongly affect measurement of changes over time. Students absent on either survey date were not included in the study, it is unclear if this may influence the findings.

Focus Groups

The Project Healthy Schools staff allowed me to recruit students to partake in a focus group at each of the five schools. At all schools I gave a short five-minute presentation to a seventh grade class explaining my project and asking for volunteers to participate. Seventh grade students were chosen because they had completed the PHS course and pre and post surveys during the 2009-2010 school year and their results were available for this project. Students were aware that they would be served food during the focus group because in four of the five schools the designated time for the sessions overlapped with their scheduled lunch. At most of the schools, students volunteered by raising their hands and the first people to be seen were invited. In two classrooms, the majority of students wanted to participate so volunteers were randomly selected (one used Popsicle sticks to select volunteers and the other used random selection of names from the class roster).

Because focus groups were volunteer-based it was difficult to ensure equal representation of boys and girls among the sessions. Similarly, it was not possible to take race of students into account in recruitment.

Figure 2. Focus Group Composition



After recruitment, the focus groups were conducted at the school at the end of September or in early October 2010. A professional from the University of Michigan Survey Research Center volunteered to facilitate the five sessions. At the beginning of the session, the students were read a verbal consent form reiterating this was a voluntary activity, food and beverages were served, and with one exception due to technical difficulty, the groups were recorded and transcribed. I also took field notes and transcribed these for analysis. The consent form can found in the Appendix, Item II. A notable variation between the schools was the physical environment in which the focus groups were held. In four schools, students and the facilitator sat in a circle around a table in an otherwise vacant room. However, School C lacked a table causing students to eat off their laps and shared the large room with individuals playing instruments loudly in the side room; there was also a student serving detention and an adult supervisor sitting nearby. School C had significantly less discussion than the other groups ending after only 31 minutes (including numerous long pauses) whereas the other focus groups lasted between 42-46 minutes, often ending because of time constraints.

The questions discussed in the focus groups targeted three major concepts: curriculum retention, behavioral change, and school environment. Parental involvement was also introduced. Along with these broad topics, there was a heavy emphasis on the school cafeteria and how teachers interacted with the intervention program. After the first focus group, several of the questions were amended because they failed to stimulate useful discussion; a new version

was used in the remaining four sessions. The two versions of the questions are located in the Appendix, Items III and IV. The data provided from these focus groups supplement the assessment of Project Healthy Schools by revealing the impact of the program on the students and their opinions about the school environment. The format of the focus groups encouraged open discussion resulting in students freely sharing thoughts while others reacted and contributed. Because my project involved gathering the opinions of seventh grade students, the observations are not necessarily factual; this is particularly evident when discussing the cafeteria.

This method was successful in obtaining information about the three major themes but also produced valuable unanticipated comments from the fluid discussion, such as how the cost of food or organization of the lunchroom influences students' choices. The maximum time allotted for each focus group was the same across all schools. This method created the opportunity for the facilitator to probe students' responses, generating a more accurate understanding of their comments.

Cafeteria Observations

Another source of data for my study was observations of the cafeteria at the five schools. During May 2010 I entered each cafeteria twice with the exception of School B, which I went to on three different days. Using a checklist sheet formulated with the help of PHS staff, I evaluated the foods offered at each school and identified any differences. The full form is located in the Appendix, Item V. All cafeterias were observed during their normal lunch hours, but students were not necessarily present during my observations. This is important because during my observations I noticed some instances of staff encouraging students to purchase healthy items. Because not all cafeterias had staff directly interacting with students when I was present, a lack of this observation does not imply that this type of encouragement is nonexistent

at other schools. The decision to evaluate School B an extra day was based on an unanticipated opportunity when I was in the area. The visits were all with permission from the schools but were unscheduled and staff was not aware I would be observing ahead of my arrival. Subjective and objective variables were taken into consideration and included: milk temperature, presence of menus, and the appearance of fruits and vegetables. General impressions of the cafeteria environment were recorded. Having a single evaluator for each school provided more consistency in the evaluations and minimized biases associated with self-reporting. Even though all cafeterias receive their food from the same provider, my data revealed that differences across schools exist in items served. These evaluations occurred during the designated lunch period and a lack of specific items does not imply that the cafeteria does not ever offer them but rather they were not available at the time of the observations. The evaluation reports student access on the day and time of observation.

Semi-Structured Interviews

The last method of data collection consisted of semi-structured interviews with Wellness Coordinators; these Project Healthy Schools staff members serve as liaisons with the schools and are responsible for: program implementation, organization of volunteers and supplies, and encouraging the school to make healthier changes. In a single one-hour discussion, I asked the three Wellness Coordinators questions comparing their experiences at the five different schools with regard to administrative support, teacher involvement, parental involvement, and school environment. There are three Wellness Coordinators that work in the five Ann Arbor schools therefore the overlap allowed them to comfortably draw comparisons. Sitting down with them, I was able to gain insight into the level of cooperation between schools and PHS programs, accessibility of the administration, and common barriers that hinder the program's success. It is

important to note that because three different individuals provided information, some schools are described in greater depth than others. The discrepancies in length do not reflect the schools themselves but rather the amount of information shared by the Wellness Coordinators.

Supplementing our meeting, all Wellness Coordinators completed scorecards indicating the number of activities each school participated in relative to the 18 opportunities for involvement. Additionally, this measurement compares all the schools based on Project Healthy Schools' criteria including communication with parents, evaluating the School Health Team, the level of staff enthusiasm as well as other variables. The combination of these tools provides a comprehensive perspective of the relationship between each school and their Project Healthy Schools liaison. These data and other data sources used in my analyses supplement each other, forming a cohesive description of the varying levels of school cooperation and highlight any discrepancies that exist.

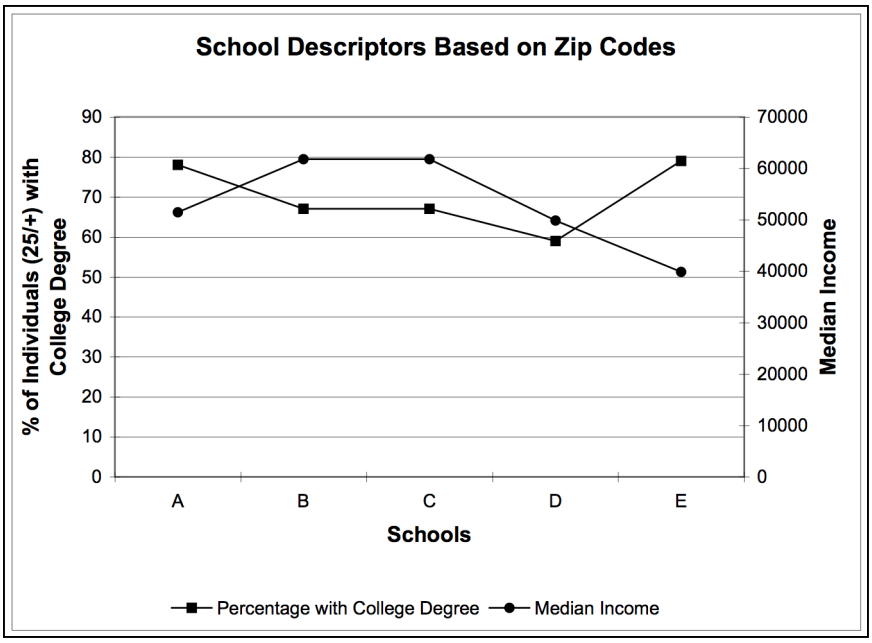
RESULTS

This section introduces the findings of each measurement in isolation; an integration of these data and a focus on the schools as a whole will be presented in the discussion section.

Demographic Description

Before introducing my results it is important to note that there exist demographic differences between the five schools in my study. Zip code data, taken from a public school review site, show disparities in median income and percentage of individuals over the age of 25 who have obtained a college degree. Figure 3 reflects both of these relationships.

Figure 3.



Furthermore, the percentage of students eligible for free and reduced lunch varies across schools as shown in Figure 4. Other important factors to consider are the gender and race of students participating in the study at each school; Figure 5 and Table 1 show the diversity that exists. The data represented in the first two figures are based on descriptors published by the Public School Review website whereas, with the exception of participation rate, Figure 5 and Table 1 were derived from Project Healthy Schools provided information. Because all sixth grade students were invited to participate in the study, the participation rate was computed comparing the number of sixth grade students that completed the MEAP at each school to the number of students that signed the consent form. Additionally, the Wellness Coordinators described differences in professions of the parents that are evident across the schools. I was told, School E draws its students from a "doctors and professors kind of neighborhood" and that "[School D] is lower SES and more transient of a population and more English as a second language." The following figures and table illustrate the diverse composition of the study participants, the schools, and the communities in which they are located.

