A PHYSICAL ACTIVITY AND NUTRITION EDUCATION PROGRAM IN ELEMENTARY SCHOOLS: TARGET POPULATION NEEDS, BARRIERS AND FACILITATORS TO HEALTHY EATING AND PHYSICAL ACTIVITY

By

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ABSTRACT

A PHYSICAL ACTIVITY AND NUTRITION EDUCATION PROGRAM IN ELEMENTARY SCHOOLS: TARGET POPULATION NEEDS, BARRIERS AND FACILITATORS TO HEALTHY EATING AND PHYSICAL ACTIVITY

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The global childhood obesity crisis, especially in the low-income (LI) minority population, has motivated interest in interventions addressing important lifestyle behaviors such as healthy eating (HE) and physical activity (PE). Understanding the perceived barriers (PB) and facilitators (FA) to HE and PA experienced by children (Chld.) and parents/primary caregivers (PPC) is important for intervention success. Based on the Social Cognitive Theory and grounded theory, a mixed method (quantitative and qualitative) study was conducted among (n=27) 5th grade LI elementary Chld. and 11 PPC to assess: dietary quality (DQ), PA and related behaviors, weight (wt.) and health perceptions, food security, child and PPC wt. status, family nutrition (Nutr.) and PA, as well as PB and FA to HE and PA. The prevalence of overweight and obesity was 59% for Chld. and 90% for PPC. Food insecurity was reported by 41% of Chld. and DQ (Healthy Eating Index-score) for both Chld. and PPC needed improvement (64/100). For PA, 81% of Chld. were not meeting the recommendation. For both Chld. and PPC the major FA to HE and PA were media (exergames and televised Nutr. and PA embedded programs), the PA & HE (PE-Nut) program and community access. The major barriers were neighborhood safety, accessibility to rec-centers, lack of community modeling of healthy lifestyles, time and monetary constraints. Family ecology was found to promote a positive understanding as well as enhance misconceptions of Chld. regarding health, HE, and PA. PE-Nut and other similar programs are therefore much needed to facilitate as well as ensure accuracy of messages/understanding in this and perhaps other target populations.

Copyright by SIMONE A. WILSON 2014 I would like to dedicate this thesis to my late grandfather Noel Davis, my mother Claire Davis, sister Schana Meade, nephew Camiran Meade, my beloved family both present and future and to all those who have supported me throughout this journey. You all hold a special place within my

heart. Love always, Simone

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CHAPTER 1

INTRODUCTION

Overweight and obesity among US children, adolescents and the population in general were declared a "health epidemic" by the U.S. Surgeon General David Satcher in 2001. This has unfortunately not changed. A 4.5 percent increase in obesity rates from 2005-2006 as well as 2007-2008 was reported among children 6 to 11 years (Ogden, 2010). In a 2008 report, 16.9 percent of children and adolescents ranging from ages two to nineteen years fell at or above the 95th percentile of body mass index (BMI), indicative of obesity (Ogden, 2010). Nearly one third of all children within the United States are either overweight or obese as a direct result of poor food options, over indulgence, economic instability, or inadequate physical activity (Bowman, 2004; Institute of Medicine, 2005; Biro, 2010). Subsequently the current surgeon general is also focused on obesity, and has hence worked on improving communities by making it easy for "people to eat well, exercise and make healthy choices …changing the designs of our communities and the designs of our everyday life" (Arvantes, 2010; U.S. Department of Health and Human Services, 2010)

Poor dietary intake has been associated with some of the most common chronic diseases such as hypertension, type 2 diabetes, fatty liver disease, metabolic syndrome, heart disease, multiple cancers, and low glucose tolerance (Caterson, 2004; Daniels et al. 2005; James et al. 2008). The increased prevalence of chronic disease associated with childhood obesity within this already vulnerable population has also garnered the attention of the White House. First Lady Michelle Obama instituted the *Let's Move* campaign to increase public awareness of childhood obesity and advocate for improved government policies that include providing healthy lunch and physical activity regulations for children (United States White House Task Force on Childhood

Obesity, 2010). Health and wellness professionals have energized their efforts to combat childhood obesity by vigorously promoting healthy food choices and physical activity.

Since children spend a significant portion of the day at school, the school environment has long been recognized as an important venue for conducting interventions, which aim to positively impact lifestyle choices around food consumption, health and wellness, and physical activity. A study conducted by Briefel et al. (2009) reported that children consume about 35 percent of their daily food intake and expend 50 percent of their daily energy during school hours. Peterson et al. (2007) reviewed several school based intervention studies conducted within the United States and abroad that focused on both behavior change and weight reduction. The majority of school-based interventions have focused on the curriculum, classroom, physical education, and changing the school environment through policies related to nutrition. Studies have also focused on reducing television viewing like the Stanford Media Awareness to Reduce Television program (SMART) (Robinson, 1999), as well as changes in nutrient content of meals offered to students through the National School Lunch Program and School Breakfast Program e.g. the Child and Adolescent Trial for Cardiovascular health (CATCH) (Nader et al. 1999). There have however, only been a few studies with sustained outcomes such as weight reduction in adolescent youth (females in particular) as a result of an intervention (Peterson, 2007). Many interventions now focus on the long-term benefits associated with nutrition education where the primary focus is on initiating and maintaining behavior change, in which case, effects are projected to transcend into long-term effects as well.

A recent federal law enacted by congress requires that local education agencies receiving federal funding develop nutrition and other activities that fall within the nutrition guidelines for food available on school campuses during the school day (Fox, 2009). In Michigan, the

Michigan Fitness Foundation (MFF) has incorporated programs such as the Physical Education and Nutrition Education Working Together Program (PE-Nut) into schools, where 50 percent or more of the student body are eligible to receive free or reduced priced meals, in an attempt to address nutrition education, increase physical activity, and improve the school environment.

In addition to the school environment, the home or family environment is also important. It is well documented that obese children are more likely to become obese adults and the risk for childhood obesity increases when one or more of the parents are overweight (Daniels et al. 2005, James et al. 2008). Habits learned in childhood (such as poor eating behavior and sedentary lifestyles) typically persist into adult life and can have a deleterious influence on health outcomes and overall weight gain (Brio, 2010; Whitaker, 1997; Sreula, 1993; Han, 2010). During early childhood development (from birth to age 5), parents are the primary influence over their children's eating behaviors (Tilston, 1991; Gosling, 2008). However, as children age, parental influences diminish; giving way to influences from the media and peer pressure (Ajzen, 1980; Gosling, 2008).

We understand that childhood obesity is affected by several factors including but not limited to: social influences, family resources, knowledge and attitudes about diet, eating/snacking frequency, genetic predisposition, and emotional distress (Briefel, 2009). Changes in lifestyle management, which incorporate the entire family, have been shown to be successful in facilitating positive dietary changes, increasing physical activity and reducing weight (James et al. 2008; Golan et al. 2001). Therefore, interventions targeting weight reduction, which incorporate the entire family, are needed to increase the likelihood for successful lifestyle changes and subsequent health status. The PE-Nut program, funded by the USDA SNAP-Ed Program in Michigan is a great example of a school-based program, which attempts to address childhood obesity, although indirectly, by integrating school activities with the family. However, it has been difficult to document the extent to which this program is reaching children who are not only biometrically, but who are also experiencing lifestyle behavior challenges. This was due to funding restrictions up until the time of the study on the types of assessments that could be conducted with SNAP-Ed dollars. This is especially true in low-income communities, which have a large African American population with young children at risk, such as the Ypsilanti area in Michigan, the focus of the current study. The goal of this study was to assess nutritional status, dietary quality and physical activity behaviors of fifth grade students from two schools located within a low -income community that is predominately African American, and evaluate the facilitators and barriers to implementing "healthy eating and physical activity." In addition, the extent to which the school and home environments influence dietary quality and physical activity behaviors in this target population with prior PE-Nut education was of interest.

Specific Aims

In order to determine concerns related to the target population, which may be associated with healthy lifestyles and hence obesity risk, the following specific aims were formulated for the study.

Aim 1.

Describe the demographics, nutrition status and quality, health as well as physical activity behavior and perceptions of a sample of predominately low income elementary students (who participated in one full year of the (PE-Nut) program), and their primary caregivers/parents.

Aim 2.

Assess the perceived barriers and facilitators to healthy eating and physical activity encountered within the school and home environment by this sample of low-income elementary school children, who participated in PE-Nut.

Aim 3.

Determine the facilitators and barriers of parents/primary caregivers whose children participated in the PE-Nut experience with regard to healthy dietary intake and physical activity behaviors.

CHAPTER 2

REVIEW OF LITERATURE

2.1 The Obesity Crisis

2.1.1 National

Childhood obesity is a serious and growing public health concern. The rates of obesity are highest among ethnic minorities, in particular African Americans, Mexican Americans, and Native Americans (Albright, 2008; Stevens, 2010). Ogden et al. (2010) reported that 19.6 % of children between the ages of 6-11 were above the 95th body mass index (BMI) percentile for age, and hence obese between the years 2007-2008. More recently, twenty-five percent Hispanic (95% CI=17.7-25.4), 24.1% Mexican Americans (95% CI=18.8-30.6), 19.4% Non-Hispanic Black (95% CI= 13.9-24.8), and 19% Non-Hispanic whites (95% CI= 14.5-23.5) fell at or above the 95th BMI percentile for age (Ogden et al. 2010). In 2009, the national obesity rate increased by 4 percent, (from 22.9 percent in 2003 to 26.9 percent in 2009) among adults (Centers for Disease Control and Prevention, 2009). It is predicted that one-third of the children born in 2000 or later will suffer from diabetes, heart disease, high blood pressure, cancer, asthma and other obesity related co-morbidities as they develop into adults.

Adult and childhood obesity rates have reached record-breaking rates in the U.S. and globally with expensive ramifications. The U.S. spent an estimated 14.3 billion dollars on obesity-related healthcare expenses pertaining to children and 147 billion dollars on healthcare towards adults in the year 2008 (Hammond, 2010). A 2008 report by the Centers for Disease Control and Prevention (CDC) predicted that our current generation of youth will have a

shorter life span due to poor nutritional health, physical inactivity, obesity and related comorbidities (CDC, 2008).

A report issued by the Heart and Stoke Foundation of Canada, featured a study in which children as young as 13 years of age were diagnosed with at least one of two cardiovascular disease (CVD) risk factors such as BMI percentile \geq 95 , high cholesterol/lipid profile and/or elevated blood pressure (Heart and Stroke Foundation of Canada, 2010). The aortas of obese children examined with echocardiography showed decreased elasticity in comparison to normal weight children (Heart and Stroke Foundation of Canada, 2010; Harris et al. 2012). Elevated lipid and blood pressure among children with a high BMI percentile for age and height is becoming less uncommon as researchers continue to explore obesity and overweight associated risk factors in children (Freedman et al. 2007; Franks et al. 2010). For example, Franks et al. (2010) found that childhood obesity was positively associated with premature death from endogenous causes as well as hypertension. Children who remain obese into adulthood are therefore at an increased risk for co-morbidities such as cardiovascular disease, diabetes, cancer and other medical conditions.

Diabetes is the leading cause of kidney failure, non-traumatic lower limb amputation, and seventh leading cause of death among adults (Ravenscroft et al. 2005; Weber, 2008; Abboud et al. 2010; CDC Diabetes Fact Sheet, 2011). Although the prevalence of type 2 diabetes in children is 0.4/1,000; it represents 6% of the cases of diabetes in Non-Hispanic White, 33% in African American, 40% in Asian/Pacific Islander, and 76% among American Indian youth (CDC, 2011), and is a serious health concern among overweight and obese children.

Cancers typically associated with elevated weight status, poor diet and inadequate physical activity behaviors are endometrial, premenopausal breast, ovarian, colon and renal cancer (Fuemmeler et al.2009). Calle et al. (2003) reported that 15-20% of deaths in the U.S. are attributed to cancer associated with overweight or obesity. Although the mechanism behind the development of cancer as the result of the aforementioned behaviors and weight status are unclear, it is believed that hormonal deregulations occur in the presence of excess adipose tissue (Fuemmeler et al. 2009).

Non-alcoholic fatty liver disease (NAFLD) has recently become an area of interest and also recognized as a health concern among obese children. NAFLD occurs in one of ten obese children (Schwimmer et al. 2006; Gupta, 2011). NAFLD is associated with poor quality of life among children and is more prevalent in Hispanics than Caucasians and interestingly less commonly seen in African Americans (Schwimmer et al 2011). Kistler et al. (2009) compared the effects of NAFLD in obese children with normal healthy children. A Quality of Life (QOL) survey was administered and children with NAFLD had an overall lower score (72.8 vs. 83.8, p < 0.01) in comparison to healthy children. Thirty-nine percent of children reported an impaired quality of life. Children with NAFLD scored relatively lower in psychosocial (70.4 vs. 81.9, p < 0.01) and physical health (77.2 vs.87.5, p < 0.01).

Asthma, sleep abnormalities, hypertension, urinary incontinence, skin infections, and psychosocial concerns are other factors commonly seen among obese populations (Maggard et al. 2005; Janke et al. 2007). Therefore, it is imperative to address the childhood obesity crisis in order to prevent, ameliorate or delay the associative co-morbidities and potentially shorter lifespan of our current and future generation.

2.1.2 State of Michigan

In 2007, 28.9% of Michigan youth, grades 9 through 12, were either overweight or obese (Michigan Department of Community Health). Among this 28.9%, 18% percent of African Americans and 11.2% of Caucasians were identified as being obese. The prevalence of obesity was higher in males (15%) than females (9.8%) (Michigan Youth Risk Behavior Survey (YRBS), 2007; CDC Youth Risk Behavior Surveillance System, 2007; Anderson et al, 2009). However, the trend that we are seeing did not start in adolescents. Fourteen percent of lowincome children, ages 2 to 4 years, within the state of Michigan, between the years 2000-2006 were obese (Anderson et al, 2009). Hispanics (20.2%) and American Indians/Alaskan Natives (16.9%) had the highest percentage of children who were obese and non-Hispanic African Americans had the lowest (12.1%) (Anderson et al, 2009). Obesity trends nationally for children 6-11 years of age increased from 6.5% to 19.6% between the years of 1976–1980 and 2007– 2008 (CDC, 2010).

2.2 Factors Associated with Childhood Obesity

Several factors have been shown to either be directly or indirectly associated with childhood obesity. These include lifestyle factors (diet and physical inactivity), the environment, socio-demographic status, beliefs and attitudes, maternal and parental obesity, and cultural factors, which are key considerations in the proposed study.

2.2.1 Lifestyle Factors

Lifestyle is defined as, a manner of living that reflects attitudes and values of a person or group (American Heritage Dictionary, 2004). Lifestyle factors associated with childhood obesity include poor dietary choices, physical inactivity, and energy imbalance.

Obesity in children is associated with endothelial arterial dysfunction, thickening of the cardiovascular walls and early signs of atherogenesis. Woo et al. (2004) measured the effects of diet and exercise on obesity related vascular dysfunction among 9 to 12 year old children. The study determined that positive changes made over a six-month period to diet and physical activity improved endothelial positive function, lowered serum cholesterol and reduced the waist to hip ratio. These findings affirm the importance of lifestyle factors for improving overall health.

2.2.1.1 Diet

In a 2010 White House report, it was stated that "We (Americans) are currently eating 31 percent more calories than we were forty years ago including 56 percent more fats and oils, 14 percent more sugar and sweeteners" (United States White House Task Force on Childhood Obesity, 2010). Briefel et al. (2009) found that sugar sweetened beverages offered in school contributed 170 calories on average. They also found that secondary school children, who consumed sugar sweetened beverages, on average had a higher intake of calories (by 229 calories) than children who did not. High overall energy intake and high intake of sugar sweetened beverages are among the main dietary factors associated with the risk for developing childhood obesity (Briefel, 2009). Fruit and vegetable intake is also a problem. Only 32 percent of American youth are consuming adequate amounts of fruit and only 13 percent are consuming

the adequate amounts of vegetables (CDC, 2009). Roughly, 80 percent of Michigan adolescents reported eating fruits and vegetables less than five times per day (CDC, 2009).

Some studies have found that children who consume school lunch have an increased likelihood of becoming obese (Schanzenbach, 2005; Fox, 2009; Kaplan, 2011). Although, children enrolled in the school lunch program receive more protein, vitamins and minerals within their diet, they also consume more dietary fat and calories overall (Kaplan, 2011). Higher energy intake coupled with inadequate physical activity leads to energy imbalance and increases the risk for childhood obesity. The school lunch program provides meals for the general student body, but offers free or reduced priced meals for low-income students who fall at or below the poverty index. Some schools have a large percentage of students eligible to receive free or reduced priced meals making this an important area for consideration. In addition meal skipping, consuming less during breakfast, and more food during dinner is also associated with the development childhood obesity (Lee et al. 2009; Raj et al. 2010). Lee et al. (2009) found that female children on welfare, skipped meals more regularly in comparison to their female counterparts who had never experienced poverty or welfare.

Bowman et al. (2004) found that once socioeconomic status (SES) in children was controlled for, fast food consumption was independently associated with male gender, older age, higher household income, being non-Hispanic black, and living in the south. "Children who consumed fast food ate 187 more calories on average than those children who did not." Overall, children who consumed fast food, consumed more energy per gram of food, fat, carbohydrates, added sugar, and sugar sweetened beverages and less milk, fruits and non-starchy vegetables. They concluded that fast food consumption appeared to have an adverse effect on overall dietary quality of children and could increase the risk for becoming overweight or obese.

Lack of parental supervision during meal time is also associated with childhood obesity (Moreno et al. 2007). Typically, in cases where the parent is absent during meal time, they often have ready to eat items accessible that require little or no preparation time. Children may also engage in watching television during meals when parents are absent which may lead to over eating. Videon et al. (2003) reported that having parent(s) present during meal time (evening meal) was positively associated with adolescents consuming fruit, vegetables, and dairy. Children who perceived their parents as actively supporting eating fruits and vegetables and reported shopping with their parents for their favorite fruits and vegetables, tended to consume more fruits and vegetables (Gross et al.2010).

Food preparation styles are often culturally influenced, and at times have been associated with childhood obesity (Bramble et al. 2009; Davis et al. 2000). Portion size and types of food consumed among adolescents are also contributing factors to childhood obesity (Jennifer, 2005). Bramble et al. (2009) conducted a qualitative study interviewing both African American and African Caribbean women. Among African Caribbean women, traditional foods and preparation styles were believed to be healthier in comparison to foods available in the United States. The women expressed that within their countries, physical activity and cooking were incorporated into their daily lifestyle. They described traditional foods such as rice, peas, mackerel, stewed chicken, dumplings, chick peas, curried chicken, spinach, okra, and fish from their countries as being natural, and described American foods as being processed and "full of chemicals." These women found preserving their family traditions to be difficult within the US, and attributed obesity and weight gain to acculturation to the American lifestyle.

The consensus among African American women was that cultural foods that have been passed down within their families, although deemed important, needed to be modified in order to maintain a healthy lifestyle. However, most women felt this way after experiencing diet-related morbidities within their families. Both groups of women viewed their hectic lifestyles as barriers to healthy eating. They associated stress with weight gain due to frequent eating, preparation style, work schedule, and hungry children who wanted food immediately after a long day, as reasons for resorting to fast food (Bramble, 2009).

For some individuals, access to healthy food items such as fresh fruits and vegetables is another important factor associated with overweight and obesity. Limited or no access to fresh produce has become a major concern among consumers living in what is now known as food deserts (Baker et al. 2006(a); Baker et al. 2006(b)Powell et al. 2010; Rundle et al. 2009). The term, food desert, is used to describe locations deplete (or scarce) of large chain supermarkets, and which have a preponderance of small convenience stores selling high-energy low-nutrient dense food. Baker et al. (2006a) found that race and income were the two determining factors that appeared to be associated with both the location and selection of quality food outlets (food outlets that would allow inhabitants to meet the United States Department of Agriculture (USDA) recommendations). Baker et al. (2006a) and Ball et al. (2009) found that African Americans living in poverty, especially in inner city areas, were less likely to have access to grocery stores (food outlets) that would most likely enhance meeting the USDA recommendations than their higher-income White counter-parts. Access to healthy foods of good quality was therefore deemed much easier in higher income neighborhoods.

2.2.1.2 Physical Activity

Children who engage in physical activity are less likely to become overweight or obese. Tremblay et al. (2003) examined the relationship among children's physical activity, sedentary

behaviors, and body mass index (BMI), while controlling for gender, family structure and SES. They determined that children who participated in both organized and unorganized sports were less likely to be overweight or obese, compared to children who watched video games and television excessively. The amount of time spent watching television or participating in screen time activities is associated with weight status. Reilly et al. (2005) found that children who spent more than eight hours per week engaging in screen time activities at age three were more likely to be obese at age seven (Reilly, 2005). Currently children on average spend roughly 7.5 hours a day engaging in screen time activities (White House Task Force on Childhood Obesity, 2010), which means that adolescents are primarily involved in sedentary activities. Ruiz et al. (2011) conducted a cross-sectional study measuring both physical and sedentary activity behaviors of adolescents from nine European countries. Ruiz et al. (2011) found that boys (56.8%) were more likely than girls (27.5%) to meet the recommended 60 minutes of physical activity a day. They determined that adolescents spent 71 percent of their time (9 hours per day) engaging in sedentary behaviors.

Troiano et al. (2008) assessed physical activity levels of children from ages 6 to 9 years, adolescents from ages 12 to 19 years, and adults. They noticed a decline in physical activity levels between childhood and adolescence and discovered that only 42 percent of children between the ages of 6 and 12 years were meeting the recommendation for 60 minutes of physical activity a day within the US. Males across all age groups were more physically active than females. Lee et al. (2009) reported that obese females who engage in more physical activities in adolescence were less likely to remain obese into young adulthood. In addition, they found that adolescents whose families experienced poverty were engaged in insufficient levels of physical activity and inadequate amounts of sleep, and were at an increased likelihood of becoming obese.

Physical activity during childhood improves lipid profiles, insulin sensitivity, self-esteem, self-concept and reduces weight, (Hansen, 1991; Hagberg, 1984; Roberts, 2003; Calfas, 1994; Rashid, 2000; LeBlanc et al. 2006). Physical activity has also been shown to have a positive impact on academic performance and cognitive functioning (Tremblay et al. 2000; Chomitz et al. 2009; Trudeau et al. 2008,). Reed et al. (2010) provided evidence that movement can influence intelligence and should be considered to promote cognitive development of elementary-age children. However, schools have struggled over the years to maintain adequate physical activity programs. Some contributing factors are unsatisfactory infrastructure, lack of equipment, inadequate financial resources, poor attainment of the goals set, low qualification of teachers, over-sized classes and other problems (Tremblay et al. 2000). Research has shown that overweight and/or obese children are at a greater risk of being absent than normal weight children (Geier et al. 2007). Trudeau et al. (2008) suggested that schools can increase physical activity by promoting community child supervision, encouraging children to actively commute to school, and providing exercise equipment. School programs are finding alternative ways to engage students in physical activity on a limited budget. Nelson et al. (2011) examined the heart rate activity of fifth grade children engaging in different methods of dance during physical education. They found that dancing elicited moderate cardiovascular response, 124.4 beats per minute (bpm)-143.4 bpm depending on the dance activity. Energy expenditure is vitally important in balancing energy intake.

Screen time is defined as the amount of time one spends on a computer, watching television, or using game consoles (Oxford Dictionary, 2011). Within the United States, children spend on average 7.5 hours per day engaged in screen time activities. Hands et al (2011)

concluded that "reducing screen time, increasing physical activity participation and preventing early adiposity before 6 years is critical in developing positive behaviors for the maintenance of healthy weight and prevention of future obesity." Therefore, encouraging physical activity and reducing screen time activity is vitally important in reducing the prevalence of obesity across all generations.

2.2.2 The Environment

2.2.2.1 Household

The environment in which a child is raised has a major impact on childhood and adolescent weight status. The family environment is key in early childhood development. Activity preferences, food intake patterns, and eating habits are formed during early childhood. In the home environment, children are more likely to form good dietary eating habits and maintain healthy weight if breakfast is eaten daily, consumption of energy dense foods is limited, eating proper portion sizes is exercised, screen time is reduced to less than two hours per day, and physical activity is incorporated as a part of daily activity (Niemeire et al. 2009, Toschke et al. 2011, Aggio et al. 2012, Giddings et al. 2005). Miller et al. (2011) found, that children (kindergarteners) who ate more breakfast at home with their families, received more hours of sleep, and in addition spent more time (minutes) in recess, had BMIs that grew more slowly over time, than children whose mothers worked many hours outside of the home, ate both breakfast and lunch at school, and engaged in more screen time (television viewing).

For adolescents between the ages of 8-12, "long-term family-based behavioral weight control programs" have been successful in weight reduction for the most part (Luttikhuis, 2009; Wilfley, 2007; Young, 2007, Sato, et al. 2010). Sato et al. (2010), who based a behavioral weight control

program on the 1977 Social Learning Theory by Bandura, found parental weight loss to be a better indicator of child weight loss, since adolescents successfully lost weight when their parents also lost weight. Sato et al. (2010) found parental BMI to be the only significant independent predictor of adolescent BMI change, suggesting the importance of parental weight loss management in adolescent weight control. The authors concluded that parents who self-monitored were more likely to make healthier changes at home, and as a result of "environmental changes," adolescent weight loss was supported. This is of relevance since Neumark-Sztainer et al. (2003) found frequency of family meals to be positively associated with intakes of fruit, vegetables, grains, and calcium rich foods, and negatively associated with consumption of sugar sweetened beverages. Sato et al. (2010) also expressed that the firm and more supportive authoritative parental style (that could potentially be associated with adolescent BMI status over time) exhibited by parents who self-monitored their own weight status, may be in part due to perspectives gained as a result of undergoing the challenge of having to self-monitor.

"It is also possible that parents who self-monitored may have gained a perspective regarding the challenges of self-monitoring, which may have helped to facilitate a more supportive yet firm parenting style (i.e., authoritative), which could play a protective role for adolescents BMI over time (Berge et al.2010)."

The family environment, which includes the family structure, also plays a role in the rate of obesity seen among children (Chen et al. 2010). Chen et al. (2010) found that children living in a single maternal parent household without siblings were at a higher obesity risk than children living within a two parent household with siblings (Chen et al. 2010). Gundersen et al. (2008) found the risk (likelihood) for childhood overweight and obesity was also high for the majority of children living in food insecure households with mothers who experienced stress within the United States. Affordability of food items is associated with obesity. Since foods high in sugar and fat are cheap and readily available, it has been shown that low-income families are more likely to purchase lower cost fats and sweets as well as alcohol (Basiotis, 1998; Drewnowski, 2003; Wilde, 2000). Participants in the Food Stamp Program (FSP) reported that the price of food was highly considered in the purchasing of food items, as well as the choice and preparation of the food to maximize satiety (Basiotis, 1998).

2.2.2.2 Location of the Residence

The environment where one lives can have an influence on the availability and type of foods consumed. This is also true with regard to the amount of physical activity. Glanz et al. (2007) more specifically described the nutrition environment as the area surrounding a designated location where a consumer purchases food, which is jointly affected by product availability, cost, and quality of the produce. Food deserts as described in section 2.2.1.1 are characterized by locations in which healthy food options are either not available, of poor quality or expensive (relative to the population's income). These areas are often times awash with liquor and convenience stores. The convenience stores located within these areas primarily sell low-nutrient energy dense foods, which are typically high in fat, sugar, calories, and sodium. These areas could hence also be described as obesogenic environments because of the association with poor diet quality and obesity (Turrell et al., 2002; Larson et al, 2009).

For inhabitants living in food deserts, the commute to a major chain grocery store can take anywhere from an hour (or more) one way. Therefore, inhabitants of food deserts are typically restricted to purchasing immediate need food items from local convenience stores.

Morland et al. (2002) found that fruit and vegetable intake increased by 32% among African American women, who shopped at a supermarket and/or specialty store versus shopping at an independent grocery (Moorland et al. 2002).

2.2.2.3. School

It is well understood that a child's eating habits are influenced by food that is available within their immediate environment, such as the home and school (Story, 2009). The school environment therefore, has been recognized as an important venue for conducting interventions targeted at achieving a healthy lifestyle due to the amount to time children spend in school, its versatility, and access to large numbers of students, including students from ethnically diverse backgrounds. The school environment fosters learning and social development through teacher and student modeling. Intervention strategies can be incorporated into the curriculum, providing the opportunity to reach a large student body population repeatedly over time.

Results of the Third School Nutrition and Dietary Assessment (SNDA-III) survey showed that daily food offerings in schools did not fully support a healthy diet for children and adolescents. On average, diets tended to be high in low nutrient, energy dense foods (Cullen and Thompson, 2006). Food items such as salad dressing, condiments, french fries, pizza products and burgers were high in total and saturated fat (Crepinsek, 2009). The most notable food groups missing for the diets of children were whole grains, fruits and vegetables, and milk products such as non-fat or low-fat (USDHHS, 2005). SNDA-III did however, find that children who participated in the National School Lunch Program (NSLP) consumed more nutrients at lunch than those children who did not participate. NSLP participants consumed more protein,

vitamin B-12, riboflavin, calcium, phosphorus, potassium, and zinc than non-participants (Story, 2009).

Children within the majority of schools across the United States have access to a la carte foods and vending machines that offer competitive food items such as sweetened beverages as well as salty and sugary snacks. Schools often rely on the sale of a la carte and vending machine items as additional revenue to support school programs. Fox et al. (2009) reported that 40 percent of school children consumed at least one or more competitive food items during the course of the school day. Briefel et al. (2009) reported that 68 percent of school children consumed sugar-sweetened beverages from both vending machines and choices in the cafeteria (a la carte). Twenty-five percent of children consumed sugar sweetened beverages at school and 55 percent consumed them at home. Fox et al. (2009) concluded, that "limiting children's access to low-nutrient, energy dense foods at school may be a promising tactic for reducing children's total caloric intake." In elementary schools, where French fries (or similar potato products) and dessert items were offered in subsidized school meals, more than once per week, the likelihood of a rise in obesity rates was significantly higher (Fox, 2009). Story proposed that comprehensive strategies be put into effect to reduce low nutrient, energy-dense food and beverages at the school for population-based obesity prevention in an attempt to reduce the total energy intake of children. Immediate changes in the school environment unfortunately will not occur overnight. Regulations put in place will expedite the process as research begins to demonstrate how changes made to the school environment improve overall diet and physical activity behaviors.

It was not too long ago in 2005, when the majority of schools across the United States began to cut physical activity programs as well as others due to overwhelming budget cuts and

governmental emphases on science, math, and English (No Child Left Behind Act) (Noffsinge, 2005). However, the rising rates of obesity within the United States could not be ignored and as a result, the government has not made it mandatory that schools receiving federal funding from e.g. the national school lunch program provide wellness programs that include both nutrition education and physical education. Physical activity requirements are often implemented through recess, physical education, and intramural sports and has been reported to improve student focus, physical activity participation, awareness of healthy habits, alertness and enjoyment (Evenson et al. 2009). Some common challenges faced among schools regarding the implementation of physical activity/education policies for elementary and middle school students were reports of insufficient time through the school day (49 to 53 percent), lack of teacher participation (24 to 26 percent), and concern regarding the amount of time spent engaging in physical activity versus academic pursuits (20-15%) (Evenson et al., 2009). However, Story et al. (2009) found that physical activity environments and policies can be added to school curricula without causing academic hindrance. They found support for physical activity implementation within the school environment offered physical, emotional, and social benefits to students. However, less than half of the states within the US, require the recommended amount of physical education/activity (Story et al. 2009).

In 2007, only 25 states sponsored policies that supported physical activity promoting activities (Story et al. 2009). Four percent of elementary schools and 8 percent of middle schools were meeting the requirements for the daily recommendations for physical activity (Lee et al. 2007). Taylor et al. (2011) found that each additional 10-unit increase in playground facilities was associated with 3.8% more activity overall (counts/minute) among children and 7.5% more moderate vigorous physical activity (MVPA) over the course of a day. In addition a 3.2%

increase in overall activity (counts/minute) and 8.3% more MVPA was observed during recess only, indicating that the number of permanent playground facilities in the school is associated with higher physical activity. Therefore policy makers could have a vital role in enhancing opportunities for much needed physical activity in schools and likely also in communities.

2.2.2.3.1 Parental participation in schools

Parental participation in schools has been an underlying issue among both teachers and researchers. Due to their time constraints and demanding time schedules it has been particularly difficult to engage parents especially of minority school-age children to participate within the schools. Besides the regular Parent Teacher Association members, who are typically white and middle-class (Kim, 2009), minority parental participation within schools is low. This could be attributed to barriers such as language, difference in child rearing beliefs or practice, education level, low socioeconomic status, low self-esteem, physically demanding jobs, lack of social networking, and negative previous school experiences (Kim, 2009). The lack of "visible" participation of minority and low income parents within schools cannot be assumed to be a lack of devotion towards their children's education. Kim (2009), posed an argument that, schools play a role in the lack of involvement by minority parents within the schools. Some of the reasons listed were the school's friendliness and the initiation of positive communication, the diversity of parental involvement programs, and school policies (Kim, 2009). Other factors that should be considered are the parents' work hours or availability.

Parents of low SES often work long hours decreasing their access to schools during normal business hours. Researchers should acknowledge some of the perceived barriers by both parents and school administrators that affect minority and low income parental participation

within schools, and find effective ways to encourage participation of these parents and parents overall. In terms of capacity, some schools are more equipped than others in their ability to train employees to reach out to parents and increase engagement programs offered by school. (Kim, 2009; Moles, 1993). Efforts made by the schools to build effective communication between the two parties (parents and schools) to reduce some of the aforementioned barriers will enhance efficacy of school-based interventions.

2.2.3 Socioeconomic Status

Obesity is often reported as being associated with socioeconomic status. Socioeconomic status (SES) is categorized into three groups (high, medium and low) and encompasses educational attainment, income, occupation, and social status (American Heritage Dictionary, 2005). Educational attainment over the years has been established as a good predictor of SES (Lareau, 2003; Strenze, 2007). Higher educational attainment is usually associated with higher income. Likewise, the higher the education level, the lower the reports of health complications (American Psychological Association, 2007). Hence, those individuals who have obtained professional and doctoral degrees have lower incidences of health complications than those individuals who obtained a high school diploma or less (American Psychological Association, 2007).