Figure 4.

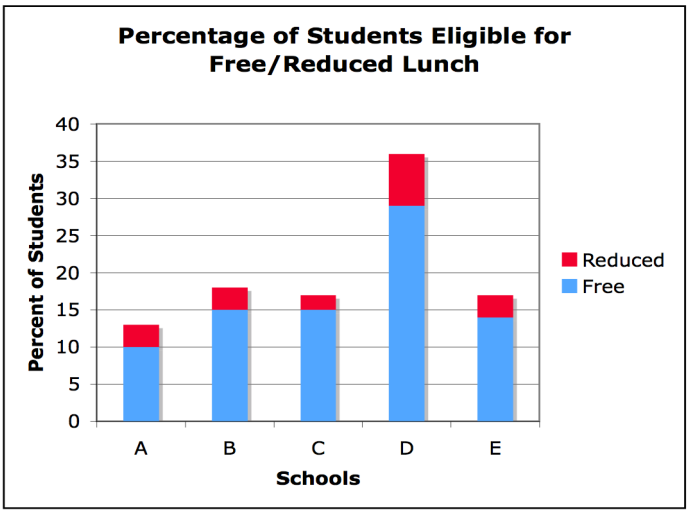


Figure 5.

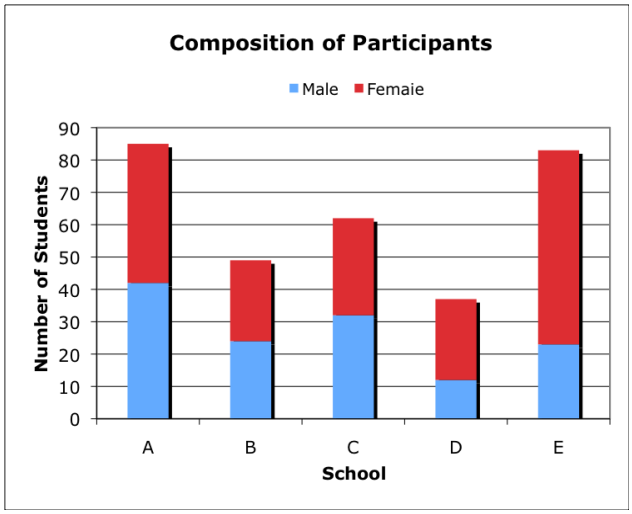


Table 1. Racial Composition of Student Participants								
	White	Black	Asia	Hispanic	Native American	Other	**Total**	**Overall Participation Rate by School**
A	53	4	13	5	0	12	85	35.12%
B	38	2	5	0	1	3	49	19.84%
C	40	5	10	2	0	4	62	28.97%
D	17	6	2	7	0	5	37	23.42%
E	61	10	6	0	0	6	83	36.73%

Because of the small sample size, I was unable to analyze significance of the differences between race and gender at each individual school. I am able to analyze differences in the participant population overall. A chi-square analysis test reveals there are significantly more female than male participants in the study ($p=0.009$). Similarly there is a significant difference among races, with more white students participating in the study ($p<0.001$).

Administrative Support for Program Implementation

To better understand the relationship between the school administration and Project Healthy Schools, I conducted semi-structured interviews with the three Wellness Coordinators

responsible for the program implementation. The Wellness Coordinators find it extremely easy to set in motion the program at the beginning of each year at School A, the original pilot school for the PHS program. One noted:

> "… [School A] was the original pilot school and I think they're just sort of on auto-pilot right now. It's something they expect every year there's very little fuss associated with the request for when the program to start… it's fairly effortless in setting it up and never a moan or a groan from a teacher, it's just 'okay, we know you're coming just let us know when you're going to be here' kind of thing" (Wellness Coordinator B).

The principal is a marathon runner and is very involved with working to transform the school into a healthier environment. This includes constantly vocalizing suggestions as to how to improve the cafeteria and offering to assist with writing a grant to fund a salad bar cart. School A is also the only school to seek and obtain a budget from their PTO committee designated to fund healthy initiatives throughout the year. A Wellness Coordinator also noted "some of [their] testimonials- [their] best testimonials have come from [School A] about kids going home and telling their parents, and then the parents changing their habits."

In discussing the administration at School B, the Wellness Coordinators emphasized the assistant principal's adamant stance against creating any kind of policy. "He just thinks it's unfair to the kids, unfair to the school, it just goes down the line, he just doesn't believe as he puts it 'in governmental intervention in our lives." This was discussed as a negative characteristic of the school. Recently, this firm position was weakened when students began bringing large quantities of energy drinks into the school. The assistant principal vocalized his concerns about the impact of these beverages and the possibility of prohibiting them.

The principal at School C was described as "very reachable" and with a health background she is proactive in working to change the environment of the cafeteria. The Wellness Coordinator noted this by saying "she closely monitors what's served and seems to

know and has a real interest in changes." The principal is a strong proponent of creating policy to implement changes.

The administration at School D, described by the Wellness Coordinators, is very accessible. The principal supported and even instigated the creation of the health team at the school. While technically there is a high level of support, many road bumps hinder the implementation of Project Healthy Schools when the Wellness Coordinator is not present.

In describing the administration at School E, the Wellness Coordinator admitted: "It's a little bit harder for me to get in contact with the principal, really and the assistant principal, sometimes they're just harder to find and to reach out to and I haven't felt overwhelming support from them. I think they're kind of like 'fine do your thing', but they don't want to get too involved."

When discussing the overall implementation of Project Healthy Schools at all five schools, the Wellness Coordinators indicated that one common barrier in changing the school climate was the use of candy as positive reinforcement. This mechanism of rewarding students represents a larger issue of resistance to change and the tendency to rely on practices based on familiarity and ease of implementation.

> *"And I think one of the big issues, is just habit, teachers are used to doing- giving out candy for rewards for example. It's sort of just these ingrained habits people have become accustomed to, so just getting people to think differently … it's just people going back to what they're used to instead of trying to get a little bit more creative and thinking of some alternatives" (Wellness Coordinator A).*

> *"I think that not everyone does the right thing but everyone thinks about it before they do it and sometimes they still come to the conclusion of, okay this is what is easiest so I'm going to do it even though it might not be the healthiest… there's thought before it happens" (Wellness Coordinator B).*

In discussing her attempts to combat this issue, specifically concerning a school-wide cookie dough fundraiser, one Wellness Coordinator shares that, "… it's just constantly reminding

people that there are other options. And trying to get them to change those ways can be a big barrier… it's quick, it's reliable, and it's cheap."

Scorecard Evaluations

Completed by the Wellness Coordinators, the scorecard evaluations assess different aspects of each school and compare them to one another. The first factor taken into consideration is parental involvement. This is an extremely important aspect of an intervention program and as we can see, the five schools have differing levels of communication with parents. Based on a discussion with a Wellness Coordinator, report card inserts are the most effective means of communication because parents are most likely to spend time reading them. It is much easier to delete an e-mail than to ignore something attached to their children's grades. The general strategy adopted by Project Healthy Schools for successful communication is to provide parents with information in many different mediums, thus providing numerous opportunities to educate parents about the program.

Almost all of the schools have formed a School Health Team yet only three meet regularly to set and achieve health goals. Having a School Health Team is advantageous for students because these are largely responsible for planning and executing various events throughout the year; examples include fun nights, 5k runs, and a multi-week volleyball tournament. School A, School B, and School E all have strong School Health Teams and participate in either 50% or more of the events offered through Project Healthy Schools.

Although the table compares staff enthusiasm across numerous individuals within a school, the most valuable support comes from the principal. One Wellness Coordinator commented it makes everything a whole lot easier if the principal supports the implementation of Project Healthy Schools. A lack of involvement on behalf of the physical education teacher does

not prevent activities from occurring at the school; however, their support is seen as a large bonus for the program. Regarding counselors and nurses, these positions are used at some schools to designate a contact person for the Wellness Coordinator yet a dedicated teacher can easily fill this role; enthusiasm in either of these positions does not seem to have an effect on program implementation.

Table 2. Scorecard Evaluations

	School A	**School B**	**School C**	**School D**	**School E**
Communication with Parents	5/5	2/5	3/5	4/5	4/5
a. Newsletters	yes	yes	yes	yes	yes
b. E-notes/ E-mails	yes	yes	no	yes	yes
c. Report Card inserts	yes	no	yes	no	no
d. Student Registrations	yes	no	yes	yes	yes
e. Curriculum Nights	yes	no	no	yes	yes
Events Evaluation	97%	53%	61%	22%	50%
Coordinated School Health Team	3/3	3/3	1/3	0/3	3/3
a. Formed Team	yes	yes	yes	no	yes
b. Meet Regularly	yes	yes	no	no	yes
c. Achieve goals	yes	yes	no	no	yes
Complete the Healthy School Action Tool (HSAT) within last 2 years?	no	yes	no	yes	yes
Teacher Champion					
a. Teacher Identified	yes	yes	yes	yes	yes
b. Teacher Responsive to Role	yes	somewhat	yes	somewhat	yes
Physical Education teachers involved?	yes	yes	yes	no	no
Teachers Demonstrate Understanding of PHS	yes	somewhat	somewhat	yes	yes
Staff Enthusiasm	90%	60%	80%	40%	20%
a. Principal(s)	yes	somewhat	yes	somewhat	somewhat
b. Physical Education Teacher(s)	yes	yes	yes	no	somewhat
c. Counselor(s)	yes	somewhat	yes	no	no
d. Nurse	somewhat	somewhat	no	somewhat	no
e. Other	yes	somewhat	yes	yes	no

As Table 2 shows, School A participated in the most school events, has the highest level of staff enthusiasm, and maintains the highest level of communication with parents compared to all of the other schools. After distinguishing the strongest school based on these measurements, it is less clear in identifying how the other four schools perform in relation to each other. It is evident that School C shares a high level of principal enthusiasm and earned a high percentage

regarding event participation. While both School D and E communicate with parents using four out of five available methods, they both have low principal enthusiasm and participated in the fewest events. School B earned only slightly higher marks when considering the same variables.

Cafeteria Observations

The findings are presented in a table, which includes observations that illustrate differences amongst the schools, as well as a qualitative description.

Table 3. Cafeteria Observations

	School A		School B			School C		School D		School E	
Date of Observation	5/7	5/10	5/7	5/10	5/24	5/10	5/24	5/7	5/24	5/7	5/10
Prepared Salads	no	no	yes	yes	yes	yes	no	no	no	yes	yes
Fruits/Vegetables first option	no	yes	no	no	yes	yes	yes	no	no	no	no
Uncooked (fresh) Vegetables	no	no	no	no	yes	no	no	no	no	yes	no
Fresh Fruit	2/4	2/4	2/4	2/4	2/4	3/4	3/4	1/4	0/4	1/4	2/4
Cut-up Fruit	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	yes
Whole Grain/Wheat Bread	no	no	no	no	yes	no	yes	yes	yes	no	yes
Temperature of Milk Cooler	40	31	49	40	40	42	58	40	38	NA	40

School A

Entering the cafeteria, I noted the vibrant color of the vegetables being served and on my second visit, commented that the cut-up fruit looked extremely fresh and appetizing. A menu posted on a door was visible to students entering the cafeteria. The Wellness Coordinators praised the Head Cook at this school for her personal investment in the students' eating habits and her initiative in offering healthier options. "She's great, she's proud of the things that she's done. She's proud when the kids—when she cuts up a bunch of cucumbers and the kids will try it and eat it-- so she on her own has done a couple of healthier things for the cafeteria."

School B

I had three visits to this school. For the first two visits, no menu was posted near the cafeteria or available when I requested one from the staff. With my third visit I noted four menus posted, with no indication as to which was the current day's menu. School B was noted to serve triple meat pizza to the students all three days of evaluation, a choice not seen at other schools.

School C

A large variety of vegetables were available to the students, all of which looked appetizing. They were incorporated into the main meal options as well as served as a side. The fruit selection was also appealing. Numerous menus were posted in the cafeteria making the lunch options easily visible to students.

School D

During my first visit I noted the food served was extremely unappetizing, the only appealing item seemed to be pizza. There was a very poor selection of fruits and vegetables. On the second visit, the only beverage available to students was milk; they had run out of other options including water and 100% juice. Again the fruit looked unappealing, but the main dish did seem appetizing. Numerous vegetables were integrated into the stir-fry being served. No menus were visible in the cafeteria.

School E

Entering the cafeteria, I was welcomed by the food service and met the head chef who explained each item on the menu for that day and even offered me a free lunch (Though tempted, I refrained). The chef explained how School E is testing a new program that serves more fresh

food items and greater options to students while not increasing the price. If successful, it will be implemented across the district. During the second visit, I noticed the staff was offering strong encouragement for students to take salad. The food again looked appealing and I described the cafeteria as the most impressive one I had seen all day. On this specific day I had observed all cafeterias except School D. Additionally, I was only able to observe the temperature of the milk cooler on one of the days due to student traffic in the cafeteria and a lack of knowledge about the thermometer placement.

Behavioral Surveys

Overall Changes in Students Behavior

In order to understand the impact of Project Healthy Schools, let us first look at all student responses analyzed as one cohort for the 2009-2010 school year. Table 4 organizes the relevant survey questions into eight overarching themes: fried food consumption, fruit and vegetable consumption, sugary beverage consumption, vigorous exercise, moderate exercise, quantity of time spent: watching television, doing non-school related activities on the computer, and playing a game system. Using a Wilcoxon Signed Ranks Test, the table compares students' pre and post-treatment responses, signaling whether the change in response is significant ($p < 0.05$) or marginally significant ($p<0.10$).

Table 4. Changes in Student Behavior

	Pre > Post	Post > Pre	Ties	Total	p-value
Fried Food Consumption	92	72	145	309	0.213
Fruit and Vegetable Consumption	111	116	82	309	0.627
Sugary Beverage Consumption	87	119	103	309	0.031
Vigorous Exercise	96	134	79	309	0.016
Moderate Exercise	87	141	81	309	0.000
TV Watching	95	85	125	305	0.246
Computer	73	100	132	305	0.115
Game System	56	82	167	305	0.044

It is immediately apparent that across all students there was a significant increase in both moderate (p=0.000) and vigorous exercise (p=0.016) after completion of the program. These results seem to align with one of the five goals of Project Healthy Schools, which entails promoting a high-level of physical activity per week. Interestingly it is also evident there was a significant increase in two additional behaviors, ones that run contradictory to the program's goals. These increases are: students' sugary beverage consumption (p=0.031) and quantity of time spent playing different game systems (p=0.044).

Differences Among Schools

When evaluating the change in student behavior on the school level, there are only three schools in which significant or marginally significant change occurred between the pre and post-test: School A, School B, and School E. Combined, these three schools represent change in six of the eight trends evaluated by the survey: vigorous exercise, moderate exercise, fried food consumption, sugary beverage consumption, time spent on computer doing non-school related activities, and playing game systems. These behavioral changes are illustrated in Table 5.

Table 5. Significant Changes in Student Behavior: Pre-Treatment versus Post-Treatment

		Pre > Post	Post > Pre	Ties	Total	p-value
Fried Food Consumption	School A	17	25	41	83	0.172
	School B	18	9	20	47	0.149
	School C	21	11	29	61	0.170
	School D	10	10	17	37	0.755
	School E	26	17	38	81	0.092
Fruits and Vegetable Consumption	School A	27	31	25	83	0.860
	School B	19	12	16	47	0.349
	School C	23	20	18	61	0.848
	School D	14	16	7	37	0.503
	School E	28	37	16	81	0.240
Sugary Beverage Consumption	School A	20	37	26	83	0.052
	School B	13	19	15	47	0.147
	School C	16	23	22	61	0.150
	School D	13	15	9	37	0.982
	School E	25	25	31	81	0.909
Vigorous Exercise	School A	25	42	16	83	0.025
	School B	15	23	9	47	0.023
	School C	20	20	21	61	0.696
	School D	16	10	11	37	0.191
	School E	20	39	22	81	0.054
Moderate Exercise	School A	23	40	20	83	0.034
	School B	12	23	12	47	0.051
	School C	19	26	16	61	0.156
	School D	15	15	7	37	0.803
	School E	18	37	26	81	0.024
TV Watching	School A	21	28	32	81	0.338
	School B	16	13	18	47	0.237
	School C	22	18	21	61	0.171
	School D	11	11	15	37	0.529
	School E	25	15	39	79	0.097
Computer	School A	20	27	36	83	0.459
	School B	9	12	26	47	0.627
	School C	16	18	25	59	0.508
	School D	10	13	14	37	0.806
	School E	18	30	31	79	0.022
Game System	School A	9	22	50	81	0.004
	School B	7	14	26	47	0.393
	School C	15	15	31	61	0.934
	School D	7	13	17	37	0.178
	School E	18	18	43	79	0.980