Differences typically seen in low-income families in comparison to families of high SES are the tendency to live from day to day and focus on immediate needs versus future unforeseen needs. Families of higher socioeconomic status tend to better meet their immediate needs, as well as establish excess wealth and luxuries to pass on to subsequent generations (Conley, 2001). Socio-economic status differences also tend to be evident interracially. According to Thomas

Shapiro, (in his book entitled Hidden cost of being African American, 2004) the differences that we see in the SES gaps are due to savings income differences.

"African Americans are unable to participate in savings and its associated wealth because their gross income is significantly lower than their white counterparts along with their rate of inheritance. The amount of income one inherits can make a huge difference in their economic placement status. Economic status also plays a role in housing, education and employment discrimination."

However, this might not necessarily pertain to African Americans specifically, but for low SES populations in general. Slominski et al. (2011) conducted a longitudinal study that spanned 30 years and described adolescent mental health as a predictor of educational attainment, and subsequently adult occupational attainment. The cycle seems continuous; families of low-economic status are often unable to provide their children with academic support, and this is in part due to limited financial resources and/or time. We now know that disparities seen in education among low-socioeconomic groups transpire into occupational attainment, which later affects health status (Slominski et al 2011).

Food insecurity is often seen among low-socioeconomic groups. In 2007, the USDA reported that 8.3 percent of households with children were food insecure (Nord, 2009). The USDA reports, that out of the 8.3 percent, 0.8 percent of the households with children were in the very low food security category. This means that children were not receiving regular meals (Nord, 2009). Widome et al. (2009) found that dietary eating patterns of food-insecure youth differed from those who were food secure. Food insecure youth reported eating less family meals and breakfast per week, and reported eating more fast food than food secure youth. Food insecure youth also had higher intakes of fat than their food secure counterparts. Although they

reported similar benefits of healthy eating, food insecure youth reported higher aversions to healthy food due to taste (Widome et al. 2009), possibly a function of unfamiliarity.

Children of lower SES are also more likely to have a sedentary lifestyle and a high BMI index as are adolescents (Newacheck et al., 2003; Chen et al., 2010; Gundersen, 2008; Eagle, 2012). This could most likely be a result of insufficient neighborhood resources and healthy food accessibility. According to Currie's study, poor children overall had higher reports of poor health in comparison to their non- poor counterparts (Currie, 2009). Lee et al. (2009) found that 14% of female children who reported being in poverty or on welfare were obese adolescents compared to 9% of children who never experienced poverty or welfare. For female children, adolescent neighborhood poverty and low parental education were both indicators of obesity in adulthood (Lee et al. 2009).

2.2.4 Beliefs and Attitudes

In some cultures, for example Latinos and African Americans, being slightly overweight is not only widely accepted, but often praised and encouraged. "Thick" or "healthy" are terms used to describe the weight status of those who, according to Western perception, might otherwise be perceived as overweight or obese (James, 2008). Redsell et al. (2010) interviewed 38 parents (12 of whom were overweight and 8 were obese). Parents within this study admitted to feeding their children every time they fussed or cried. Food was implemented as a security blanket, mechanism of comfort, and reward in some cases by parents from infancy because they perceived hunger to be a major problem. This might have resulted in excess calorie intake and overweight.
He (2007) conducted a study in Canada among low income elementary school students and their parents. He found that 38% of parents incorrectly identified their children's weight status and, as long as their children were physically active and maintained "a good appetite" they did not perceive the children as being overweight. Parents were more concerned about their children being underweight; when in fact their children were normal or overweight. Booth et al. (2009) found that Hispanic parents were concerned about school-age children being overweight, but were reluctant to address the issue with their own children. Instead they preferred issues regarding overweight and obesity be addressed by healthcare practitioners (not friends or other professionals), or externally by restricting marketing to children, providing education for parents, providing more opportunities for physical activity and access to healthy food. They thought that the school should play a positive role in eating and physical activity, but should not have control over what food items were brought into the home.

Parents who choose to remain unreceptive to recommendations concerning their children's health status are placing their children at a higher risk for developing chronic disease. Monitoring dietary intake and physical activity are well established methods to prevent and reduce the risk for acquiring chronic disease (UDSDA, 2010). However, if parents are not open to developing good habits for their child during childhood, it is likely that children will continue unhealthy dietary and physical activities into adulthood. Behavior changes initiated by the entire family have been shown to be more successful than behavior change targeting one individual (Sato et al. 2010). Thus, if parents do not see the need for change, then interventions focused on children are at an even higher risk of being unsuccessful long-term.

Kelly et al. (2011) assessed the racial differences seen in body dissatisfaction and image

among 6-11 year old girls and found that perceptions of body dissatisfaction did not differ between African Americans and Caucasians. Most girls in both racial groups underestimated their actual size, and 99 percent of girls reported ideal figures smaller than their actual body sizes. However, African American girls selected a larger body image to represent their ideal body size. The authors concluded that obesity might mitigate cultural factors that protect African American girls from feelings of body dissatisfaction. Van den Berg et al. (2010) found that body dissatisfaction and self-esteem were strongly related among nearly all groups of adolescents for both boys and girls. Obesity was viewed as a sickness among obese children, and they were aware of the dietary and physical activity habits necessary to be healthy, but admitted to needing external support (Serrano et al. 2010). Serrano et al. (2010) also found that obese children were cognizant of society's acceptance of lean and slender bodies as the standard of beauty. They attributed their low self-esteem to body image, and reported feelings of guilt that at times caused them to socially isolate themselves (Serrano et al. 2010).

2.2.5 Maternal/ Parental Influences

It is still uncertain to what extent parental involvement and weight loss predicts weight loss success in children. However, previous studies have indicated that parental involvement is associated with greater weight loss among school-aged children (Kitzmann & Beech, 2006, Sato et al. 2010). Epstein et al. (2001) evaluated the effects of a parent focused behavioral intervention on parent and child eating changes as well as impact on weight among families with at least one obese parent. They found that over the course of one year, overweight parents and children who reduced their intake of high-fat/high sugar foods and increased fruit and vegetable

consumption lost a considerable percentage of weight in comparison to the parent and child pairs, who only decreased their consumption of high-fat/high sugar foods.

Obese children are more likely to become obese adults; and that risk increases for obese adolescents (Guo, 2000; Sato et al., 2010). Maternal obesity is a highly correlated predictor of childhood obesity, along with income, and living in a single parent home (Strauss, 1999; Hediger et al. 2001). If a mother is overweight the likelihood of the child becoming overweight triples; and quadruples if the mother is obese (Hediger et al. 2001). It appears as though the pattern of maternal obesity increasing the odds of female adolescents remaining obese into adulthood is particularly strong for females (Lee et al. 2001). Parental eating behaviors/practices are often directly reflected in the weight status of the children.

Taveras et al. (2010) assessed early childhood risk factors for obesity. The objective was to find associated risk factors for obesity from the prenatal period through 4 years of age. The investigators found that children were more likely to become obese if their parents experienced higher rates of depression during pregnancy, introduced their children to solid foods before 4 months of age, had higher rates of maternal restrictive feeding practices, had higher intakes of sweetened beverages and fast food, and allowed children to have a television in their room by age 2. A study conducted by Jouret et al. (2007) in France, assessing factors associated with preschool aged childhood obesity found that "children being overweight at the age of four was associated with gender (female), an overweight mother, and diabetic grandparent." Interestingly there were no significant associations with gestational age and overweight or obesity. However, children who were overweight at 9 to 12 months, were at an increased risk for being overweight.

that boys who were overweight consumed higher fat and energy foods compared to their nonoverweight counterparts.

Rosenkranz et al. (2011) evaluated the relationship between parenting behaviors and physical activity to child weight status. The study determined that maternal encouragement for child physical activity positively related to physical activity and child's weight status (Rosencrantz et al. 2011). There was a negative correlation between mother-child shared physical activity and child's weight status.

2.3 Implications of Childhood Obesity

"Childhood obesity increases the risk of metabolic, cardiovascular, and respiratory comorbidities as well as psychosocial outcomes which include impaired quality of life, decreased self-confidence, and social interactions (Weiss, 2004; Zeller, 2006; Sato et al. 2010)". Nearly 147 billion dollars per year is spent on obesity-related co-morbidities (Hammond, 2010).

Obesity contributes to 26 million deaths per year and about 22 million children under the age of five were overweight according to the 2005 World Health Organization (WHO) Global report (World Health Organization, 2005). Lee et al. (2009) indicated that Black and Hispanic females are more likely to stay obese from adolescence into adulthood. This puts minorities at a larger disadvantage since Lee et al. (2009) also found that the odds of staying obese from adolescence into young adulthood was 70% if the adolescent lived in poverty or received welfare during adolescence in comparison to those who had not experienced poverty or welfare (the trend was particularly strong for females.)

First Lady Michelle Obama in February 2010, announced the initiation of *Lets Move*, a national campaign set forth to target childhood obesity with the hope that our current generation

of youth will reach adulthood at healthier weights (United States. White House Task Force on Childhood Obesity, 2010). *Let's Move* is a comprehensive, collaborative, and communityoriented campaign that includes strategies to address both individual and environmental factors that lead to childhood obesity. Leaders in government, medicine and science, business, education, athletics, and community organizations have been engaged in promoting a uniform message to increase fruit and vegetable consumption along with physical activity.

Obesity is just as much a major health concern as the fight against under-nutrition worldwide. Interestingly enough, they are juxtaposed affecting all age groups (WHO, 2012). Women in general are known to have higher rates of obesity, and males have higher rates of being overweight (WHO, 2012). Overweight and obesity are equally detrimental to long term health such as diet-related non- communicable diseases: diabetes mellitus, cardiovascular disease, hypertension, stroke and cancer as mentioned earlier (WHO, 2012). Therefore, it was concluded that if effective interventions are not conducted, we are at serious risk of the next generation dying prematurely or living a life plagued by debilitating chronic conditions that reduce the quality of life (WHO, 2012).

2.4 School Based Interventions

2.4.1 PE-Nut (Physical Education and Nutrition Working Together) Program

School based interventions are designed to bring about health awareness that will inform students of healthy food alternatives and the importance of physical activity. By setting the stage for promotion of healthy food and physical activity, school based interventions provide an environment conducive for optimal student learning. In an attempt to combat the childhood obesity epidemic within Michigan, the Physical Education and Nutrition Education Working Together (PE Nut program), funded by the USDA and the Michigan Nutrition Network (MNN) of the Michigan Fitness Foundation (MFF), was initiated. PE-Nut is administered in over 400 low-income schools, throughout the state of Michigan.

The concept of the intervention program was developed with the notion that in order to prevent obesity, it is critical that children not only receive sound physical education (Exemplary Physical Education Curriculum (EPEC)), but nutrition education as well. The objective of PE-Nut is to foster a positive change in students' food choices, physical activity, and knowledge of nutrition. Each school is provided with an outside nutrition educator, who teaches lessons from the Healthy Classroom, Healthy Schools curriculum (HCHS). The main focus of HCHS is to transform the classroom (school environment) into a place where students and staff members can learn and practice healthy eating and physical activity habits that will lead to a healthier lifestyle. HCHS also increases opportunities for children to make healthy choices and be physically active. Each lesson includes a nutrition activity, tasting experience, physical activity break, and family letter. The goal is to encourage positive lifestyle behavior practices.

Classroom teachers are given resources and support from outside nutrition educators, and regional coordinators as well as receive training on how to supplement lessons taught by the nutrition educator; using physical activity breaks (known as Fit Bits) and reading books with nutrition themes as a part of their language arts (Health Through Literacy). Health Through Literacy, consists of nutrition themed books provided by PE-Nut as part of the classroom component reinforcement tools. Each book is provided with a tip sheet that initiates discussion, activity, and food tasting ideas to enhance the health message and make connections to math, social studies, science, and language arts. At least one teacher from each school attends a training

session to learn about the goals of PE-Nut and how to complete monthly logs of activities implemented.

The physical activity component of PE-Nut uses the Exemplary Physical Education Curriculum (EPEC) (Michigan Fitness Foundation, 2006). EPEC is an award winning physical education curriculum that teaches standard based physical education, which incorporates nutrition messages. Physical educators are trained in EPEC and attend annual meetings. PE-Nut also provides take home material to connect with parents and inform them of what their child is learning.

The PE-Nut program is based on the Ecological Model and involves four tiers: the individual, classroom, school environment, and community that also includes parents/guardians. At individual level, students learn how to improve their own eating and physical activity habits by taking part in the Healthy Classrooms, Healthy Schools curriculum and engaging in structured physical activity lessons (Michigan Fitness Foundation, 2006). At the classroom level interpersonal groups, are used to encourage more healthful behaviors among peers, information sharing, and support needed to make good nutrition and physical activity choices. By guiding students and teachers through the process of assessing their current classroom and school environments, both students and teachers are motivated to make changes that support healthy eating and physical activity. At community and family level, it is expected that support and expansion of what is learned in the classroom occurs. Therefore, the intervention, which begins within selected classrooms, serves as a model for peers, family members, school administrators, policy makers, and community leaders.

During the 2008-2009 academic year, PE-Nut presence within the schools was shown to have a positive effect on children's food choices and nutrition knowledge. Approximately 21,138

students across the state of Michigan were involved, 68% of whom were eligible for free or reduced lunch. Eighty-two percent of 1,682 children, who completed a survey, agreed that they were "pretty smart about healthy foods", 82.1 percent "Liked most fruits", 72.7 percent reported they ate "a lot of different foods", 81.7 percent reported trying new foods, and 87.1 percent reported being physically active on a daily basis. In conclusion, children were willing to try new foods introduced through PE-Nut and discuss them with their parents. While these preliminary findings are encouraging, they are not sufficiently comprehensive to assess dietary quality, actual PA or child risk for overweight and obesity in this vulnerable population, and hence the additional justification of need for such a program. Therefore, the current project addressed this important task.

2.5 Conceptual Foundation for Research

We currently understand, as aforementioned in the above literature review, that there are multiple factors that affect obesity and health, such as socioeconomic status, food access, personal beliefs, cultural norms, the environment, knowledge, and support. Individuals are influenced by the environment which might subsequently impact behavior. Therefore each of these factors are never independent of one another, but can be grouped as individual, environmental and behavioral. How these three factors (individual, environment, and behavior) interact among each other needs to be further understood. For example, what low income African American children and their parents perceive as impeding and/or facilitating healthy eating and physical activity behaviors will allow us to better target interventions specifically to their needs.

Quantitative data is more readily available and strongly suggest that there is just cause for concern for the low income and/or overweight/obese African American community in relation to

health, and that there are external factors that increase health risk. Thirty-seven percent of African American males 20 years or above and 51 percent of African American women 20 years or above within the United States are obese (National Center for Health Statistics, 2010). Approximately 39% of males and 44% of African American women suffer from hypertension within the United States (National Center for Health Statistics, 2011). Nineteen percent of the African Americans reported not having health insurance coverage (Adams et al. 2010). This report is of great concern especially since the leading cause of death among African Americans is heart disease, cancer and stroke (Heron, 2010). In 2007-2008, 19.9% of children between the ages of 6-11 were obese. Roughly 20% of boys (19.8%), and 29.2% of African American girls were obese (Ogden, 2010). The National Center for Health Statistics Report (2011) showed that among children 1-14 years of age, cancer was the second cause of death and heart disease was the fifth leading cause of death in the year 2007 (Xu, 2010). Heart disease accounts for 4% of all deaths related to children between the ages of 1–14 years old (Xu, 2010). However, the manner in which external factors influence the African American population and the best method to offer support is still not clearly understood. Gaining the perspectives of African American children and their parents will give us a better understanding of how to better provide support.

To accomplish this, the current study encompassed and attempted to explain both the perceived barriers and facilitators to healthy eating and physical activity among 5th grade African American children and their parents who received some nutrition and physical activity intervention, using the grounded theory approach. The grounded theory places emphasis on the views, values, beliefs, feelings, assumptions and ideologies of the individual (Charmaz, 2006). It moves beyond gathering descriptive information by both generating and discovering a theory during the process. The Social Cognitive Theory accounts for environmental influences (social

norms, community access, ability to change the environment), personal factors (attitude, expectation, knowledge etc.), and behavior (skills and practice) that all play a part in the character development of human beings (Bandura, 1989). Once we address the social aspect of decision making and behavior change, we can then take it a step further and begin the process of transitioning from exemplifying previous behavior or attitudes to implementing the desired outcome or goal. This process is described by the trans-theoretical model (TTM) (Prochaska et al.2001). We used these theories and model as the foundation framework of the research process.

2.5.1 Grounded Theory

The grounded theory is a qualitative research design in which the inquirer generates a general explanation of a process, action, or interaction shaped by the views of a large number of participants (Strauss et al.1999). It provides for the generation of a theory of action interactions, or process through interrelating categories of information based on data collected from the individuals. Constructivist grounded theory places more emphasis on the views, values, beliefs, feelings, assumptions, and ideologies of individuals. The grounded theory methodology is often used in cases where the voices of an individual, group, or population have not been heard, such as in the case of the target population for this study. The grounded theory allows for the platform of thoughts, perceptions, opinions, or accepted wisdom of people surrounding an issue or subject that we would otherwise not hear from, or about.

2.5.2 Social Cognitive Theory

The Social Cognitive Theory (SCT) developed by Albert Bandura, is constructed around three chief reciprocal factors individual, environmental and behavioral as depicted in the figure 1. The environment is described as external factors and can be either a social factor, which can include family, friends and colleagues; and/or physical environments, such as a location or

community. It is also based on the theory that people learn vicariously through other people (modeling of behaviors and mimicking activities) (Bandura, 1989; Bandura, 1977). At the individual level, the theory includes self-efficacy (the belief in one's ability to accomplish a task) and self- regulation (development, commitment, and actual implementation of a goal and the plans to attain the goals) as factors that influence personal motivations and actions (Bandura, 1989; Bandura, 1977). Behavioral considerations include incorporating desired behavior outcomes into routine practice, which would be for example for the purpose of the current study practicing healthy eating and physical activity behaviors on a daily basis (Bandura, 1989; Bandura, 1977).