Table 5 indicates that School A experienced positive change in vigorous (p=0.025) and moderate exercise (p=0.034). Interestingly, it also had an increase in quantity of time spent playing game systems (p=0.004) and a marginally significant increase in sugary beverage consumption (p=0.052). School E follows a similar trend having significant increases in moderate exercise (p=0.024) and vigorous exercise (p=0.054) while also an increase in time spent on the computer (p=0.097). Additionally, School E experiences a marginally significant decrease in fried food consumption (p=0.092). School B is the only school to have large increases in activities aligning with the goals of Project Healthy Schools, vigorous and moderate exercise, without an increase in a behavior discouraged by the program. It is important to note that the analysis identifies variation in responses over time, therefore a lack of significant change reflects a constant frequency of behaviors; this applies to both positive and negative activities. To better understand the changes that occurred, the Appendix, Item VI shows the baseline levels of all behaviors at each school.

In analyzing the baseline data, statistically significant differences between the distributions of pre-test responses were identified. These include: two questions gauging sugary beverage consumption (question eight and nine) and two questions measuring screen time (question 22 and 24). These baseline differences along with their level of significance based on an ANOVA test can be found in the Appendix, Items VI and VII.

Focus Group Themes

This last piece of qualitative data is critical to interpreting the survey responses; they enable us to better understand how the program has impacted the students as well as recognize the external forces of influence. Throughout the focus groups, students discussed themes introduced by the questions, such as behavior change and teacher influence, as well as topics that

organically arose from the conversation, including the influence of cost and organization of the cafeteria on their food consumption.

Curriculum Retention

When speaking with the students about what they remembered from the Project Healthy Schools program introduced last year, all focus groups mentioned the five-pound fat and muscle models brought in for one of the lessons. Visibly seeing these models seemed to have made a significant impression. Students described wanting to be more active because they did "not really want that in [their] body" or they went home and talked with their parents about the models shown in class. One student confessed to taking a picture of the model with her cell phone and showing her uncle when she went home. While often referred to as "disgusting" the models seems to successfully encourage students to talk with their families about the PHS lesson and vividly remember it six months later. Additionally students identified sampling different foods and participating in interactive activities as their favorite aspects of the program.

Behavior Change

When discussing the impact Project Healthy Schools had on their level of physical activity, most students claimed they were already active. Even though this was the case, one student said it "made me more aware that you have to be healthy" and another "just wanted to do more stuff to be healthier." The program also increased awareness of the nutritional value of fast food. Students discussed how eating at McDonald's used up a majority of their caloric allotment for a single day and another described how the program caused her to change her food consumption.

> *"Well after Project Healthy Schools like I explained to my parents cause sometimes like we'll go straight from wherever they're picking me up from to*

soccer and so on the way we will stop at McDonald's but instead of buying like chicken nuggets, we get like a salad and a grilled snack wrap instead."

While some students felt McDonald's was not a healthy option others vocalized that regardless it was still delicious and a large part of their diet. Another student revealed her understanding that a healthy weight is maintained by the interaction of two factors: food consumption and level of physical activity.

"It just made me want to do more sports like cause mostly um my mom doesn't cook that much so we mostly go out a lot so like yeah it…so like um um like like it made me want to do more sports"

Identifying the lack of control concerning her diet, the student indicates that she still maintains the ability to alter other aspects of her life to create balance. This example reinforces the need to be cognizant of household resources when implementing nutritional education programs.

Parental Involvement

Numerous students indicated that their parents play an influential role in their food consumption inside and outside of the home. When discussing what he usually purchases in the cafeteria, one student shared:

"Well um I used to get hamburgers a lot but my mom told me that they're not very good like for you and that they're like frozen and that they have some bad stuff in them so I stopped getting them."

Another student vocalized how her mother does not like her purchasing lunch in the cafeteria because she wants to be informed regarding what her daughter is eating. This control is seen again when a different student explains how her mother encouraged her to adopt a diet limiting her meat intake.

"I talked to my mom about it and she's kind of like the one that encourages-encouraged me to be a pescaterian cause my mom is a vegan where she doesn't have any dairy products or anything so um I told her I didn't really wanna be a

vegan but kind of in between there so she like gave me a choice of either a vegetarian or a pescaterian and then she explained what it was and I chose to be a pescaterian so for the past 3 months I've been a pescaterian. It's not really hard if you think about it like there's certain things you can get at the grocery store, there's soy nuggets and stuff and that's kind of like the same thing as tofu but it's more like processed."

While telling the focus group about her restricted diet and the motivations behind it, the student was eating an Italian sub, complete with genoa salami. Inside the home, parents seem to influence food consumption of their children however it is unclear about their continued influence once students are placed in an environment with greater options and less supervision.

Teacher Influence

Another theme discussed by the students was how their teachers interacted with the Project Healthy Schools program and the message it presented. Most teachers universally welcomed Project Healthy School volunteers into the classroom, however once the volunteers left only some of the teachers continued promoting the lessons taught while others did things to detract from the general message. The following student comments identify the diverse way in which teachers interact with their students and health.

Student A: "um well not to be mean to any of the teachers but la-my last year advisory, [teacher], I don't think she really showed like any good thing for like healthy schools-
Student B: "nut uh"
Student A: "She would have like a mountain of coke bottles right behind this closed off desk area so no one could see them but whenever we would walk by we'd just see this huge pile of coke like empty"
Student B: "there- there was probably like fifty"
Student C: "yeah"
Student A: "like sixty something"
Student B: "yeah it was probably like fifty or sixty just empty coke cans not recycled or anything just "
Student A: "she would just like drink em and toss em"

Student X: "my advisory teacher was a health fan-a-tic and she was - she made us do a bunch of running and stuff and I mean like walks and stuff and we went

outside a lot and we did runs and stuff… we did a lot of like runnings and stuff and uh walks and stuff and she like ran herself so she like was I dunno really liked being outside and like running I mean walking"
Student Y: "she's like a marathon runner"

"um well with our teacher she didn't really like to go outside so we kinda just other than the reading day we pretty much just ran around inside our classroom and played and… so we never ended up going outside and we were supposed to have an outside day but it never really worked out."

"…my advisory teacher didn't really influence it at all. I guess she would sort of ignore it even though she acted nice to like the people but yeah."

"my advisory always ate a bunch of stuff and she'd always like tell us after healthy schools that she'd like explain some of the stuff they were teaching us even more so I think maybe she carried it on more than other advisors"

"my first hour [teacher] she wouldn't let us eat in class except for healthy stuff… so we wouldn't like have potato chips or anything she'd make us eat like like if we wanted to eat anything it would have to be like a granola bar or just something healthy"

These examples highlight how teachers are able to shape the behavior of their students by allotting them time to be active, changing their classrooms to promote the messages taught in the lessons, or simply by setting an example through their own behaviors.

Availability in the Cafeteria

All students seemed to share similar opinions about the quality and variety of food served in the cafeteria. Among the five focus groups a reoccurring criticism vocalized by the students was that the pizza and bosco sticks served are extremely greasy and unappealing. One student described a bosco stick to the facilitator by saying: "…well when you like bite in it this grease and stuff just… it's like they put the cheese-put the cheese and then they put like grease then they put like dough on it and then they put like more grease." While these comments were typically refuted by at least one student, majority of each group appeared to agree with this complaint. An interesting finding is that while students were quick to criticize the nutritional

value of items served, majority of students purchased and consumed these items on a regular basis. One female student shared that her lunch usually consisted of two pieces of pizza or a burger with fries every day, however she still questioned why the cafeteria sold these items knowing that they were fairly unhealthy. Continuing, she argued that the school should stop serving these foods because if you give "a kid a choice between healthy and unhealthy" items, they will always choose the unhealthy option. This point introduces a controversial question: what exactly is the responsibility of schools concerning the health of its students? Is it acceptable that one student described the food in the cafeteria as "mostly grease and bread and protein?" It is also important to reflect upon the fact that a vegetarian student did not purchase school lunch because she felt the cafeteria did not offer options consistent with her diet.