Figure 2.1 Research Components based on the Social Cognitive Theory

Bandura's SCT also places a huge distinction between, being morally competent (knowledgeable, having the capacity or ability, skills, awareness of moral rules and regulations, and cognitive ability to construct behaviors) and morally performing (Bandura, 1989; Bandura, 1977). He describes moral competence as having the ability to perform a moral behavior, and moral performance is the act of doing the moral behavior within a specific situation (Bandura, 1989; Bandura, 1977). Moral performance is further described as being influenced by rewards and incentives. Bandura's SCT also includes observation and modeling as key learning components. Observation aids in both learning and knowledge acquisition. He believed that modeling enables one to acquire basic rules and strategies for dealing with different situations and can be exemplified through intrapersonal modeling through the use of media.

2.6. Gap in the Literature

In order to reduce obesity, diet-related co-morbidities, and physical inactivity among child intervention programs need to initiate change within the family, classroom, community and school environments collectively. There is a need, therefore, to determine effective ways to positively influence children and their families (especially those from low SES communities), who are at higher risk for diet and physical inactivity related co-morbidities, to not only implement, but also sustain healthier dietary and physical activity behaviors. Among schoolchildren, it is *critical* that the family, community as well as the overall school environment be addressed.

Public health professionals need to increase the efficacy of their efforts to counteract childhood obesity by understanding the barriers and motivators children and their parents face and experience (Gosling, 2008). Therefore, this study will utilize data from two sample low-

income schools with a large proportion of African American children and 1) describe the risks for overweight\obesity; 2) determine perceived barriers and facilitators of a healthy lifestyle experienced in the home and school environment perceived by children; and 3) determine perceived barriers and facilitators experienced by the parents/primary caregivers of a sample of children from two low-income elementary schools. The information gathered from this thesis will provide a greater understanding of the obesity risk (nutritional status, dietary quality and physical activity) as well as the facilitators and barriers faced by children and their primary caregivers towards healthy eating and engaging in routine physical activity. In addition, the goal is to enhance the efficacy of future school-based interventions, such as PE-Nut.

CHAPTER 3 METHODS

3.1 Study Design

The grounded theory constructivist approach was employed to guide the study design. A mixes method qualitative and quantitative design was used to assess children who completed one year of the Physical Education and Nutrition Working Together program (PE-Nut) Healthy Classrooms Healthy Schools curriculum and their parents/primary caregivers. Subject recruitment and data collection was conducted over the course of five months (February-June 2012), after obtaining Michigan State University Institutional Review Approval as well as permission from school principals and the superintendent for Ypsilanti schools, where the research was conducted. A small pilot study was first conducted to assess the study feasibility, test instruments and to determine the time needed for study data collection.

3.2 Sites

The study included two elementary schools located in Ypsilanti, Michigan. Ypsilanti, Michigan is located in Washtenaw County and has a total city population of 19,435 according to the 2010 U.S. Census data. Sixty-one percent of the population is White, 29% Black, 0.58% Native American, 3.9% Hispanic or Latino and 3.4% of Asian race (U.S. Census Bureau, 2010). There are a total of 8,026 households in Ypsilanti City, 29% of which have children under the age of 18. Nine hundred seventy-five of these households are run by single female parents, 61 % of whom have children under the age to 18 (U.S. Census Bureau, 2010). The 2007-2011 American Community Survey 5- year Estimates, reported the mean household income for inhabitants living in the City of Ypsilanti, MI as \$47,498 and the median household income for

residents with families was \$33,699 (Census Bureau 2013). According to the 2007-2011 U.S. Census Bureau State & County Quick Facts, 26.4% of Ypsilanti residents are living below the poverty index, which is 10.7% higher than Michigan's State average of 15.7% (U.S. Census Bureau, 2013). In 2009, 33.5% of the Ypsilanti population was living below the poverty line, in comparison to the state wide average of 16.2% (<u>http://www.city-data.com/poverty/poverty-</u>Ypsilanti-Michigan.html).

The two schools selected for the study share similar socioeconomic and demographic characteristics within the Ypsilanti school districts of Washtenaw County. This school district was selected due to its large population of African American low-income students.

Elementary School A of the Ypsilanti school district had a student enrollment of 414 students, in grades K-6, for the 2011-2012 academic year (Center for Educational Performance and Information (CEPIa), 2012), of which 336 (81.2 percent) were receiving free or reduced priced meals. Seventy-one percent of Elementary School A students were African American, 20% were Caucasian, 3.3 % were Hispanic, and 1.6% were of Asian or American Indian decent. Elementary school B, of the Willow Run school district, had a student body enrollment of 471 students for the 2011-2012 academic year. Three hundred seventeen (67.3%), were receiving free or reduced priced meals (CEPI, 2012b). During the 2011-2012 academic school year the Elementary School B student population consisted of 63.2% African American, 29% Caucasian, 4.4% Hispanic, and 1.4% children/students of Asian or American Indian decent.

3.3 Study Subjects

Our target population was fifth grade students who previously completed one year of the Michigan Nutrition Network's Physical Education and Nutrition Education Working Together (PE-Nut) program. The children were selected from participating PE-Nut classrooms. Eligible students were confirmed by administrators and PE-Nut nutrition educators after official permission was obtained. The primary researcher and PE-Nut educator recruited parents and students through flyers (see Appendix C) and take home packages. Each recruitment package contained a flyer, which provided brief information regarding the research and study eligibility and a consent form (see Appendix D) explaining the purpose of the study and its confidentiality. In addition, parents were recruited through school-wide events hosted by the school for parents and children. Parents were asked to complete the consent forms and return them to their children's homeroom teacher.

One hundred and five students and parents were recruited to participate in the study. Of the one hundred and five students, seven students and one parent agreed to participate from Elementary School A and twenty children and eleven parents from Elementary School B. Data collection continued within these two groups (parents and children) until qualitative data saturation was reached. It was estimated that twenty-four parents and forty students would be necessary for the completion of the study. However, data saturation was reached at twenty child and eight parent participants.

3.4 Procedures

Prior to the initiation of the study, meetings were held with both the Michigan Fitness Foundation/ Michigan Nutrition Network Staff and representatives of each elementary school

from the Ypsilanti Public School district. Letters supporting the involvement of the research study were obtained from each of the participating elementary school principals and the superintendent. Ethics approval was obtained from Michigan State University Institutional Review Board (IRB) (Appendix A). Recruitment packages were then distributed to the one hundred-five eligible participants within participating 5th grade PE-Nut classrooms. Consent forms (Appendix D) were to be signed and returned to their homeroom teacher within one week of its dispersal. Returned consent forms were then collected from each participating 5th grade PE-Nut classroom located within Elementary Schools A and B prior to the start of the midwinter break during the month of February 2012.

Parents who agreed to participate in the study were contacted by phone and through take home letters. An appointment was scheduled by the primary researcher to participate primarily in a focus group discussion, or when deemed more appropriate, an in-depth telephone interview. Data collection began during the month of March 2012 with a small pilot study consisting of four child participants. Data collection techniques for the children were subsequently adjusted to take place over the course of two days instead of one to reduce the respondent burden and increase involvement. On day one, the interviewer who was collecting data identified children whose parents had signed the consent form and obtained the child's written assent (Appendix D) by reading the assent form to the child and then asking him/her to sign. On day one, after assent was obtained, the interviewer collected data from the child which included 1) socio-demographic, family history and physical activity information, 2) a 24-hr dietary recall and 3) anthropometric assessment. On day two, children completed 1) an in-depth qualitative interview, which was audio recorded and 2) a second 24-hour dietary recall. Children were provided with school supplies valued at \$20 as an incentive upon completion of all three parts of the data collection

Parents were contacted by telephone and take home letters to schedule focus group appointments. Focus groups for parents were held at corresponding elementary schools during the evening. Once scheduled, each parent completed a survey questionnaire, Block Brief 2000 Food Frequency Questionnaire for Adults (Block G et al. 1990, NutritionistQuest, 2013) and engaged in the focus group. Parents who were unable to attend the focus groups due to scheduling conflicts were asked to participate in an over the phone in-depth interview.

Over the phone interviews occurred in two steps. Parents first completed the qualitative in-depth interviews, which were audio recorded verbatim. Parents were then asked to schedule a date and time to complete the survey questionnaire and Block Brief 2000 Food Frequency Questionnaire for Adults. The investigator subsequently contacted and completed both the Block Brief 2000 Food Frequency Questionnaire for Adults and survey questionnaires with the parent over the phone. Parents were sent \$20 grocery store gift certificates as incentives via certified mail after all the necessary data were obtained.

3.5 Instruments

Both descriptive data describing the study sample demographics and qualitative data of 5th grade students in the Ypsilanti Community School District and their parents/primary caregivers were assessed. The qualitative interviews assessed individual knowledge influences that the home, school and neighborhood environments as well as behavioral factors that may have an impact on healthy eating and physical activity behaviors.

3.5.1 Child Assessments

3.5.1.1 Child Survey Questionnaire

The interviewer assisted survey questionnaire (Appendix E) incorporated several components, which addressed socio-demographic information, physical and sedentary activity behaviors, food security, dietary intake patterns and anthropometric assessment.

3.5.1.1.1 Demographic

Demographic questions obtained from children included but were not limited to age, gender, ethnicity, family history, total number of individuals living in a household and parental marital and employment status.

3.5.1.1.2 Physical Activity

Physical activity questions were adapted from the School Physical Activity and Nutrition Project SPAN (Hoelscher et al. 2003). Physical activity questions were used to assess the physical activity behaviors of the study participants. In addition, the adapted physical activity questions from SPAN addressed sedentary behaviors as well as weight perceptions and potential barriers such as being teased or bullied, which might cause children to be more reclusive and not actively participate in group activities with their peers such as physical education or recess (Parrish, 2012).

3.5.1.1.3 Food Security

The USDA's September 2006 *Self-Administered Food Security Survey Module for Children Ages 12 Years and Older* was adapted and used to descriptively assess the child's perceptions of food security and gain from a child's perspective, their impressions of the household food security environment.

3.5.1.1.4 Dietary Assessment

Two twenty-four hour dietary recalls were collected, using the USDA standardized procedures (Blanton, 2006; Moshfegh, 2001; Moshfegh, 2008), with the use of food models. Investigators were also equipped with monthly school menus to verify reported items. The twenty-four hour dietary recalls were typically collected within one week of each other capturing usual dietary intake that reflected both weekday and weekend food intake. Information from the 24-hour dietary recalls was collected to provide dietary quality information and used to generate a HEI index score (Guenther et al. 2008).

3.5.1.1.5 Anthropometric Measurements

Student heights, weights and waist circumferences were measured privately by the primary researcher and/or one of six trained associates in a private location at the schools provided by the school administrators.

3.5.1.1.6 Qualitative Interviews

Once the descriptive demographic survey was completed (Aim 1), children were asked to complete an interviewer assisted in-depth open ended qualitative interview to determine from their perspective, the facilitators and barriers to healthy eating and physical activity within the school and home environment (Aim 2). The qualitative interview guide that was developed incorporating questions from the DEAL DiEt and Active living Study survey instruments (Maynard et al. 2009). Each child was interviewed in a private place such as individual room or

private section of the library designated by the school. In-depth interviews from 17 students were analyzed, and from those seventeen interviews, thirteen additional students were asked to complete a second series of open-ended in-depth qualitative questions, which further expounded on the theme concepts generated from the first series interview responses. This information was used to construct the hypothesis and the basis of our grounded theory, regarding children's perceptions of perceived barriers and facilitators to healthy eating and physical activity encountered within the school and home environment. Interviews were audio recorded and transcribed verbatim by trained undergraduate research assistants.

3.5.2 Parent Assessments

3.5.2.1 Parent Survey Questionnaire:

The survey questionnaire included demographic information as well as the Family Nutrition & Physical Activity questions which aimed to assess environmental and behavioral factors of the family, which may influence weight status (Ihmels et al. 2009). Additional questions regarding physical activity and dietary behavioral factors of both the family and child were also addressed (Appendix F).

3.5.2.1.1 Brief Block Food Frequency Questionnaire:

Once parents completed the parent questionnaire, they were also interviewer assisted to complete the Block Brief 2000 Food Frequency Questionnaire for Adults (Block G et al. 1990, NutritionistQuest, 2013), which assessed the parents' usual dietary intake over the course of one year.

3.5.2.1.2 Focus Group/ Phone interviews:

Focus groups were conducted at the participating schools. The interview guide incorporated questions from the DEAL parental qualitative interview guide (Maynard et al. 2009). In the event that parents were unable to attend the focus groups, they were given the option of participating in a phone interview. The interview guide asked questions concerning facilitators and barriers experienced in regards to healthy dietary intake and physical activity behaviors for them and their families based on the social cognitive theory. An open forum group discussion (n= 2) was led by the primary researcher, audio recorded and transcribed verbatim to generate central themes. From these findings and themes, new questions were generated (grounded theory) to further determine if those themes re-occurred and to provide more in-depth information concerning the themes. New parents were asked to engage in a focus group (n=2) or over the phone in-depth interview (n=7) in order to complete this aspect of data collection. This data was also audio recorded and transcribed in order to generate central themes, which were used to support or enhance the data that was obtained from the initial focus group.

3.5.3 Study participant incentives

Incentives allotted to children for their participation in the study included school supplies (pencils, pens, notebooks etc.) valued at \$20.00. The parent incentive for participation was of equal value, \$20 dollar Meijer (local grocery store) gift card.

3.6 Measurements and Variables

3.6.1 Weight and Central Adiposity

Weight status was assessed from measurements of standing height, weight, and waist circumference (to provide an indication of central adiposity). A one day training session was held for all researchers (primary researcher and 2-3 undergraduate research assistants) to reduce inter examiner error. The research team (trained in proper procedures to collect anthropometric measurements) took students in groups of 5 to be measured in a facility provided by the school. Each student removed their shoes socks and excess clothing for their standing height, weight, and waist circumference assessments, which were measured privately. All measurements were taken in duplicates (average of two measurements). Outliers were removed and additional measurements were taken if necessary.

Parents' anthropometric measurements were also done privately prior to the beginning of the focus group. Standing height and weight measurements were taken after shoes were removed. Parents, who conducted over the phone interviewers, were asked to self-report their height, weight, and waist circumferences (or pants size it they were unaware).

Body weight was measured to the nearest 0.1 kg using a calibrated electronic weighing scale (TBF-300A, Tanita, Tokyo Japan). Participants were asked to step on to the scale and wait for 3 seconds as the scale determined the correct weight.

Height was measured using a portable stadiometer (217 Seca, Hanover MD). Participants were asked to stand with their backs straight against the portable stadiometer, feet flat, and arms hanging loosely by their sides. Stature was measured at the maximum distance from the floor to the vertex of the head and recorded to the nearest millimeter. Measurements were taken in

duplicates of two. If the second measurement exceeded greater than 0.1 millimeters, a third measurement was taken.

Body mass index (BMI) percentile was calculated using the BMI-percentile "Calculator for Child and Teens English Version" found online at

http://apps.nccd.cdc.gov/dnpabmi/Calculator.aspx . Children were classified as obese (BMI- forage greater than or equal to the 95th percentile), overweight (85-95th percentile BMI-for-age), normal weight (5th - 85th percentile BMI-for age) or underweight (below the 5th percentile BMIfor-age) as per CDC guidelines (CDC, 2011). Waist circumference was measured with a nonstretchable measuring tape. Measurements were taken once (or twice if considered inaccurate) over light clothing at the highest point of the iliac crest. Anthropometric procedures were obtained from the *Anthropometric Standardization Reference Manual* (Lohman, 1991).

3.6.2 Dietary Intake

Dietary intake for children was measured using the Multiple-pass 24-hour dietary recall method (Blanton, 2006; Moshfegh, 2001; Moshfegh, 2008)). Twenty-four hour dietary recall information was collected in five steps. Participants were asked to provide: 1) a quick list (uninterrupted) list of food items consumed within the past 24-hours 2) interviewers probed for foods which may have been forgotten 3) children reported the location and time of consumption and 4) the amount/portion size of the food items consumed 5) the interviewer preformed a final probe to ensure that no food items were missed. The dietary intake data included one week day and weekend day. Food models were used to enhance accuracy of reported portion sizes (questions regarding such things as portion sizes and differences between whole and 2% milk were also addressed throughout the interviews).

Dietary intake information was gathered from the 24-hour dietary recalls and analyzed using the USDA's "What's In the Foods You Eat Search Tool" website (<u>www.ars.usda.gov/Services/docs.htm?docid=17032</u>). The "What's in the Foods You Eat Search Tool" provided the nutrient content of the foods and beverages reported, in addition to the subgroups required to conduct the Healthy Eating Index (HEI) scores.

Information gathered from both the 24-hr multiple-pass dietary recall (children) and Block Food Frequency (parents/caregivers) were used to generate HEI scores. The healthy eating index (HEI) 2005 (Figure 3.1) is a 12-component scoring system validated by Guenther et al. (2008). HEI consists of five food groups from the U.S. Department of Agriculture Food Guide Pyramid, four nutrients recommended by the Dietary Guidelines for America and an additional component assessing variety of the overall diet (Guenther et al. 2007).

For adults, the Block Brief 2000 FFQ was sent to NutritionQuest for data analysis. The nutrient content was then analyzed, in gram amounts, based on the consumption pattern and frequency (i.e. never, every day, once per week, few times per year) of a particular food item reported by the respondent.

The USDA Food Codes were identified from the "What's In the Foods You Eat Search Tool" website (<u>www.ars.usda.gov/Services/docs.htm?docid=17032</u>) and coupled with the food items reported in the Brief Food Frequency Questionnaire. Once the foods and recipes were identified and coded, the information was merged with the MyPyramid Equivalencies Database and used to generate a HEI score for each of the HEI components (Cook et al. 2004; McCullough, 2000). The five food groups assessed were grain (bread, cereal, rice and pasta), vegetables (in this case included potatoes), fruit (juice and whole fruit), milk (milk, yogurt, and

cheese) and meat (poultry, fish, eggs, nuts and dry beans). USDA's recommended intakes for girls and boys respectively for grains are 9 and 9.9 ounces, vegetables 4 and 4.5 cups, fruits 3 and 3.5 cups, milk 2 and 3 cups, meat 2.4 and 2.6 ounces. The scoring components are listed in the HEI (Figure 3.1). In addition to the food group's sodium, saturated fat and calories from solid fats alcoholic beverages and added sugars (SoFAAS) were also assessed (Guenther et al. 2008)

The USDA Center for Nutrition Policy and Promotion (CNPP) developed the Health Eating Index (HEI) to serve as a dietary quality and overall health risk indicator (Guenther et al. 2008)). Krebs-Smith et al. (2010) found that children (between the ages of 9 and 13) were not meeting the USDA plate method recommendations (previously known as MyPyramid) for total fruit (78.4%), vegetables (92%), milk (67%), grains (17%), whole grains (98%), and meat and beans (52%). Ninety-seven percent of boys and girls between the ages of 9-13 yrs were exceeding the maximum recommendations for energy and solid fats. Eighty- six percent of boys and 92% of girls exceeded the recommended allowance for added sugars. Children and adolescents between the ages of 2-18 years have an average total caloric intake of 2,027 per day. Pizza, grain-based desserts, whole milk, regular cheese, sausage (franks, bacon, and ribs), reduced fat milk, fried white potatoes, pasta (and pasta dishes), dairy desserts, and burgers were among the top ten items consumed among children 9-13 years old and key contributors of solid fats (National Cancer Institute, 2010). Soda, fruit drinks, grain-based desserts, candy, ready-toeat cereals, syrups, yeast breads, whole milk, and reduced milk were among the top 10 contributors of added sugar in the diets of 9-13 year old boys and girls (NCI, 2010a).

Key nutrients of interest included fat (saturated fat), fiber, protein, calcium, folate, potassium, the minerals iron and zinc as well as overall total energy and caloric intake. The prevalence of hypertension is particularly high among the African American population (USDA,

2010). Excessive sodium has been linked to hypertension within the U.S., and potassium is recommended by Healthy People 2010 to counteract the effects of sodium on high blood pressure as well as reduce the risk of kidney stones, and bone loss (USDA, 2010). Potassium is predominately found within fruits, vegetables, and milk. Dietary fiber intake among children and adults within the U.S. is not sufficient. On average, Americans consume 15 g of dietary fiber instead of 17-25 g per day (USDA, 2010). Dietary fiber helps reduce cardiovascular disease, obesity, and type 2 diabetes risks and can be consumed naturally from whole grains, fruits and vegetables. Dietary fiber should be consumed by adults and children regularly to increase nutrient density and regulate the gastrointestinal system (USDA, 2010). Calcium intake within the U.S. is low. Inadequate calcium intake is a concern among children (starting at 9 years old), adolescents, and adult women. Inadequate calcium intake increases the risk for osteoporosis in the future (USDA, 2010). Iron deficiency is often seen in women and young girls during puberty. Sources of iron include lean meat, poultry, legumes, white beans, lentils, spinach, and iron fortified foods (easily absorbed when coupled with foods containing vitamin C). Twenty percent of women and adolescents within the U.S are folate deficient (USDA, 2010). Sources of folate include beans, peas, oranges (and juice), dark green vegetables, spinach, mustard greens and fortified products (USDA, 2010). The current dietary intake of children is not meeting the current recommendations and as a result putting them at risk for being deficient in key nutrients and at risk for becoming overweight and obese (Kennedy, 1995). Excessive calorie intake (in the form of added sugars, fat, carbohydrates, and protein) coupled with inadequate physical activity is associated with cardiovascular disease, hypertension, diabetes, overweight and obesity seen in children and adults (Johnson et al. 2007; Krauss et al. 1996; Longo & Fontana 2010; Jebb 2004; Wadden et al. 2011; Guenther et al. 2013; Goran & Treuth 2001).

			Standard for
	Maximum	Standard for	minimum score
Component	Points	Maximum Score	of zero
Total Fruit (includes 100%			
juice)	5	≥ 0.8 cup equiv. per 1,000 kcal	No Fruit
Whole Fruit (not juice)	5	≥ 0.4 cup equiv. per 1,000 kcal	No Whole Fruit
Total Vegetables	5	\geq 1.1 cup equiv. per 1,000 kcal	No Vegetables
Dark Green and Orange			No Dark Green or
Vegetables and Legumes ²	5	≥0.4 cup equiv. per 1,000 kcal	Orange
Total Grains	5	\geq 3.0 oz equiv. per 1,000 kcal	No Grains
Whole Grains	5	\geq 1.5 oz equiv. per 1,000 kcal	No Whole Grains
Milk ³	10	\geq 1.3 cup equiv. per 1,000 kcal	No Milk
Meat and Beans	10	\geq 2.5 oz equiv. per 1,000 kcal	No Meat or Beans
Oils ⁴	10	≥12 grams per 1,000 kcal	No Oil
Saturated Fat	10	≤7% of energy5	$\geq 15\%$ of energy
			≥ 2.0 grams per
Sodium	10	≤0.7 gram per 1,000 kcal⁵	1,000 kcal
Calories from Solid			
Fats, Alcoholic beverages,			
and Added Sugars			
(SoFAAS)	20	$\leq 20\%$ of energy	\geq 50% of energy

Table 3.1 Healthy Eating Index-2005 components and standards for scoring¹

¹ Intakes between the minimum and maximum levels are scored proportionately, except for Saturated Fat and Sodium (see note 5).

² Legumes counted as vegetables only after Meat and Beans standard is met.

³ Includes all milk products, such as fluid milk, yogurt, and cheese, and soy beverages.

⁴ Includes nonhydrogenated vegetable oils and oils in fish, nuts, and seeds.

⁵ Saturated Fat and Sodium get a score of 8 for the intake levels that reflect the 2005 Dietary Guidelines, <10% of calories from saturated fat and 1.1 grams of sodium/1,000 kcal, respectively.

Source: Guenther PM, Krebs-Smith SM, Reedy J, Britten P Juan, W, Lino, Carlson MA, Hiza HA, and Basiotis PP. USDA Center for Nutrition Policy and Promotion and National Cancer Institute.

3.6.3 Physical Activity

Physical activity questions were adapted from the School Physical Activity and Nutrition

Project SPAN (Hoelscher et al. 2003). The seventeen questions adapted from the SPAN

questionnaire assess physical activity, sedentary activity, the children's comfort level with

engaging in physical activity among their peers, weight perceptions, and knowledge about health and physical activity.

3.6.4 Demographic Survey

The demographic qualitative survey for the children and parents included sociodemographic questions that addressed age, ethnicity, parental marital status, religious affiliation, educational level, health-related family history, parental employment status, and household demographics. In addition parental surveys addressed annual household income.

3.6.5 Data Analysis Descriptive Statistics

Descriptive characteristics for the a) socio-demographic data, b) Dietary quality, c) physical activity (means, standard deviations) were computed using STAT 10.0 SE 2007 for each variable. Unbiased estimates of coefficients replaced missing or questionable data. Unusable data was dropped from analysis this included data collected without proper consent forms or students who provided consent but later declined participation within the study prior to the completion of data collection.

3.6.6 Data Analysis- Qualitative

Qualitative data from audio taped interviews was transcribed verbatim and the transcripts were checked for accuracy by listening to the audio conversations two to three times. Both the qualitative interview transcripts and in-depth open ended questions were coded separately and agreed upon by two researchers to ensure reliability and confirmation of any reoccurring themes. Qualitative Data were analyzed using QRS NVivo 8 Copyright 1999-2009.

3.6.7 Triangulation

Triangulation is the process of ensuring quality data by validating the information collected across multiple sources. More specifically 1) quantitative data (demographic, physical activity, 24-hour dietary recalls data) were cross checked with qualitative data 2) parental interviews were cross-checked against both their child's interview and survey questionnaires, 3) the school menus were used to validate food reports on the child's 24hr dietary recalls

3.7 Timeline

IRB approval from Michigan State University was obtained in October, 2011. Discussions relevant to recruitment, scheduling data collection, and data collection procedures occurred with nutrition educators and school principals within the month of December 2011. Staff training of personnel took place prior to data collection during late January to ensure proper and consistent data collection procedures. Data collection occurred March 2012 through June 2012.

CHAPTER 4

RESULTS

4.1 AIM 1. Demographics, nutrition status and quality, as well as physical activity behavior and perceptions of Sample Population

4.1.1 Child Participant Characteristics Overview:

Child demographic data is depicted in Table 4.1. Twenty-five middle childhood and 2 young teens (n=27), 10 females and 17 males participated in the study. The age of child participants, ranged from 10-12 years with a mean age of 10.5 (SD=0.64). At the time of data collection (February-May 2012), all participants were in the 5th grade. Seven participants were from School A where 87% of students were eligible to receive free or reduced price meals, and 20 students were from School B where 82.7% percent of students were eligible to receive free or reduced price free or reduced price meals during the academic school year 2011-2012. The majority of participants identified themselves as Non-Hispanic Black (n=15), followed by Multiracial (n= 9), and Non-Hispanic White (n=3) (Table 4.1).

English was the dominant language spoken in the household reported by most participants (n=25); one participant reported Spanish as the dominant language spoken in his household and one child reported both English and Spanish as languages spoken in his household (English by his mother and Spanish by his stepfather). For the majority of the participants, the mother was reported as the primary caregiver for the child (n=14), followed by mother and father (n=6), father (n=3), mother and grandparent (n=1), mother and stepfather (n=1), and mother, father and nanny (n=1). The participants reported the marital status of their parents as being single (n=13), married (n=8), separated (n=3), divorced (n=4) and widowed (n=1). Children primarily described

their households as consisting of 4 family members, but 8 households had 6-12 members of which 6-9 were children. They also reported that most parents were employed full (n=9) or part-time (n=4).

4.1.2 Parent Participant Characteristics Overview:

Eleven parents participated in the study. Parent demographic data is reported in Table 4.2. The age ranged from 28-47 years with a mean age of 37 (SD=6.3). The majority of the parents were Non-Hispanic White (n=6), followed by Non-Hispanic Black (n=4). Five of the participants were married, and 3 were separated. The majority of the parents had some college education (n= 5); one parent had a graduate degree. Several were employed full time; 2 parents chose not to disclose their occupational status. The total household annual income reported by the parents ranged from less than or equal to 20,000 to 70,000 or above.

Variable	n=27	Percent
Gender		
Male	17	63
Female	10	37
BMI Percentile		
5 - <85 th	11	41
85th <95th	5	18
$\geq 95^{\text{th}}$	11	41
School		
School A	7	26
School B	20	74
Ethnicity		
Non-Hispanic Black	15	56
Non-Hispanic White	3	11
Multiracial (Other)	9	33
Parent Marital Status		
Single	16	59
Married	8	30
Separated	3	11
Dominant Language Spoken in Household		
English	25	93
Spanish	1	4
Both English and Spanish	1	4

Table 4.1 Child Demographics (Total n=27; \bar{x} Age= 10.5 ± 0.64)

Table 4.1 (Cont'd)

Variable	n=27	Percent
Primary Caregiver		
Mother and Father	8	30
Mother	14	51
Father	3	11
Grandparents	1	4
Mother and Grandparent	1	4
Parental Employment Status		
Full time	13	48
Part Time	7	26
Unemployed	7	26
Total Number of People in		
Household		
\geq 4	16	59
5-9	9	33
≥10	2	7
Total Number of Children in the		
Household		
\geq 1-2	13	44
3-5	12	44
≥ 6	3	11

Variable	n=11	Percent	Variable	n=11	Percent
Gender			Education		
Male	1	9	High School	2	18
Female	10	91	Some College	1	9
Body Mass Index (BMI)			Certificate	1	9
Normal (18.5-24.9)	1	9	College	6	55
Overweight (25-29.9)	1	9	Graduate	1	9
Obese (≥30)	9	82	Parental Employment Status		
School			Employed Full Time	8	73
School A	1	9	Unemployed	4	27
School B	10	91	Total Number of People in Household		
Ethnicity			≥4	6	55
Non-Hispanic Black	4	36	5-9	4	36
Non-Hispanic White	6	55	≥10	1	9
Interracial (Other)	1	4	Total Number of Children in the Household		
Parent Marital Status			\leq 4	9	82
Single	4	36	9-May	1	9
Married	5	45	≥10	1	9
Divorced/Widowed	2	18	Annual Household Income		
			≤ \$20,000	4	36
			\$20,00-34,999	2	18
			\$60,000-69,999	3	27
			\$70,000-above	2	18

Table 4.2 Parent Demographics (Total n =11; \overline{x} Age= 37 ± 6.2)

4.1.3 Weight and Health Status

4.1.3.1 Children's weight status and health perceptions

Among the child participants, 11 were of normal BMI-percentile (5- $< 85^{\text{th}}$), five children were overweight (85^{th} - $<95^{\text{th}}$), and 11 children were obese (≥ 95 th). Table 4.3 shows that thirteen children reported they were trying to lose weight, a majority of which were males (n=8). Of these, three were of normal BMI percentile, two were overweight and 8 were obese. More than half (51%) of the students felt that in comparison to students of the same height, they weighed the right amount. Nine students believed that they weighed too much in comparison to the students within their grade of similar height. Of the nine students, three were of normal weight and six were obese. A majority of the students (n=14) agreed with the statement, "If I run and play I will have fewer health problems". Of the nine students who partly agreed with that statement, four were of normal BMI percentile, two were overweight, and three were obese.

Among the family medical history related disease reported, several children reported having a family history of heart disease (n= 1), hypertension (n=3), glaucoma or eye problems (n=4), diabetes (n=3), cancer (n=1), smoking (n=15), or alcohol consumption (n=3).

Waist circumferences were measured for both children and adults (Table 4.4). Children of normal BMI percentile (n=10) had an average waist circumference of 59.2 cm. Children who were overweight had an average BMI percentile (n=4) of 70.2 cm. Children who were obese had an average waist circumference of 82.1
				Ethnie	city		
		Non-His White (panic n=3)	Non-Hispar (n=1	nic Black 5)	Othe (n=9	er))
Variable	Total	Female	Male	Female	Male	Female	Male
What are you trying to do about your weight?							
Lose Weight	13	0	1	4	2	1	5
Gain Weight	3	0	0	0	3	0	0
Stay the Same	11	1	1	1	5	3	0
Compared to other students in your grade who are as tall as you, do you think you weigh:							
Too much	9	0	1	4	1	1	2
The right amount	14	1	1	0	6	3	3
Too little	4	0	0	1	3	0	0
If I run and play every day, I will have fewer health problems.							
Agree	14	0	1	4	5	1	3
Disagree	13	1	1	1	5	3	2
If I am overweight I am more likely to have more health							
problems like cancer or heart							
disease.	10	0	1	1	2	1	4
Agree	10	0	1	l	3	1	4
Disagree	17	1	1	4	7	3	1

Table 4.3 Child Responses to Weight Perceptions and Views on Health

Table 4.3 (C	Cont'd)
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					BMI Per	centile			
		5-<85th	(n=11)		85th <95 (n=5)	th		≥95th (N	=11)
Variable	Total	Female	Male	Total	Female	Male	Total	Female	Male
What are you trying to do about your weight?									
Lose Weight	3	1	2	2	1	1	8	3	5
Gain Weight	2	0	2	1	0	1	0	0	0
Stay the Same	6	5	1	2	0	2	3	0	3
Compared to other students in your grade who are as tall as you, do you think you weigh:									
Too much	3	2	1	0	0	0	6	3	3
The right amount	6	3	3	4	1	3	4	0	4
Too little	2	1	1	1	0	1	1	0	1
If I run and play every day, I will have fewer health problems.									
Agree	4	3	1	2	0	2	8	2	6
Disagree	7	3	4	3	1	2	3	1	2
If I am overweight I am more likely to have more health problems like cancer or heart disease.									
Agree	4	2	2	1	0	1	5	0	5
Disagree	7	4	3	4	1	3	6	3	3

4.1.3.2 Adult Weight and Health Status

As depicted in Table 4.4, only one parent was of normal BMI (18.5-24.9); the remaining parents were either overweight (BMI 25-29.9; n=1) or obese (BMI \geq 30; n=9). Parents reported a family medical history of cardiovascular disease (n=2), cancer (n=7), hypertension (n=14), glaucoma (n=7), diabetes (n=13), smoking (n=7), and consumption of alcohol (n=6) (Table 4.5). Based on waist circumference data, parents whose weight status fell into the normal BMI had a waist circumference of 71cm. Parents who were overweight (n=1) had an average waist circumference of 91cm. Parents who were obese had an average waist circumference of 104.2cm. According to the CDC and the National Heart, Lung and Blood Institute classification of associated disease risk in concordance with classifications of overweight, obesity and waist circumference, parents, who were overweight and had a waist circumferences of 88 cm or less, were at an increased risk for developing type 2 diabetes, hypertension and cardiovascular disease (CVD). Parents who were obese and fell into the BMI category of 30-34.9 (n=2) and 35-39.9 (n=2) with a waist circumference that exceeded 88 cm for women and 102 cm for men were at very high risk for developing type 2 diabetes, hypertension and CVD. Parents whose BMI was 40 or above and whose waist circumference was greater than 102 cm (n=1) were at extremely high risk of developing type 2 diabetes, hypertension and CVD (n=3).