Fruit and Vegetables

Another common critique of the food served in the cafeteria was the lack of appealing fruit and vegetables being offered.

> *"…vegetables are like gray and it looks very- it's very mushy and gray and it doesn't look very appealing um like some of the fruits they have or like some of the bananas are completely bruised they're—it's just some of it you can eat it, it just probably doesn't taste too good"*

One student described his favorite thing sold in the cafeteria as being strawberries however the manner in which they are prepared causes us to question their nutritional content.

> *Student A: "like the sliced strawberries with sugar, I once paid ten dollars for a whole bunch of it…but rarely there's a huge tub of like strawberries that are sliced and have sugar on them with like the water in that's flavored"*
> *Student B: "it's like- they're like really processed. What he's talking about is like they're like processed strawberries they're not fresh and they're like dipped in like soaking in this syrup and it's disgusting"*
> *Student A: "and it tastes amazing"*
> *Student B: "it's disgustin"*

Two focus groups specifically mentioned how they wished the schools would continue to offer them options similar to elementary school where there was a fruit cart available to them offering fresh and free fruits and vegetables on a daily basis.

> *Student A: "in elementary school they used to have this fruit cart where they would have um they would have fruit they would have like sometimes strawberries they'd have like eight different containers where they'd refill them. Where there's strawberries and everything was like fresh you could get like um peas, celery, oranges, apples, strawberries and then as soon as they ran out- and everything was fresh and cold and like not mushy"*
> *Facilitator: "uh huh, and they don't do that now?"*
> *Student B: "no"*
> *Student A: "now they have one thing where there's sometimes watermelon or squash and peas where you just go up and then but its usually not too great"*
> *Facilitator: "did you- okay answer me this, did you eat it when you had that?"*
> *Student A: "I ate it almost everyday… and the thing had like applesauce and pudding and it was like- you could just get free fruit and- free fruits and vegetables and it was really good"*

Other students added that it was a popular item among the students and healthier than many of the options they currently have.

> *"well I was just gonna say… in elementary school when they had all that fruit everybody like at my school they always went for it right away and I think that'd it'd be really good if they brought it into middle school because everybody would eat it and it's a lot more healthy than the stuff that they give you."*

> *Student A: "…I think that they should have more healthy stuff but in elementary school we had like a salad bar that you could have stuff and it was really good. I would get it like every day--"*
> *Student B: "it was free"*

<u>*Factors Influencing Food Consumption*</u>

Financial Cost

When expressing their desire for more fruit and vegetables in the cafeteria, numerous students described how the fruit cart available in elementary school offered fresh items at no cost. It is unclear if the students were attracted to carts because they were a source of abundant healthy foods or because it was free. While no questions specifically asked students about the

cost of food or their opinions on the pricing system, students from three different focus groups mentioned the topic. One student explained that he never buys lunch saying, "my mom thinks it's too expensive" and another commented that the "cafeteria food rips you off, too expensive".

Another example is evident after a student is asked if he felt the food in his cafeteria fit into the food pyramid. His response spurs an interaction revealing that cost may impact some students' behavior while others remain unaffected.

> *Student A: "um not usually, it's that sometimes um the specials sometimes they usually do and the um like the subway the sandwich line that usually fits in the best I would say except that's the most expensive"*
> *Facilitator: "oh it costs the most?"*
> *Student A: "yeah it costs um a dollar more, I'm just bringing that up"*
> *Student B: "oh really I thought it cost us like $3.15 like the same, no? oh that's weird"*

This dialogue echoes a common complaint found in the public discourse regarding diet: healthier foods are more expensive. It is interesting to reflect on the experiences with produce students have had in the elementary versus middle school cafeterias. In elementary school, students are served free fruits and vegetables on a daily basis throughout the year; the Chartwells Food Program, which is the district food provider, funds this opportunity. At the middle school level, however, complementary fresh fruit and vegetables are only available three times a week and furthermore this is isolated to the first three months of the school year and sometimes again in May and June. Along with the discrepancy in frequency, the presentation of the fruits and vegetables is also different. At the elementary school, there is a cart full of free produce easily visible and accessible to all students, however, in middle school the items are incorporated into the food line and offered as part of the students' purchased meal. Free samples are available to all students yet their placement on the line might cause confusion thus discourage consumption. Additionally, healthier meals in middle school seem to be priced higher than other options

offered. It appears that some students alter their behavior, or are at least cognizant of cost while it does not influence the decisions of others, shown by their obliviousness to it. This juxtaposition of elementary and middle school cafeterias lends itself to scrutiny as we attempt to determine why this discrepancy exists and the implications it has on the students.

Supply of Food in Cafeteria

It would seem reasonable to assume that the students' purchases reflect their preferences however as we observe when discussing cost, this is not necessarily true. Another factor that plays an important role is the availability of food items in the cafeteria. The diminishing options throughout the progression of the three lunch periods were identified by one focus group as a significant factor determining students' food consumption. While none of the other schools discussed this theme, it presented itself numerous times at the one school with different students expressing how this impacted their choices. The general consensus reached by the group was that the cafeteria did not serve enough food to feed all the students. These students were assigned to third lunch and as a result, majority of the items were purchased before the last group entered the cafeteria. Students were forced to construct their meals reflecting availability and not necessarily their preferences. One student explained how at her designated lunchtime there were hardly any options; she ended up purchasing a bottle of vitamin water and a bag of chips. Another student shared that she often finds herself in a similar situation. She vocalized her frustration at having to purchase a piece of pizza one day due to a lack of other options.

Structural Organization of Cafeteria

Another factor determining students' food consumption, in at least three of the focus groups, is organization of items in the cafeteria. One student claimed that he chose food on the

basis of which line was shortest. Another student answered the question of what she purchased on the days she did not bring her lunch by saying:

> *"… there are lunch lines for two sides so this side is the subs and pizza and then there's—but there's pizza on both sides so I come from this side and there's like different things everyday there's like chicken nuggets, macaroni and cheese, then there's like taco salads. I usually get from this side."*

This response reveals that pizza, being served in both food lines, is a very accessible item for students. This convenience seems to influence students' choices especially since this specific student bases her decision on which line is closer to her classroom. Understanding this relationship between placement and consumption, it seems schools could promote the sale of healthier items by making their presence more prominent in the cafeteria.

Another "problem" within the cafeteria identified by two students relates to the main meals and their complementary side dishes. One vocalized, it was "strange" how you were required to take a piece of bread if you purchased hot lunch however there was no such policy concerning vegetables. She felt it should be the other way around; vegetables automatically accompany meals and bread is the extra option. Similarly, a student in a different focus group stated:

> *"…you can either get the pizza meal or whatever they're having as a special and you can't combine the two so you don't get much of a variety. So if you get the pizza you can only get bosc-bosco sticks with pizza… it doesn't really make all that much sense to me."*

These students both identify an interesting point about how the cafeteria structure limits their food options. It seems that altering the menu arrangement perhaps by having all meals coupled with vegetables, as one student recommended, might be a helpful technique in encouraging students' consumption of healthier foods.

Opportunities for Physical Activity

During the focus groups students were asked to reflect on whether they felt there were opportunities to be physically active at school. Three focus groups directly addressed the topic and arrived at different conclusions. The majority of one school claimed there were not opportunities to be active during school however lots of after school activities were available. Another group replied in unison that unless you take gym there were minimal opportunities. Both of these groups had extensive discussions about how they arrived at these conclusions and a large portion of the students participated in the conversation. At the last focus group, the students reached the consensus that "yes" there were opportunities to be physically active however all responses were only a few words and no interactive conversation occurred. All groups tended to emphasize that after-school activities were the main source allowing students to be active. However, in order to participate in these referenced activities, students are required to pay an additional fee. It is reasonable to suggest that these additional costs to participate in the programs might be a deterrent for some students.

One student explained that they have the opportunity to go outside during lunch, which would be a chance to be active, however it was not a possibility for all students:

> *"… I don't think there's much chances because like at lunch I don't think they give you enough time to eat and go outside… well lunch you go outside I guess not a lot of people do because like they get their lunch really late and they don't have that much time"*

For a student, eating lunch and going outside are transformed into competing desires during the school day. The limited time allotted for students to consume their lunch is now a barrier in their attempt to participate in physical activity. Another student contributed to the conversation by adding, "well like we could go outside during after lunch but the thing is I'm like a really slow eater so so I never really got to go outside at all."