Variable	Chil	d BMI Perce	ntile	Adult BMI					
	5 - <85th (n=10)	85th <95th (n=4)	≥95th (n=10)	18.5-24.9 (n=1)	25.0-29.9 (n=1)	30 -35 (n=2)	≥36* (n=3)		
Waist Circumference (cm)	59.2	70.2	82.1	71	91	93	115.5		

Table 4.4 Child BMI Percentile and Adult BMI by Waist Circumference (WC)

• Disease risk for Type 2 Diabetes, Hypertension, and Cardiovascular Disease for Men WC ≤102 cm and Women WC ≤88cm who are overweight BMI 25-29.9 is increased.

 Disease risk for Type 2 Diabetes, Hypertension, and Cardiovascular Disease for Men WC≥102cm Women ≥88cm who are obese BMI 30-35 is very high and whose *BMI is who exceeds 40 + (n=1, Male) is extremely high

		Cardiovascular						
Par	ticipant	Disease	Cancer	Hypertension	Glaucoma	Diabetes	Smoking	Alcohol
A10	004				1			
E00)1					2	2	3
E00)23	2	1	4	4	4	1	
E00)3		2	2	2	2	1	
E00)4		1				1	
E00)6		1	1		1		
E00)9					2		
E01	10		2	1				1
E01	14			1		2	1	
E01	19			1				
E02	22			3			1	2

Table 4.5 Parent's Family Medical History

4.1.4 Dietary Quality

4.1.4.1 Dietary Quality of Children:

The overall dietary quality of the 5th grade students was assessed using the Healthy Eating Index (HEI-score) based on 12 components as described in Table 3.1 and presented in Figure 4.1. In the area of total grains (4.8/5), meat and beans (8.4/10), and saturated fat (8.9/10), 5th grade students earned scores fairly close to the recommended intakes. Students dietary quality scores for total fruit, whole fruit, and milk scores were less than recommended at 3.3/5, 3.1/5, 6.6/10 respectively. The subcomponents scores were as follows: whole grains (1.3/5), total vegetable (2.6/5), dark green leafy vegetables (2.6/5), sodium (2.5/10), oils (5.5/10), and calories from SOFAs (15.1/20). The children's intakes were hence far below the recommendations. The overall HEI score was 64/100 indicating a moderate dietary quality with room for improvements.

The daily intakes of the following key nutrients were also calculated: dietary fiber, sodium, potassium, calcium, iron, and folate. The mean intake compared to those recommended for children 9-13 years by the National Academy of Sciences (NAS, 2005b) were 22g (SD=4.53) for fiber (recommended=31g for boys and 26g for girls); 2,473.2 mg (SD=664.98) for sodium (recommended tolerable upper intake level for sodium= 2.2g for both boys and girls); 1672.4 mg (SD=600.98) for potassium (recommended= 4.5g (4500mg) for both boys and girls); 657.01mg (SD=269.77) for calcium (recommended= 1,300 mg for both boys and girls); 11.61mg (SD=3.89) for iron (recommended= 8mg for both boys and girls); and 457.94 μ g (SD=149.8) for folate (recommended= both 300 μ g for boys and girls). In addition, the mean total energy intake and protein intakes were 1398.5 and 56 grams compared to the average daily recommendations of 2000 kcal/day and 34g of protein for both boys and girls.

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Figure 4.1 Children's Overall HEI Score

4.1.4.2 Dietary Quality of Parents:

The food frequency data for parents showed parents receive an overall HEI score (Figure 4.2) of 64 out of a 100. Among the areas, which they could improve, were increasing the consumption of whole grains (1.2/5), total and dark leafy green vegetables (3.7/5), and the consumption of dairy (5/10).

The daily intakes of the following key nutrients were also calculated: dietary fiber, sodium, potassium, calcium, iron, and folate. The mean intakes compared to those recommended for adults between the age of 31-50 years by the National Academy of Sciences (2005b) were 18.2g

(SD=15.05) for fiber (recommended= 38g for males and 25g for females); 2277.8 mg (SD=102.2) for sodium (recommended tolerable upper intake level for sodium= 1.5g (1500mg) for both males and females); 2883.5 mg (SD=1764.8) for potassium (recommended =4.7g (4700mg) for both males and females); 742.6 mg (SD=397.4) for calcium (recommended= 1000 mg for both males and females); 12.7 mg (SD=6.1) for iron (recommended= 8 mg for males and 18mg for females); 365.25 µg (SD=236.4) for folate (recommended= 400 µg for both males and females). In addition, the mean total energy and protein intakes were 1994.9 kcal and 76 grams respectively compared to the daily recommendations of 2000 kcal and 56g of protein for males and 46g for females.



Figure 4.2 Parent's Overall HEI Score

4.1.5 Food Insecurity

A little more than half of the students (n=15) reported no instances of food insecurity within their households (Table 4.6). Twelve students were worried that food within their household would run out before their family could afford to buy more. The specific food security concerns expressed were as follows: actually running out of food 2-6 times in the past year (n=6); inability to eat from all of the food groups (n=7) or eating less due to financial constraints (n=9). In addition, skipping meals for part or an entire day was reported by 3 students.

		Ethnicity						
		Non-Hisp White (n=	oanic =3)	Non-Hisp (n=15)	anic Black	Other (n=9)		
Variable	Total (%)	Female	Male	Female	Male	Female	Male	
Concerns about food running out								
Yes	48	0	1	1	5	2	4	
No	52	1	1	4	5	2	1	
Has food run out in the past?								
Yes	26	0	0	0	4	1	2	
No	74	1	2	5	6	3	3	
Unable to eat foods from all the food groups	s							
Yes	33	0	1	1	4	0	3	
No	67	1	1	4	6	4	2	
Reduced food intake due to limited money								
Yes	41	0	0	0	6	1	4	
No	63	1	2	5	4	3	2	
Reduced size of meals due to limited money								
Yes	22	0	0	0	3	0	3	
No	78	1	2	5	7	4	2	
Meal skipping due to limited money								
Yes	4	0	0	0	1	0	0	
No	96	1	2	5	9	4	5	
Hunger in the past month due to insufficien	t food							
Yes	22	0	0	0	4	0	2	
No	78	1	2	5	6	4	3	
Did y not eat for a whole day due to lack of	food							
Yes	11	0	0	0	2	0	1	
No	89	1	2	5	8	4	4	

Table 4.6 Child Self-Report of Food Insecurity by Ethnicity, Gender and Weight Status

Table 4.6 (Cont'd)

		BMI Percentile							
		5-<8	5th		85th <	95th		≥9	5 th
		(n=1	1)		(n =	5)		(N=	:11)
Variable	Total	Female	Male	Total	Female	Male	Total	Female	Male
Concerns about food running out									
Yes	5	3	2	2	0	2	6	0	6
No	6	3	3	3	1	2	5	3	2
Has food run out in the past?									
Yes	3	1	2	2	0	2	2	0	2
No	8	5	3	3	1	2	9	3	6
Unable to eat foods from all the food groups									
Yes	3	0	3	2	0	2	4	1	3
No	8	6	2	3	1	2	7	2	5
Reduced food intake due to limited money									
Yes	3	1	2	4	0	4	4	0	4
No	8	5	3	1	1	0	7	3	4
Reduced size of meals due to limited money									
Yes	2	0	2	2	0	2	2	0	2
No	9	6	3	3	1	2	9	3	6
Meal skipping due to limited money									
Yes	0	0	0	2	0	2	0	0	0
No	3	1	2	13	5	8	9	4	5
Hunger in the past month due to insufficient fo	od								
Yes	2	0	2	2	0	2	2	0	2
No	9	6	3	3	1	2	9	3	6
Did y not eat for a whole day due to lack of foo	d								
Yes	0	0	0	2	0	2	1	0	1
No	11	6	5	3	1	2	10	3	7

4.1.6 Physical Activity Behaviors

4.1.6.1 Child's Assessment and Report

Self-reported physical activity behaviors by children are depicted in Table 4.7. The majority of the students engaged in 30 minutes of physical activity (n=23) at least one to three times per week; 6 reported engaging in physical activity 4-6 times per week. Within the past year many of the students had participated in an organized sport (n=18).

Most children traveled to school by school bus (n=19); 5 of these students were overweight and 6 were obese. Seven students utilized family transport; of these 4 were obese. Only one student reported walking to school and was identified as being obese.

Sedentary behaviors reported by children indicated that the majority of boys (n=11) and girls (n=7) spent one hour or less watching television, using the computer, and/or playing video games per day. Two children reported playing video games and using the computer for five hours or more.

Child perceptions of physical activity barriers in the school environment were also assessed (Table 4.8). Eight students reported feeling somewhat safe in the school environment (n=8). More than half of the student population reported experiencing peer verbal bulling. With the majority of the students reporting experiencing verbal bulling almost every day (n=10) when asked in peer bulling.

		Gen	der]	Ethnicity			BMI Percenti	e
				Non- Hispanic	Non- Hispanic				
*7 • • •	T ()	Female	Male	White	Black	Other	5-<85 th	85th<95th	≥95th
Variable	Total	(n=10)	(n=17)	(n=3)	(n=15)	(n=9)	(n=11)	(n=5)	(n=11)
Exercise for at least 30									
minutes									
\leq 3 per/wk	22	7	14	3	12	7	8	5	8
4-5 per/wk	4	5	1	0	2	2	2	0	2
\geq 6 per/wk	2	0	2	1	1	0	1	0	1
Play outdoors for 30 minutes									
or more, not during school									
hours									
\leq 3 per/wk	18	6	12	2	10	6	8	4	6
4-5 per/wk	3	1	2	0	1	2	1	0	2
\geq 6 per/wk	5	2	3	1	3	1	2	1	2
Sports teams during the past 12 months									
0 Teams	9	4	5	2	6	1	3	1	5
1Team	12	3	9	1	6	5	5	3	4
2 Team	3	2	1	0	1	2	1	0	2
3 or more	3	1	2	0	2	1	2	1	0
Currently involved in an									
organized physical activities									
No	18	4	14	3	11	4	8	5	5
Yes	9	6	3	0	4	5	3	0	6

 Table 4.7 Self-Reported Physical Activity and Sedentary Activity Behaviors Among 5th grade students

 Table 4.7 (Cont'd)

		Gen	der]	Ethnicity		BMI Percentile			
Variable	Total	Female (n=10)	Male (n=17)	Non- Hispanic White (n=3)	Non- Hispanic Black (n=15)	Other (n=9)	5- <85 th (n=11)	85th <95 th (n=5)	≥95 th (N=11)	
Hours per day watching TV, DVDs, or movies away from school										
0-<1hr.	6	7	11	0	1	5	2	2	2	
1-2hrs	9	3	5	2	5	2	6	1	2	
3-4hrs	7	0	0	0	5	2	1	2	4	
\geq 5hrs.	5	0	1	1	4	0	2	0	3	
Able to Play outside after school instead of watching TV										
Not Sure	3	1	2	0	2	1	2	1	0	
A little Sure	8	2	6	1	4	3	1	1	4	
Very Sure	16	7	9	2	9	5	0	3	7	
Hours spent on										
computer										
0- <1hr.	18	7	11	2	10	6	8	3	7	
1-2hrs	7	2	5	1	3	3	3	1	3	
3-4hrs	0	0	0	0	0	0	0	0	0	
\geq 5hrs	2	1	1	0	2	0	0	1	1	

		Gen	der	F	Ethnicity		BN	/II Percen	tile
Variable	Total	Female (n=10)	Male (n=17)	Non- Hispanic White (n=3)	Non- Hispanic Black (n=15)	Other (n=9)	5- <85 th (n=11)	85th <95 th (n=5)	≥95th (n=11)
Hours spent playing video games									
0- <1hr	15	8	7	1	9	5	6	3	6
1-2hrs	9	1	8	2	4	3	3	2	4
3-4hrs	0	0	0	0	0	0	0	0	0
\geq 5 hrs.	3	1	2	0	2	1	2	1	1
Minutes of daily physical activity/exercise expected									
\leq 20 min	2	1	1	0	2	0	1	1	0
30-45 min	12	6	6	1	5	6	6	2	4
50-60 min	11	3	8	2	7	2	4	1	6
I don't know	2	0	2	0	1	1	0	1	1

 Table 4.7 (Cont'd)

				Ethr	nicity		
		Non-F	Hispanic	Non-H	Iispanic	Ot	ther
		Whit	e (n=3)	Black	t (n=15)	(n	=9)
Variable	Total	Female	Male	Female	Male	Female	Male
School Safety							
Somewhat safe	8	0	1	1	3	2	1
Mostly safe	21	1	1	4	7	4	4
Peer verbal bullving							
Never	0	1	1	3	2	2	0
	9	1	1	J 1	$\frac{2}{2}$	$\frac{2}{2}$	2
1-5 units	0	0	1	1	6		2
Almost every day	10	0	0	1	0	0	3
Peer physical bullying							
Never	19	1	2	3	8	4	1
1-3 time	4	0	0	1	2	0	4
Almost every day	1	0	0	1	0	0	0
Excluded from Participation							
Never	18	1	1	2	8	4	2
1-3 time	5	0	0	2	1	0	2
Almost every day	4	0	1	1	1	0	1
Affect participation in group physical activity during school							
No	24	1	1	5	10	4	3
Yes	3	0	1	0	0	0	2

 Table 4.8 Child Perceptions of Physical Activity Barriers in the School Environment by Ethnicity and Weight Status

Table 4.8 (Cont'd)

					BMI Per	centile			
		5-<85th	(n=11)		85th <95t	h (n=5)		≥95th (ľ	N=11)
Variable	Total	Female	Male	Total	Female	Male	Total	Female	Male
School Safety									
Somewhat safe	3	3	0	2	0	2	3	0	3
Mostly safe	8	3	5	3	1	2	8	3	5
Peer verbal bullying									
Never	5	3	2	1	1	0	3	2	1
1-3 times	3	2	1	1	0	1	4	1	3
Almost every day	3	1	2	3	0	3	4	0	4
Peer physical bullying									
Never	9	4	5	4	1	3	6	3	3
1-3 time	1	1	0	1	0	1	5	0	5
Almost every day	1	1	0	0	0	0	0	0	0
Excluded from Participation									
Never	9	4	5	3	1	2	6	2	4
1-3 time	1	1	0	1	0	1	3	1	2
Almost every day	1	1	0	1	0	1	2	0	2
Affect participation in group physical activity during school									
No	11	6	5	5	1	4	8	3	5
Yes	0	0	0	0	0	0	3	0	3

4.1.6.2 Parent Physical Activity Perceptions

Parents were asked to report the required amount of physical activity an adult should engage in per day. Responses ranged from 30 minutes (n=4), 40-45 minutes (n=2), 1 hr (n=3) to 3-4 hrs (n=1). Parents were asked to report where they acquired information concerning the recommendations for physical activity. Three parents indicated that this was common knowledge, 3 reported that it was an educated guess, 2 parents reported television (one mentioned specifically Saturday morning cartoons), 1 from a book, and 1 from an adult weight loss class.

4.1.6.2.1 Family Nutrition and Physical Activity

The Family Nutrition and Physical Activity Screener was used to assess the family obesogenic environment (data depicted in Table 4.9) (Ihmels et al. 2009).

The Family Meal Patterns: The family meal patterns component evaluated both the obesogenic risk factor of skipping breakfast, and eating family meals. Three participants received a score of ranging from 7-8 indicating an acceptable family meal pattern environment; 8 parents received a score of 5-6 which is borderline at risk.

Family Eating Practices: Family eating practices addressed meals eaten away from home and eating meals in front of the television, which are both practices that could potentially put a child at risk for poor eating habits and/over eating. Six parents received a score between 5-6 indicating moderate risk, 5 parents received a score ranging from 7-8 indicating an acceptable family environment.

The Food Choices: The food choice component addressed the consumption of packaged foods, which contain a higher salt and fat content than fresh food items. Three parents received a score ranging between 3-4 (at risk), 4 parents' scores ranged from 5-6 (moderate risk), and 4 parents received a score of 7 (acceptable).

Food Beverage Choices: The food beverage choice component addressed the intake of sugarsweetened beverages, which have been linked to excess calories, and associated with obesity and in addition reduced consumption of dairy, putting children at risk for lower intakes of calcium. Five parent's received a score ranging from 3-4 (at risk), 7 parents received as score ranging from 5-6 (moderate risk), and 2 parents received a sore of 7 (acceptable).

Restriction and Reward: The restriction and reward component evaluated parents behaviors of restricting snack food items, which in turn may increase the desirability of the items. Firm restriction of certain food items may impede the child's ability to learn to regulate intake of some desirable snacks. Parent of using food or beverage items as a reward may also send the child the wrong signals where they may "value these food items over healthier options." One parent received as score of 3 (at risk), 6 parents received a score ranging between 5-6 (moderately at risk), 4 parents received a score ranging from 7-8 (acceptable family environment).

Screen Behavior and Time Monitoring: The screen behavior and time monitoring component addressed extreme television viewing, video game usage and unmonitored usage. Excessive sedentary activities such as screen time activities have been shown to be associated with obesity. It is recommended that children engage in 2 hours or less of sedentary activities. Three parents received a score of 2 (high risk), 2 parents received a score of 4 (at risk); 3 parents received as score ranging between 5-6 (moderate risk); 3 parents received a score of 8 (acceptable family environment). *The Health Environment:* The health environment component includes such practices as providing opportunities for physical activity, and limiting television viewing. Two parents received a score of 4 (at risk), 8 parents received as score ranging between 5-6 (moderate risk) concerning the Health Environment component; and only 2 people received and "acceptable".

The Family Activity Behavior: The Family Activity Behavior component addressed the family's involvement in physical activity with their child. Physical activity related behaviors included: screen behavior and time monitoring, environmental support, as well as family and child activity and sleep patterns. By modeling such behaviors, parents are helping to establish healthy views on physical activity. Seven parents received as score of 5 (moderate risk) and only 4 parents received a score ranging between 7-8 (acceptable family environment).

The Child Activity Involvement: The Child Activity Involvement component addressed the child's engagement in routine physical activity, which is associated with a reduced risk of becoming overweight or obese. Two parents received a score ranging from 3-4 (at risk), seven parent received a score ranging from 5-6 (moderately at risk); and 2 parents received a score ranging from 7-8 (acceptable family environment).

The Family Routine Component: The Family Routine component addressed regularly scheduled bedtime. Irregularly scheduled bedtimes have been shown to increase the risk for childhood overweight. Three parents received a score ranging from 5-6 (moderate risk) and eight parents received a score ranging from 7-8 (acceptable family environment).

Total Family Nutrition and Physical Activity Score: Overall, nine parents received a total FNPA score ranging between 51-58 which fell into the at risk category, two parents received scores ranging between 72-73 falling into the acceptable family environment category. (see Table 4.9)

Participant	Parent BMI	Child BMI	Family Meal	Family	Food Choice	Beverage Choices	Restriction/Reward	
		Percentile	Patterns	Eating Habits				
A1004	40	70	6	6	4	5	6	
E001	37.7	100	6	7	7	3	3	
E003	44.4	9	5	7	6	5	7	
E004	36.9	85	5	6	5	4	8	
E006	31.8	92	6	7	3	4	5	
E009	29.9	72	5	6	4	4	6	
E010	37.6	97	7	5	7	5	6	
E014	30.6	98	5	6	6	4	6	
E019	22	93	7	7	7	7	8	
E022	30.1	53	8	7	7	7	8	
E023	31.2	70	6	6	6	6	6	

Table 4.9 Parent Family Nutrition and Physical Activity Responses, Parent BMI and Child BMI Percentile

 Adult BMI below 18.5 Underweight, between 18.5-24.9 Normal, between 25.0-29.9 Overweight, ≥30 Obese; Child BMI Percentile < 5th percentile underweight, 5th- <85th percentile healthy weight, 85th percentile - <95th percentile Overweight, ≥ 95th percentile Obese.

• Each Component Score is based on an 8 pt scale ranging from 0-2 extreme risk, 3-4 at risk, 5-6 at moderate risk, 7-8acceptable family environment; The Total FNPA overall score ranges from 20-40 at extreme risk, 41-60 at risk, 61-70 at moderate risk, 71-80 acceptable family environment.

			Family	Screen time		Family			Total
	Parent	Child BMI	Meal	behavior and	Healthy	Activity	Child Activity	Family	FNPA
Participant	BMI	Percentile	Patterns	monitoring	Environment	Involvement	Involvement	Routine	Score
A1004	40	70	6	5	5	5	5	8	55
E001	37.7	100	6	8	6	5	5	8	58
E003	44.4	9	5	2	5	8	5	8	58
E004	36.9	85	5	2	4	5	4	8	51
E006	31.8	92	6	8	6	5	6	7	57
E009	29.9	72	5	4	6	5	5	8	53
E010	37.6	97	7	2	4	7	3	5	51
E014	30.6	98	5	5	5	5	6	6	54
E019	22	93	7	8	5	8	8	8	73
E022	30.1	53	8	6	8	8	5	8	72
E023	31.2	70	6	4	5	5	7	5	56

Table 4.9 (Cont'd)

• Adult BMI below 18.5 Underweight, between 18.5-24.9 Normal, between 25.0-29.9 Overweight, ≥30 Obese; Child BMI Percentile < 5th percentile underweight, 5th- <85th percentile healthy weight, 85th percentile - <95th percentile Overweight, ≥ 95th percentile Obese.

• Each Component Score is based on an 8 pt scale ranging from 0-2 extreme risk, 3-4 at risk, 5-6 at moderate risk, 7-8acceptable family environment; The Total FNPA overall score ranges from 20-40 at extreme risk, 41-60 at risk, 61-70 at moderate risk, 71-80 acceptable family environment.

4.2 AIM 2: Children's Perceived Facilitators and Barriers to a Healthy Lifestyle

Based on the social cognitive theory, which was the theoretical foundation of the study, the primary themes that emerged from the study as facilitators to healthy eating and physical activity by children were personal motivation and being in control, teacher modeling, use of media, and neighborhood food and environment support. These will be discussed within the context of personal, home, school, and community environments.

4.2.1 Personal:

4.2.1.1 Personal Facilitators:

Children were primarily motivated to eat healthy and be physically active because of personal aspirations of becoming a professional athlete, a personal desire not to be viewed as lazy, or belief in the health benefits. These were depicted in the following interesting quotes:

"I think when I eat at home sometimes I think I'm gonna, be a I wanna be a baseball player, I wanna be a football player and a basketball player and a baseball player and I wanna be a really good athlete[A002]."

"Well usually I feel that if I don't get out too much, that I might not live longer--a longer life and that I won't be able to lose some weight. So I run outside and start playing[E1010]."

One individual displayed his personal motivation, by sharing his story of attempting to sell candy bars in his community so that he could have enough money to purchase fruits and vegetables for himself, and his family. "Well, I.. I said this earlier like way back [umhmm] I said, I said I wanted to save money [umhmm] I only go outside for an hour and nobody wants to buy no chocolate, but I just try my best .. I can buy healthy foods for me, myself, me, myself and my family [A004]."

Sibling rivalry was also mentioned as a motivating factor for one student, who identified himself

as being overweight and was motivated as result of being teased by his sibling,

"Sometimes, because like um my brother um because I um had gained a lot of weight and the doctor said I mean (something) 100 and I was like (inaudible) cause my brother was teasing me about it and so I said I'll show you what fat is and I lost some weight and he was like oh you're not fat no more [E1013]."

Concerns with body image (n=10) and health (n= 16), also served a facilitator to positive health

concepts regarding energy balance, such as were seen with the participants. Due to his interest in

maintaining an "ideal" body weight, the first quote shows how he avoided gaining weight by

making sure he went outside and exercised after a meal.

"Because like sometimes people eat that and then they be like ... oh I feel so sick, because they [their]like in love with it [the food] and like and then they like go to sleep. And like when you first eat something and then you lay down you can gain, that weight can stay in your body. But when I eat a lot of fat foods, I II don't want to be just sitting down and watching TV or go to sleep, I I like be up and go outside and do everything I can to get all of that weight and make sure I'm like like um supposed to be the way it is [E1013]."

"That you should be healthy that you shouldn't get really big cause the bigger you get the more health problems you get and you could die. From how big you are. Cause it's very easy to get a heart attack when you're big. Like a 5 year old on the news, he had a heart attack because of how big he was [E002]"

"Because it has like....uhm sometimes...like sometimes people put like salt on it and it can cause on it and they said it can cause cancer and stuff like that. And uhm like it has sugar in it, and sugar is pretty much seen as unhealthy E1010."

4.2.1.2 Personal Barriers:

Personal barriers reported by the children included a lack of motivation or tiredness in some

cases (n=7).

"I don't live in Ypsi so like. It usually does it. Well when I get home late. That doesn't make me want to play late, but sometimes I play at night if my sisters friend is over. Or just my sister[E1014]."

Enjoyment of junk food taste and hunger (n=2) were also perceived as barriers to healthy food choices.

"oh pretty much nothing because I really don't really listen when it comes to junk food if I like it... when I'm seriously hungry and I see junk food I, I look for the best thing to eat [E1007]."

"The taste, and um, I don't like yea I don't like the taste, so usually I just don't get it [A001]" and "It's easy to eat healthy, it just depends if you want to or not [E008]."

Personal health or health concerns were expressed as challenges such as having asthma or

instances when they felt sick (n=2) as evidence by:

"Sometimes like sometimes (clears throat) I hate running cuz I have asthma [E1005]."

4.2.2 Home Environment

4.2.2.1 Home Environment Facilitators:

Family was referenced by 22 children as a source of information about health, healthy eating and

physical activity.

"...*My* mom, my dad, my grandma, my aunt, my uncles and everybody in the family *[E1002]*."

Parents were especially viewed as valid sources of information by the children,

"Probably not my parents, cause my parents taught me nothing wrong [E1002]".

It became evident that there were distinctions made in the messages from family sources reported by children. These messages were further categorized into potentially positive and potentially negative messages.

Potentially positive messages from family sources were messages that were unbiased and did not pose a negative threat to the child's wellbeing. Examples of a positive message expressed by children were as follows,

"well every time I wanna go to the store and she says you know if you eat well you can be very strong and grow up and my grandma told me if I can get in sports so I can be a better athlete [A002]."

The parent/primary guardian was perceived as facilitating good dietary practices or engagement in physical activity towards achieving a future goal set by the child.

"Like my dad tells me what's healthy for me to eat and what's not. Like and he tells me to go outside certain times so I can be active and play [E1005]."

"like my mom teach[es] me what not to eat and what to eat and how .. How you should exercise so your body will have energy My grandma always tell[s] me there, like she thinks jogging is good, walking...we do fast walking E1016."

Family pets were also mentioned as facilitators to physical activity by two participants. One participant mentioned that she liked doing physical activity with her dog, because "*he listens to me*". Interestingly, the use of media, within the home was viewed as a facilitator for both healthy eating and physical activity by children as portrayed in both the following two quotes respectively (n=4).

"well based on what I see on TV is people always eating healthy. And on this one channel, on cartoon-network, this one dog says to his owner "Johnny, eat the carrot" and find out that his eye vision gets really stronger ...and then it lets me know that carrots actually help me see in the dark. Milk actually helps you get stronger bones, meats actually helps you- you know- get your body working. Fruits helps your heart. And vegetables help you um, think [E1010]."

"No he, well, I know T.V. I watch it and it helps me. It helps me, like when 'Dancing with the Stars', it helps me workout, stretch my arms [A004]."

Some children within the study made a clear distinction between regular video games, and those (such as the Xbox connect and Nintendo Wii) that actually require movement. They specifically mentioned interactive video games such as "Just Dance" and the "Wii Fit" as facilitating engagement in physical activity (n=2).

"The Wii Fit is like exercise, so it got exercise and there, there's this right thing that shaped like a square but it's bigger and we turn on the Wii and then you jog and play you get a jump and then there's a connect [A007]"

4.2.2.2 Home Environment Barriers:

Potentially negative messages from family sources were deemed as those that could evoke fear or feed into insecurities about body image. These messages were expressed by several children (n=9). For example, some family members provided information, which was not entirely factual, and potentially disturbing/misleading.

"When..when my grandma be saying about oo I heard this [inaudible] was on the TV and they was eating too much junk food and then they almost exploded [E101]"

"She, she get[s] me very paranoid... She, she like, I don't want to say threaten me... I guess that's the word I can say, she says if you keep eating sugar, you're going to get diabetes. So I don't, but that[s] mostly my sister [E1014]."

Children also reported messages from family members that fed into insecurities regarding body

image as depicted by with participants A004 and E1015 respectively:

"That's, because it made me fat, and my mom, and I had to go to the gym with my dad to help me workout and be skinny again."

"yeah because as I am eating, I'm getting bigger, because my mom is saying my face [is] getting fat, like that [demonstrates]."

Family barriers reported by children included, parents using food as a rewards and extended

family members such as uncles and aunts bringing fast food when they visited (n=2).

"ummm when my dad wants to take me out to eat and stuff at McDonalds sometimes and with special occasions and stuff like when I win a game, that's all.. when most of the time, sometimes my uncle comes over at our house and brings like a lot of junk food and stuff like McDonalds and he brings chips and he brings pizza and Taco Bell [A002]."

Children also mentioned money as a barrier to buying healthy food and parents being too tired,

not interested or busy to take them someplace where thy could engage in physical activity.

"sometimes my parents don't have enough money to buy it [E1017.]"

"Well, I..I tried asking my mom, "Can we go to the park" and we only go there, like, once a month. I said "Can we go to the park?" "Not today," she says all the time. I just sit in my room doing nothing. I really should be going outside but my time extends like one hour. My mom says that, I just have to sit there doing nothing I can't do no fun things in the house. My mom says I might break something. Uh I might break something and do something that might hurt someone [umm]."

"Nothing, all my parents do is watch TV [E1017]."

Screen time (television and computer) was viewed as a major barrier to physical activity (n=11).

One student specifically described his computer as a distraction to physical activity, and another

mentioned that his aunt had introduced him to a particular television series, which they watched together.

"Well, usually when the TV's on, I usually end up stopping for a minute and watching it, and I usually end up watching it the whole entire day. And usually I get on [my] computer and look up how to play this one song on the piano. And I go to my piano in my room and try to start playing the song. And then getting up and running to the computer, piano computer, piano- like that, trying to figure out the song [E1010]."

"It's like there's a movie called The Lying Game.... And I like I'm just trying to find out who took the twin sister..Cause my Auntie got me into watching that movie and she natural uh natural um I forgot what the movie's called...Natural Survivors I think.... It's two um and (inaudible) and The Ghost Whisperer, my auntie, she gets me to watch the movies with her and I start to like them."

4.2.3 School Environment

4.2.3.1 School Environment Facilitators:

Teachers were identified as a source of information regarding healthy eating, and physical

activity (n=5). For example, in the school environment a teacher modeling healthy eating was

found to be a positive influence by one student.

"Well, it's healthy because, she like, she never come out like with junk food or cookies like we do for snacks, and even for snacks she gets something healthy. Unlike her, WE come out with a bag of chips or something to snack, she come out with some healthy stuff, ummm, for snack today I don't know what she had, it was something green, so I didn't even bother to ask. And I think, I think that she's good, she's kind of nice because, that, she's not eating junk food like us, she be trying to get us not to eat the junk food, but we don't go that way. For snack we always have junk food [E006]."

In School A, the salad bar also was considered a facilitator to healthy eating, because they were able to connect the choices with some of the knowledge they had gained.

"well, I think the salad bar, ... that may good. I know--.... Mmhmm. And it be having a lot of fruits and vegetables and then.. I kind of like that kind of stuff [A001]" and "The things that make it easier for me to eat healthy is fruits and the low fat milk, and the salads, 'cause they're from the food groups that help you stay strong and fit. And the low fat milk gets your bones bigger [E1010]."

The children also found the offering of fruits during snack time as a positive influence in conjunction with the salad offerings at lunch.

"It's easy, it's very easy because they give you healthy snacks and you get to choose if you want um salads or whatever they have at the salad bar [A003]."

What children from both schools wanted to see offered more were fruits and vegetables,

preferring the fruits over the vegetables because of the sweet taste.

"because fruits, fruits is good for you, vegetables are good to you too but I think like vegetables are better for you because they don't have like a sweet taste like not really at all. Fruits have like a sweet taste too but it's still good for you like pineapples [E1019]."

The PE-Nut program was also specifically mentioned as a facilitator to healthy eating and physical activity among children. One student, in response to the question about how information from PE-Nut had helped the family, described how the PE-Nut program changed the family environment,

"Like cause me and my sister we didn't really like eat any vegetables or anything like that, all we would do is eat like junk food and stay in the house all day and just watch TV and play the Wii and stuff. And now like we started playing, we'll go outside and play and like get active and stuff with our family [E1005]." What is particularly unique is that the schools involved in the program have engaged in a schoolwide approach of promoting health and physical activity. This was clearly evident in the fact that one student reported her librarian as instrumental in providing advice about healthy eating and physical activity;

"...uh our library teacher, teaches this program, and teaches us if you eat healthy foods and non-healthy foods like this, and just sit and change the channel and sit and be lazy you can be fat. But if you, if you stay healthy and active and play some games and stuff you won't be fat [E1018]."

When we asked how weight is related to the foods we eat, one child responded they were informed by their teacher that food was related to the physical appearance and functioning.

"what you eat, is what you are made out of or something, just like our teacher told me

[E1003]."

The implication of that statement, as follows, definitely indicated there was a connection to

health,

"That like if you eat cake or something then you're gonna get fat or something. Like, you're not gonna[get] fat if you eat, like, one piece. You're not gonna get like really fat, you're just gonna get a little bit fat and then if you eat, like, healthy stuff you'll get stronger bones and you might be, you might be more active. You might feel more active, like to move around. But... okay [E1003]."