School Policy

Expanding from the conversation about fitness two focus groups began discussing their concerns that gym was not a mandatory course for all students after the 6th grade level. Two students discussed this describing the advantages and disadvantages of having a choice in their coursework:

> *Student A: "well like some people didn't take gym so they don't get that kind of yeah they—you can choose if you want to take gym or not and I think a lot of students picked no um I dunno why but they did and so maybe it's just like so almost like half the school doesn't get it – doesn't get their exercise that the kids in school-in gym do"*
> *Student B: "yeah like in 6th grade you have to take gym but then in 7th and 8th it's optional"*
> *Student A: …"it's nice to have an option but this is like when I told my—um what I think about it, the parents were all so worried that the kids weren't getting exercise they need everyday"*

This dialogue reflects both their understanding of the importance of physical activity as well as the realization that without mandatory gym it is possible that students are failing to participate in a healthy level of fitness on a regular basis. In another focus group, students discussed their confusion about the school policy.

> *Student A: "…like it's kinda weird that we're not- forced to do gym. Because some kids can just come to school and do other classes but they won't exercise at all- they'll not- I mean it seems like we should be forced to do gym"*
> *Student B: "yeah like to be more healthy"*

This exchange emphasizes students' understanding about the importance of physical activity and their concern not only surrounding their own health but also that of their peers.

Misconceptions about the Cafeteria

Just mentioning the cafeteria elicited groans from two of the focus groups while in the other groups students eagerly offered critiques about the food served after further questioned

about the items available. In one focus group after being asked to discuss the ways in which the cafeteria food fit into the food pyramid, a student went so far as to describe the cafeteria in a manner that was factually incongruent with the data collected through cafeteria observations. He felt very strongly that the cafeteria was comparable to a candy store; offering every type of candy imaginable to the students but only five pieces of the same type of fruit. This elaborate description included the student listing the names of all the candies available and concluding that the entire cafeteria was 85% sugar and gooey snacks and 10% inedible. It was unclear what he believes the remaining 5% to be. Even while majority of his peers disagreed with his statements, he adamantly maintained his position. He could not be persuaded that the cafeteria was anything other than a source of gross and unhealthy foods. The cafeteria observations conducted at the school being described disprove his accusations; there is no candy sold in the cafeteria. It is interesting that the student refused to restructure his notions about the cafeteria even after his peers blatantly told him he was wrong about the quantity and variety of candy offered. He attempted to further argue his point by explaining that his mother agreed with him in that the cafeteria did not offer any healthy options. This example encourages us to question how these preconceived views about the cafeteria influence students and parents on a regular basis. Additionally, it pushes us to consider how these opinions were established and if it is possible to change them over time if they are no longer accurate.

DISCUSSION

When deciphering the data collected, it is important to understand how the different measurements interact with one another to create a comprehensive snapshot of each school. At first glance it might seem that inconsistencies exist amongst the different measurements,

however when evaluating the results, one is able to discern cohesive patterns that emerge from the findings.

School A

Earning the highest rating on the scorecard analysis and a very positive evaluation from the Wellness Coordinator, School A appears to be extremely successful in engaging with the program and creating a healthier environment for the students. Examples of this include: participation in almost all of the optional events, high level of staff enthusiasm, seeking and obtaining a budget from the Parent-Teacher Organization (PTO), and developing a strong School Health Team. School A was also the pilot school for the Project Healthy Schools program; this was mentioned when a Wellness Coordinator described the ease of implementation due to an established routine. As hypothesized for schools that actively embrace the program, the behavioral survey results indicate significant increases in levels of vigorous and moderate activity amongst the students. The cafeteria received positive comments and earned average marks based on the set criteria yet no notable change in food consumption was recorded. Interestingly, School A experienced a significant increase in students' time spent playing game systems and marginally significant increase in sugary beverage consumption. This school serves a community with a relatively high percentage of individuals possessing college degrees and an average level of median income compared to the other schools.

School B

School B serves a population possessing an average number of college degrees and one of the highest levels of median parental income compared to the other schools in the study. Receiving an average scorecard grade, School B participates in roughly half of the events

available and maintains a sixty percent level of staff enthusiasm; it also has a strong School Health Team. Additionally, students at School B reported a higher level of moderate and vigorous exercise after exposure to the intervention program. Regarding the cafeteria, School B earned the lowest score and no changes were seen in the survey results concerning food or beverage consumption.

School C

School C, similar to School B, has a population with one of the highest levels of median parental income and an average quantity of college degrees. Even though it is similar in these regards and exceeds School B in both event participation and staff enthusiasm, there was no statistically significant increase in positive behaviors for students at School C. Overall, it earned an average scorecard grade and the second highest cafeteria rating; however, no changes in food or beverage consumption were evident from the surveys.

School D

Having the highest level of students eligible for free and reduced lunch, School D also serves a community with the lowest level of college degrees compared to the other schools. During evaluations, School D earned a below average cafeteria rating accompanied by negative comments and earned the lowest ranking on the scorecard. Ultimately, there were no statistically significant changes occurring in students' behaviors at School D.

School E

School E serves a population with the highest level of college degrees and received an average grade on the scorecard evaluation tool including a fifty percent event participation rate and twenty percent level of staff enthusiasm. Looking at the survey results, significant and

marginally significant increases in students level of moderate and vigorous physical activity occurred as well as an increase in time spent on the computer. In regards to the cafeteria, School E earned the highest score for the cafeteria observations and received extremely positive comments; a marginally significant decrease in fried food consumption occurred.

CONCLUSION

I studied a nutritional education program implemented in five middle schools to examine the impact of the program on student behaviors and identify factors influencing implementation of the intervention program. Ultimately the findings reveal that the level of school cooperation with Project Healthy Schools regarding administrative support, staff enthusiasm, and event participation are associated with a positive change concerning level of physical activity in some, but not all, of the populations studied. In addition, although students retained knowledge from the exposure, it is apparent that there are other factors playing a role in successfully changing behavior.

Regarding changes in food consumption patterns, there is evidence of a marginally significant decrease in fried food consumption occurring in the school receiving the highest cafeteria score and most positive cafeteria comments. Even though variability exists among the five cafeterias no change in fruit and vegetable consumption was observed. These findings suggest that school cafeterias are only one component of a successful nutritional education program.

During each focus group, students vocalized the program's impact on their food choices inside and outside of school suggesting evidence of improved food choices or awareness and a basic level of knowledge retention as result of the intervention. They also emphasized the influence of their parents on their diets. Whether it is encouraging a specific diet, packing school

lunch, or regularly eating dinner at restaurants instead of cooking meals at home, the connection between parents and their children's diet is clear. When looking at the results combining all students, there is evidence that an increase in sugary beverage consumption occurred and this is found to be marginally significant at one of the schools. While some change is evident over the duration of this intervention, and there seems to be an increased awareness of healthy eating based on feedback within the focus groups, Project Healthy Schools does not appear to be a large determinant influencing dietary behavior. This reinforces the idea that motivating and enabling individuals to enact change is a multifaceted issue.

In implementing a program to alter behaviors, one essential component is family support; this argument is echoed throughout the literature review and in the focus group findings. Parental influence is a crucial ingredient in the success of an intervention and this lack of high-level parental involvement could be seen as an explanation for the limited and inconsistent changes achieved through Project Healthy Schools. Incorporating families as a whole, above a basic level of communication, might result in greater changes in student behavior.

The results also reveal that students at two of the schools experience significant increases in time spent on a computer or playing a game system. While these findings run counter to one of Project Healthy School's five goals, it is important to note that the current literature is divided about whether a large amount of screen time is implicitly negative. Some argue that they play a causal role concerning obesity by displacing time spent being physically active, while others contend it is actually exposure to the commercials that increases the risk for being overweight (Parker-Pope, 2010).

Another aspect explored in this study is the influential position teachers and other adults within the school inevitably occupy because of their regular interaction with children. The focus

groups provide insight to the behaviors students observe, such as heavy soda consumption or frequent participation in physical activity. These observations possess the power to either contradict or reinforce the message presented in the Project Healthy Schools program. The Wellness Coordinators also identify inconsistencies with support from the schools regarding the promotion of the intervention. An obstacle present at all five schools, the use of candy as a reward, is another example of the schools undermining the message. The extent to which it impacts the intervention is unclear however it is fair to assume that this tension between maintaining the status quo and enacting new behaviors to encourage a healthier lifestyle is likely to hinder the success of Project Healthy Schools.

In the literature review it is evident that schools promoting healthy behaviors in a multitude of ways are more effective in creating positive change in students' behaviors then those relying on only one approach. Combining this research with my own suggests that schools are likely to experience greater success in behavioral change when they become a large proponent of the programs themselves. If schools were to fully embrace the mission and various aspects of the program, it would help eliminate several barriers identified by Wellness Coordinators that negatively impacted program implementation, ranging from the use of candy as a reward within the school to limited physical activity opportunities.

Relying on a mixed methods approach that incorporated quantitative and rich qualitative data, I gained insight into a variety of influences identified by both students and staff that affect the intervention. Student anecdotes, speaking with Wellness Coordinators, and physically entering the cafeteria, I was able to create a comprehensive understanding of the Project Healthy Schools program implementation. One limitation of the research is that the population being studied is Ann Arbor Public Middle School students, thus implying a certain level of

socioeconomic status as well as a disproportional representation of certain racial groups. The effect the baseline behaviors had on the program is unclear; if the frequency of unhealthy behaviors were significantly higher, the program would have the potential to create greater improvement than seen in this study. In addition, I was unable to control for socioeconomic status, parental income, and race for students on an individual basis and instead relied on a school level analysis. Future research should consider the long term implications of an intervention program, these participants reflected absorption of the material presented however it is unclear how this will impact their future behaviors as they get older. To better understand the benefits and areas for improvement, it would be beneficial to explore the effects of a nutritional education program compared to a control group.

Although we have looked at specific factors influencing the behavioral changes in students participating in Project Healthy Schools, it is important to look beyond the program at general trends in society as a whole. There has been a transformation in the way Americans live their lives. Decreases in physical activity are tied to an increased reliance on other modes of transportation. After school sporting activities are being cut due to budget constraints at a time when unstructured physical activity among children is much less common than a generation ago (Obama, 2010). It is estimated that the average child between the ages 2 to 19 is not exercising enough to maintain a healthy lifestyle (GetKidsInAction, 2011). The cultural attitude regarding health in America has shifted and there is more acceptance of obesity as being normal. A drastic expansion of the fast food industry has resulted in growing portion sizes, a heavy emphasis on marketing to children, and an overall increase in fat and oil consumption. The average American today consumes 31 percent more calories and fifteen pounds more sugar than the average person living in 1970 (Obama, 2010). It is important to educate and motivate students to lead healthier

lifestyles. The ramifications of prioritizing health in schools may even reconstruct how we, as a society, value nutritional education and our health.

Acknowledging that many forces impact individual behavior associated with childhood obesity, we are better able to appropriately confront the issue. The positive correlation between student performance and nutrition is well documented and, considering the current emphasis on high-stakes testing, improving the health of the students is in the schools' best interest (WestEd, Philip R. Lee Institute for Health Policy Studies). It is evident that targeting the individual student is not sufficient to create consistent positive change by itself. Consideration should be given to expanding programs to address the various other factors of influences including: structure of the cafeteria, administrative support, and especially family influence. With inclusion of these factors, it is likely school-based intervention programs will be more successful in combating this epidemic. It is also apparent that we, as a society, may need to expand beyond school-based programs to recognize and address all factors that have the potential to contribute to this growing problem.

Appendix: Table of Contents

I. Survey Questions Utilized in the Study

Optional Responses for Questions 1-9: None, 1 Time, 2 Times, 3 or More

1. Yesterday, how many times did you eat hamburger meat, hot dogs, sausage (chorizo), steak, bacon, or ribs?

2. Yesterday, how many times did you eat battered or fried chicken, chicken nuggets, chicken fried steak, fried pork chops, or fried fish?

5. Yesterday, how many times did you eat vegetables? Include all cooked and uncooked vegetables; salads, boiled, baked and mashed potatoes. Do not count French fries or chips.

6. Yesterday, how many times did you eat fruit? Do not count juice.

7. Yesterday, how many times did you drink fruit juice? Fruit juice is a 100% juice drink like orange juice, apple juice, or grape juice. Do not count punch, Kool-Aid, sports drinks, or other fruit flavored drinks.

8. Yesterday, how many times did you drink any punch, Kool-Aid, sports drink, or other fruit flavored drinks? Do not count 100% fruit juice.

9. Yesterday, how many times did you drink any regular (not diet) sodas or soft drinks?

Optional Responses for Questions 15 and 16: 0 days, 1 day, 2 days, 3 days, 4 days, 5 days, 6 days, 7 days

15. On how many of the past 7 days did you exercise or take part in physical activity that made your heart beat fast and made you breathe hard for at least 20 minutes. (For example: basketball, soccer, running, or jogging, fast dancing, swimming laps, tennis, fast bicycling, or similar aerobic activities).

16. On how many of the past 7 days did you take part in physical activity or exercise for at least 30 minutes where your heart did not beat fast or you did not breathe hard, such as fast walking, slow bicycling, skating, pushing a lawn mower, or household chores?

Optional Responses for Questions 22-24: I don't (do activity), less than 1 hour, 1 hour, 2 hours, 3 hours, 4 hours, 5 hours, 6 hours

22. How many hours per day do you *usually* watch TV or video movies away from school?

23. How many hours per day do you *usually* spend on the computer away from school? (Time on the computer includes time spent surfing the Internet and instant messaging).

24. How many hours per day do you *usually* spend playing video games like Nintendo, Sega, PlayStation, Xbox, GameBoy, or arcade games away from school?

II. Assent Read at the Beginning of each Focus Group

Re: Project Healthy Schools Phase II
Study Number: HUM 20181

You are invited to join in a discussion group (focus group) with other students who have had Project Healthy Schools activities in the classroom. This group will talk about what you've learned from Project Healthy Schools and whether or not you've made different choices in your activities and what you eat and drink. We also will talk about what you've shared with your family about Project Healthy Schools

The things we talk about in the discussion group will help us figure out if Project Healthy Schools works at your school and how we might be able to make it better.

We may publish information we learn from these groups, however, we will not include your names or pictures of you.

You do not have to be part of this group. Joining in this group or not joining will not affect your grade in any of your classes. It is your choice and you are free to change your mind.

If you have any questions, please ask us. We thank you for your help and your ideas about Project Healthy Schools.

Thank you,

III. Focus Group Questions: Original Version

Opening

- Go around the circle, everyone gives their names and their favorite healthy food
- General Introduction: Thanks for volunteering; today we are here to talk about Project Healthy Schools.

Transition

- Does everyone remember Project Healthy Schools, what type of things did you learn?
    - Confirm they are correct or remind them: It's when Health Ambassadors came during advisory and spoke with your class about eating healthy foods and being active.

V. Key Questions

- What, if anything, have you told your siblings, family members, maybe even your grandparents about Project Healthy Schools?
    - If they did share: Why did you decide to tell them about that?
    - Did your family ever ask you questions about Project Healthy Schools?
        - If yes: What types of things have they asked?
- **Tell me what a typical meal is like at dinner for you and your family during the week**
- Tell me about the food served in the school cafeteria...
    - How often do you buy hot lunch?
        - What do you think about it? (appearance, taste, variety)
    - How, if at all, does it fit into the MyPyramid?
    - What do you think about the Balanced Choice meal offered everyday?
        - Have you ever purchased it?
            - ❖ Yes: How often would you say that you buy it?
            - ❖ No: Why not? (potentially already answered)
- Let's talk about physical activity
    - Did Project Healthy Schools make you want to be more active?
        - If yes: Why?
        - What sort of activities do you like to do?
    - **Do you feel like your family likes to be physically active?**
        - **Yes: What types of activities does your family do?**
            - ❖ **How often would you say that your family does these things?**
        - **No: What makes you say that?**
- Now I want you to think about your classes, class parties, and school events.
    - When thinking about all these things, do you think your teachers or other school staff applied the Project Healthy Schools message outside of the ten lessons taught during advisory?
        - If yes: In what ways?

Conclusion

- What are your overall thoughts about the Project Healthy School Program?
    - How do you think we could make it better?
    - How do you think we can make PE classes more active?

IV. Focus Group Questions: Revised Version

Questions:

I. Opening
- Go around the circle, everyone gives their names & their favorite healthy food
- General Introduction: Thanks for volunteering; today we are here to talk about Project Healthy Schools.

II. Transition
- Does everyone remember Project Healthy Schools, what type of things did you learn?
    - Confirm they are correct or remind them: It's when Health Ambassadors came during advisory and spoke with your class about eating healthy foods and being actie.

III. Key Questions
- What, if anything, have you told your siblings, family members, maybe even your grandparents about Project Healthy Schools?
    - If they did share: Why did you decide to tell them about that?
    - Did your family ever ask you questions about Project Healthy Schools?
        - If yes: What types of things have they asked?
- Tell me about the food served in the school cafeteria...
    - How often do you usually buy hot lunch and what do you buy?
    - If you bring a lunch, what do you usually bring?
    - What do you think are the most popular things sold?
        - Why?
    - What are things you usually don't buy?
        - Why don't you buy these items? (appearance, taste, variety)
    - How, if at all, does the food in the cafeteria fit into the Food Pyramid?
        - How would you describe the fruits and/or vegetables served?
    - What do you think about the Balanced Choice meal offered everyday?
        - Have you ever purchased it?
            - ❖ Yes: How often would you say that you buy it?
            - ❖ No: Why not? (potentially already answered)
    - Does anyone have anything else to add about the food in the cafeteria?
- Let's talk about physical activity
    - Did Project Healthy Schools make you want to be more active?
        - If yes: Why?
        - What sort of activities do you like to do?
    - Do you feel like you there are chances to be physically active at school?
        - What are these opportunities?
        - If you could make any changes to gym class, what would you change?
- Now I want you to think about your classes, teachers, and class parties
    - When thinking about all these things, do you think your teachers or other staff applied the Project Healthy Schools message outside of the lessons in advisory?
        - Can you tell me how?

IV. Conclusion
- What are your overall thoughts about the Project Healthy School Program?
    - How do you think we could make it better?
    - What was your favorite or least favorite part of the program?

V. Cafeteria Observation Form

Project Healthy Schools Middle Schools Food Service Evaluation

Date:

School Visited:

Arrival Time:

Departure Time:

Reviewer:

How many times have you visited this cafeteria previously?

Comments:

In Person: a la carte line

❑	Candy	
❑	Cookies	*none*
❑	Other baked goods	
❑ ❑ ❑ ❑	Beverages (list sizes): 100% Juice 100% Juice Slushy Bottled Water Other beverages	
❑	Baked snacks chips/foods.	List all (any fried) snack/chips offered:

V. Cafeteria Observation Form (Continued)

In Person: Lunch Options on the Lunch Line (not including a la carte line)

Available	Option	Details
❑	Fried snacks (chips)	
❑	Refrigerated yogurt	
❑	Refrigerated prepared salads	Options:
❑	Fruits/Veggies are the first foods on the line	
❑	Uncooked (fresh) vegetables	What?
❑	Fresh fruit	
❑	Cut-up fruit	
❑	Today is a Farm Fresh Feature day	
❑	**1%** and/or skim milk	Describe other types of milk offered:
❑	Flavored milk	Circle: Strawberry Chocolate Vanilla/White
❑	Note the temperature in the milk cooler. Temperature was _____.	Circle one: Students were going through the line No students were going through the line
❑	Whole grain/wheat bread	
❑ ❑	Brown rice No rice served	Check with food service staff since often you cannot tell by looking at these products.
❑ ❑	Whole grain/wheat buns/rolls NA	Check with food service staff since often you cannot tell by looking at these products.
❑	Whole grain/wheat pizza	Check with food service staff since often you cannot tell by looking at these products.
❑ ❑	Whole grain pasta NA	Check with food service staff since often you cannot tell by looking at these products.
❑ ❑	Food service staff encourages students to take a complete meal, to include main dish, sides, milk? NA	Comments you hear from food service staff:
❑	When looking at the food, there is a variety of color.	
❑	Menu is posted where students can see it before they go through the lunch line.	
❑	Hand sanitizers are in or near the lunchroom a	
❑	Hand sanitizers functional	
❑ ❑	Hand sanitizers are used NA	

VI. Differences in Baseline Survey Responses and Significance Level

			N	Mean	Std. Deviation	Std. Error	ANOVA Sig.
Fried Food Consumption Yesterday	Question 1	A	86	0.52	0.627	0.068	0.276
		B	49	0.63	0.698	0.100	
		C	62	0.79	0.890	0.113	
		D	37	0.62	0.639	0.105	
		E	84	0.62	0.675	0.074	
		Total	318	0.63	0.711	0.040	
	Question 2	A	86	0.26	0.513	0.055	0.374
		B	49	0.16	0.373	0.053	
		C	62	0.24	0.534	0.068	
		D	37	0.35	0.716	0.118	
		E	84	0.18	0.385	0.042	
		Total	318	0.23	0.497	0.028	
Fruit and Vegetable Consumption Yesterday	Question 5	A	86	1.65	0.955	0.103	0.230
		B	49	1.90	0.963	0.138	
		C	62	1.58	1.033	0.131	
		D	37	1.43	1.068	0.176	
		E	84	1.71	0.899	0.098	
		Total	318	1.67	0.974	0.055	
	Question 6	A	86	1.72	1.013	0.109	0.456
		B	49	1.59	0.814	0.116	
		C	62	1.61	0.912	0.116	
		D	37	1.41	0.985	0.162	
		E	84	1.71	0.926	0.101	
		Total	318	1.64	0.938	0.053	
Sugary Beverage Consumption Yesterday	Question 7	A	86	1.02	0.881	0.095	0.926
		B	49	0.94	0.922	0.132	
		C	62	0.92	1.013	0.129	
		D	37	1.00	0.943	0.155	
		E	84	0.90	0.939	0.102	
		Total	318	0.96	0.932	0.052	
	Question 8	A	86	0.43	0.728	0.079	0.038
		B	48	0.25	0.438	0.063	
		C	62	0.29	0.555	0.070	
		D	37	0.65	0.949	0.156	
		E	83	0.31	0.623	0.068	
		Total	316	0.37	0.671	0.038	
	Question 9	A	87	0.26	0.559	0.06	0.034
		B	48	0.31	0.552	0.080	

		C	62	0.39	0.583	0.074	
		D	37	0.54	0.869	0.143	
		E	84	0.19	0.502	0.055	
		Total	318	0.31	0.599	0.034	
Vigorous Exercise: Days in Past Week	Question 15	A	87	4.32	2.099	0.225	0.925
		B	49	4.51	1.757	0.251	
		C	62	4.23	1.859	0.236	
		D	37	4.16	2.291	0.377	
		E	83	4.39	1.981	0.217	
		Total	318	4.33	1.988	0.111	
Moderate Exercise: Days in Past Week	Question 16	A	87	3.02	2.14	0.229	0.227
		B	49	3.63	2.138	0.305	
		C	62	2.94	2.231	0.283	
		D	37	3.08	2.203	0.362	
		E	84	3.58	2.365	0.258	
		Total	319	3.25	2.232	0.125	
TV Watching: Average Hours per Day	Question 22	A	85	1.271	1.1791	0.1279	0.041
		B	62	1.484	1.1907	0.1512	
		C	49	1.490	1.313	0.1876	
		D	37	2.027	1.3842	0.2276	
		E	83	1.373	1.2417	0.1363	
		Total	316	1.462	1.2562	0.0707	
Computer: Average Hours per Day	Question 23	A	87	1.103	1.1517	0.1235	0.697
		B	49	0.980	1.2415	0.1774	
		C	60	1.150	1.1692	0.1509	
		D	37	1.203	1.2988	0.2135	
		E	82	0.945	0.8784	0.097	
		Total	315	1.063	1.1212	0.0632	
Game System: Average Hours per Day	Question 24	A	86	0.465	0.7428	0.0801	0.070
		B	49	0.602	1.0256	0.1465	
		C	62	0.831	1.2379	0.1572	
		D	37	0.608	0.774	0.1272	
		E	83	0.434	0.6037	0.0663	
		Total	317	0.566	0.8879	0.0499	

VIII. ANOVA Analysis of Significant Baseline Differences

		Sum of Squares	df	Mean Square	F	Sig.
Fall_Q_8	Between Groups	4.537	4	1.134	2.572	**.038**
	Within Groups	137.143	311	.441		
	Total	141.680	315			
Fall_Q_9	Between Groups	3.715	4	.929	2.641	**.034**
	Within Groups	110.083	313	.352		
	Total	113.799	317			
Fall_Q_22	Between Groups	15.644	4	3.911	2.527	**.041**
	Within Groups	481.400	311	1.548		
	Total	497.044	315			

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