4.2.3.2 School Environment Barriers:

Classroom barriers (n=9) included social events (classroom parties, classroom snacks, and Friday

"Go-Getters" described as weekly prizes presented to students) as well as school meal food

preparation. During these social events, children described "junk foods" as key featured items.

A majority of the students reported meat, which was perceived as being uncooked, as a barrier

to healthy eating (n=9), as well as fat and grease content of the meals. The following quotes

provide evidence of these three findings.

"...for break time, today like Friday, we do go-getters and we uh we get like to choose a prize so I like choose candy and uh, I like I- I take that home, or I just eat [it] on the bus [E1007]."

"like if its, um because sometimes um I see pink in the meat sometimes so that's why I think it's not healthy because it's not all the way cooked... cause my mom said don't eat it if you see pink meat cause you'll get sick and I don't wanna get sick. [A003]."

"Because they, they [school meals] um they sometimes all they be having is just they be having a whole bunch of like fat on the foods [A001]". "Umm sometimes I eat school lunch sometimes I bring my own lunch because the school lunch is greasy and my mom don't want me to get like don't eat greasy.... because they're ...they're greasy food. They have a lot of grease on it and if you eat a lot of grease ...if you eat a lot of grease it won't be good for your body [E1016, Female]"

Among the physical activity barriers mentioned by children in the study, was replacement of

physical education and recess with Art and Media classes (n= 2); being criticized by others, and

the competitive nature of the activities (n=8).

"Music might stop me we don't do like, like we don't do a lot of running in there. We just... we just like sit down sometimes watch movies and TV like singing and we just sit down and watch TV [E1016]." "Art. Um, art, media even though media does help you, I don't know how art helps you [E1002]."

"People making fun of you and sometimes when they think you are doing it wrong, they try and correct you, when you are doing the best you can [E010, Male]".

One child specifically reported a dislike for physical education because she received a grade of a

C+ that removed her from the honor roll (in which she had been a part of for several years).

"Umm... I don't really like P.E., but since it is healthier, I guess I can give it a chance. But I still don't like it....I kind of got a bad grade, I got a C+ and it got me off the Honor Role. That's why I hate it. And I have been on honor roll all times... So, now I'm not... If it's not about Honor Role and stuff, I like it. It's fine [E1014]."

4.2.4 Community Environment:

4.2.4.1 Community Environment Facilitators:

Children considered neighborhoods that had a major chain grocery store in close proximity as a

facilitator to healthy eating in their environment (n=4).

"Easy cause we live right by a grocery store [A003]."

More importantly, children positively viewed neighborhoods where their community members practiced physical activity and were seen eating healthy foods, as well as safe neighborhood environments with park facilities as beneficial.

"it's pretty easy because the people who live next to us have 3 kids and they're [Names children] and they like to eat healthy too like us and our families get together and play and we went to school together and that's where[who] I played my 6th tournament with [A002]."

"Canton Park it's near and it's really big and it's really safe. There's another one next to it and it's very, it's like almost the same size but little bit smaller...and I see people help out with the community...[A007]."

4.2.4.2 Community Environment Barriers:

Neighborhood barriers mentioned included neighborhood safety, the food environment and accessibility to recreation centers such as parks (n=24). Among the top noted neighborhood barriers was the lack of community modeling of healthy eating and physical activity. Children

reported that not seeing it, made it difficult to engage in such behaviors themselves. The lack of grocery stores and the presence of gas stations and liquor stores, were also specifically touted as negative influences. In addition to the neighborhood food environment, children also expressed neighborhood safety as both a concern and barrier to engaging in physical activity. The inability to go the park unsupervised, lack of facilities in close proximity, and lack of community sharing were common threads in the participant responses.

"there is not, there is not a lot of grocery stores and places to get food in my neighborhood ...because a lot of people in my neighborhood don't eat healthy like, my family [A001]."

"because gas station sell those chips, pop, and candy [A005]" and "There's a lot of liquor stores down there [E1002]."

"I can't go alone, and I have to go with an adult. Someone.. I can't go by myself 'cause I can get snatched up. And killed or something, so I at least gotta I have to go with somebody who's old enough. And who's responsible [E1007, Male]"

"Well, people in West Willow ..they don't give a lot of foods to people. They, they keep them for themselves. They get, they take the food for themselves and I hardly get nothing. I say, sometimes I go to peoples door and say, um can I borrow somethin, somethin and then, sorry we're almost out [oh]. They have to save it for themselves and tell lies, and that's why I never wanted to live in that neighborhood [A004]."

4.3 AIM 3 Parents' Perceived Facilitators and Barriers to family Healthy Lifestyle:

The key themes which emerged relative to parental facilitators and barriers to healthy lifestyle were lack of self-motivation (n=7), income status (n=8) and time (n=10), and environmental constraints (n=5). These will be discussed within the individual, home, child's school and

community contexts.

4.3.1 Individual

Among the parents, the individual facilitators for healthy eating and physical activity were providing a healthy environment for their children and self-motivation to lose weight. Parents suggested that having classes where they could learn about healthy food, as well as how to achieve and maintain a healthy weight would serve as a facilitators if available. It appears that for parents, changes in dietary and physical activity habits would be more effective in a supportive group setting. Personal barriers reported by parents, were time (n=10) and lack of motivation (n= 7), as well as cost and budgetary constraints (n= 8).

"Um, probably like a class or something, I think like a healthy uh uh class where you can eat healthy foods and talk about different ways to stay in shape um I think that would be better because like if they give you fliers and things I get a lot of fliers and stuff, and some of them I read most of them I don't you know only if my kids point them out and say hey read this then I read it. But if I was taking a class I would probably take more in and benefit from it because I'm there. Yea [E003-E012]"

"like uh my eating habit is more of a grab and go type of thing. Cause I'm always at work. So the stuff that's around me is the stuff I grab [E001]" and "I don't, there's nothing holding me back other than lack of motivation [E004]."

"Sometimes cost. And being busy. Usually I'm on the go. If you don't prepare or grab a healthy snack, then you're just grabbing something cause you're starving. Um and cost is a big one. For me, from week to week I call it- "G.G"- gas and groceries. (others laughing) It's very hard to try to have—to buy organic for one, I haven't even tried even buying organic, 'cause it's just not in the budget. Just to buy a good variety of fruits and vegetables and feed 6 people, and um to have enough to make it from week to week is very hard [E009]."

"I'm very open to it. Like I said, I already do it. But I think a lot of it is having more resources to spend more and doing organics and things like that-budget. Like transitioning into it; I'll say I'm already in it but I wanna do more [E1019]."

Fear of dying or developing dietary related co-morbidities, served as strong motivation for some

(n= 6)

"Life. Like what she said I don't want to die at the age of 40.... I want to live to be long and I don't want to have diabetes high blood pressure any of them things that be killing people these days to be one of the reasons why because I wanted to be a gluttony [E006]."

4.3.2 Home Environment

4.3.2.1 Home Environment Facilitators:

Parents found that limiting the amount of "junk food" and increasing the availability of fruits and

vegetables in the household were important facilitators. In addition they reported that

information from PE-Nut that they received through their children helped them to make healthy

food choices in their home environment.

"Um yes. Yes because like I think the main issue would be for my kids, when they're really hungry and let's say we run out of vegetables or something like that, because I usually have a lot of vegetables and um fruits cause its quick and then, they eat it before dinner. But if I run out and there's donuts and stuff they're grabbing donuts and whatever. So like for me I just, when I realized it I just stop buying so much because that way they only have the choice of whatever's in there and if they have to wait for me to cook then they just have to wait [E1003-E012].

"Um they help me cook, um they tell me about programs in school like the PE-Nut program ... Yea, they're like I wanna make this! (laughs) or the PE-Nut program told us to play more and do this.Yea they come home and tell me everything they learned, so that that's helps out a lot [E003-E012]."

From a physical activity perspective, parent engagement in family activity was perceived as a positive. Family activities reported by parents and their children reported included walks in the park, bicycle riding and swimming. Some families participated in regular physical activity.

"we bike ride, uh go to the park, we take long walks with the dogs [E009].

"Go swimming. That's about it I can't think of anything else. Go to the park [E006]"

"uhm, what do we do exactly to be physically active? um I said it already, we work out together we run together and we- that's about it [E019]."

Since the change in technology, family activities have also changed to include interactive video games (exergames), which are not typically considered as engagement in family physical activity. Time spent playing exergames were viewed as a great opportunity for family physical activity among parents,

"Go to the park play dodgeball on the Xbox..." Dude you're jumping all over that living room we're hands and trying to kick your feet keep these balls from flying [E010]"

Regardless of the type of physical activities parents engaged in with their children, there was a sense of satisfaction and accomplishment.

"[how do you feel,] good... 'cuz you know you're not only doing something good for yourself but you're also doing it for your children [E009]. Yea, exactly [E1019]."
4.3.2.2 Home Environment Barriers:

In the home environment, time was seen as a barrier to engaging in physical activity. One mother described her struggle with time, as being monopolized with housework and running errands for the household.

"yea, it's like basically I do house work. A lot, until as much as I can stand, and then um, running errands, mostly a big portion of my day is running a lot of errands cause I have (inaudible) and then you go out and you forget, sometimes. I forget to eat, literally, and then when I do eat I want to eat a whole [lot] because I haven't eaten and then after awhile[E003-E012]."

Lack of interest (n=2) and money (n=2) to engage in physical activity was also reported as a barrier to parents. Parents expressed the desire to have their children engage in organized sport activities, but found money to be a limitation.

"lack of interest ... umm sometimes the price of things [E004]."

"Um, more opportunities in the community. A lot of the recreational things that the kids want to do like getting involved with baseball teams and soccer teams and dance classes or stuff like that it costs a lot of money. Um, I'm a single parent. It's harder for me to provide those things for my children. Um, I have to maintain the bills and make sure there's food in the house, and those aren't always what I can afford to do for the girls. Like the program here that they have at the school called "Girls on the Run," my daughters in, both of the girls, um my the younger one her best friend that stays with us too, she's in the program too [E009]."

With regard to healthy eating, lack of family interest (n=1), money, (n=8), and time constraints were key contributors, expressed by parents.

"well I love vegetables but my family does not umm and I'm not one just like umm and I wish I like chicken but I don't.. It's a lack of interest from the family really [E004]."

"either you're out of time or you're out of money or you're out of time and money." "Um not having a lot of time sometimes money, like the vegetables are expensive, so money... Money mostly because if I had if I had more money to purchase like vegetables that we don't normally eat, they're more expensive, you know like green beans and carrots and stuff like that [E003-E012]."

"Sometimes, not always, I eat meals with the family Thursday, Friday, Saturday and Sunday and Monday Tuesday Wednesday I'm on breakfast schedule."

Parents described meal times with their families as family communication time, especially for the children to talk. They viewed this as an opportunity for them to become informed on their children's everyday interactions with peers, and other daily activities.

"No the kids talk more than I do. We, me and my boyfriend don't talk, it be (inaudible) they talk. And [child's Name] talks too. Yea he answers whenever his sisters talk. The kids talk, we just listen. I use that as a time to eavesdrop on what they're talking about, I let them go and I just come in every now and then like "really?" "No way! What else happened?" You know, yea that's about it. [E006]."

4.3.3 Child's School Environment

Parents felt as though the school meals could use improvement (n=8). One parents specifically mentioned that there should be a balance between perceived food children's preference and dietary quality. However, changes in the school menu offerings such as whole-wheat products and school breakfast were also viewed as positive. In addition, there was an appreciation for the important role school meals played in the lives of children whose families did not have the resources.

"Well um I think it needs to be a mix between being something the kids really like and something that's healthy. Um my daughters always complaining about the milk tasting funny [[E003-E012]."

"I do see the school here though has integrated a lot of wheat product, whole grain bread and whole grain muffins and stuff like that. Where um the other schools my children have been in I have not seen that, [E009]"

"I appreciate the fact that like the schools now a days um like my kids I could drop them off um 15 minutes early for school every day if I didn't have the means and they could at least get breakfast. Now granted breakfast is like a pop tart sometimes and like a thing of milk. But for some kids they don't have anything, so like I appreciate that.... [E022]"

4.3.4 Community Environment:

4.3.4.1 Community Environment Barriers:

The neighborhood environment was reported as being of concern in that it did not support healthy eating and physical activity behaviors. Parents (n=3) reported that grocery stores were not in close proximity to where they lived.

"Ummm healthy food choices in my neighborhood (laughs) nothing? (laughs) I don't know they don't really promote like healthy food. We don't have like a good market that's like really close by unfortunately um the grocery store is close enough but even there they don't necessarily promote like healthy eating. So I would say nothing (laughs) [E019]."

"There aren't any in my neighborhood. I know for me, if I forget an ingredient or if I want fresh fruits and vegetables and don't have them right, at that minute, and I don't want to go all the way to Kroger's or Meijer's which is far. There's like a Dollar General right by where I live, but they don't have the fresh fruits and vegetables...oh yea. So even if it's something on the shelf, it's helpful. Like Kmart, they have certain things there too but if they had a fresh fruits and vegetable area that would be pretty cool [E009]."

Lack of neighborhood facilities and a safe environment were primary barriers encountered by parents towards engaging in physical activity (n=5). Parents also reported that a major barrier with regard to lifestyle behaviors that their children experienced within the neighborhood teasing,

"well there's no gym, you know you have to go. I have an office and community centerit's not a community center. I don't want to go to the park, drive far away[A1004]" and "A: yes um around here we live on kind of a busy street and its not like the grandest neighborhood like so I don't let my son ride his bike down our street so that's kind of a challenge and like when I get up and go jogging in the morning I don't just like go out my door and go jogging I get in my car and drive to a park that's like a mile down the road and then go jogging there because I don't feel safe [E022]" "Cause we don't know our neighborhood [E006] and "Cause we live in the projects and its just a bad place [E010]."

There's a park directly behind our thing, but you can't send your kids to the park there's all kinds of rats there. I'm gonna stop saying rats, that's the only thing, rats are ghetto people for people who don't know (laughs.) [E006]".

" a nicer, group of kids, I don't know....umm I mean [Child's Name] is smaller than a lot children and tender hearted, So [Child's Name] can be the kid to pick on. I think once they 've seen him cry [other children] and everyone knows they can make him cry . He's getting on pretty well about it, this year happens to be a particularly good year for him, Um I mean, he gets picked on, on the bus, he gets picked on in school, he gets picked on at lunch, he gets picked on at recess, he gets picked on outside at my house. I mean, I don't know, he's not a bad kid he's a big hearted kid, so he, I know he doesn't take no for an answer. If the kid doesn't like him he thinks that he needs to try just that much harder to make that person be his friend [E004]."

When asked if the parents felt safe sending their children to the neighborhood park the parents were especially concerned as follows:

"No, guns go off daily [E010]," "Oh, hell no![E006]."

"Stray bullet hit one of the kids, my kids don't go there [E010]" and "If I can't look out the window and see you, you can't go outside. I don't care if you is 11 or 12 it's not the right neighborhood, or it's not the right area, maybe if we were in Ann Arbor but, Ypsilanti, No [E006]."

4.4 Grounded Theory: Systematic Processing of Healthy Lifestyle Information

Based on the grounded theory methodology approach, our initial findings sought to explore the perceived barriers and facilitators to healthy eating and physical activity experienced by children and their parents/primary caregivers. In-depth interviews and focus groups captured the voices of

predominately low-income 5th grade students and their parents/caregivers. After seventeen interviews were completed with children, we learned that children were concerned and had misconceptions regarding topics surrounding weight, overall health, healthy eating and physical activity. Questions were thus further developed to explore these concerns and misconceptions which surfaced during our interviews (Glaser et al. 1967). We were able to identify that children were receiving information about health, healthy eating and physical activity from numerous sources that resulted in fear, anxiety and concern. These messages were either reduced or elevated depending on the family ecology. The family ecology, as depicted in the model which evolved (Figure 4.3), determined whether or not the child maintained a balanced understanding of health, healthy eating, and physical activity or an unbalanced view in which misconceptions obtained and processed from various sources were reinforced or dispelled. Figure 4.3 shows how children who participated in our study, process and internalize messages regarding health, healthy eating and physical activity. More specifically evidence is provided on how messages regarding health, healthy eating, and physical activity if not nurtured within a supportive family environment have the potential to elicit fear, anxiety and misconceptions concerning regarding health, healthy eating and physical activity. This could lead to issues in the future relative to lifestyle behaviors and weight. These messages as portrayed in Figure 4.3 will be discussed under the subheadings 4.4.1 System Messages/ Sources, 4.4.1.2 Internal Conflicts, 4.4.1.3 Fear and Anxiety, 4.4.1.4 Family Ecology, 4.4.1.5 Child Understanding, and 4.4.1.6 Child Misconceptions

4.4.1 System Messages/Sources

A dominant emerging theme, grounded within the data, was that of system messages. We noticed that much of the information regarding health, healthy eating, and physical activity was drawn

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from various sources of information. The information regarding health, healthy eating and physical activity appeared to be processed heuristically by children. Heuristic processing is defined as a limited mode of information, which calls for less cognitive efforts and fewer cognitive resources (Eagly et al.,1993). Eagly et al. (2003) provides a more definitive example of this, "When individuals are processing heuristically they are viewed as focusing on the subset of available information that enables them to use simple rules or cognitive heuristic information to formulate their judgments and decisions". Messages received from the various sources, served as the children's solid foundation of knowledge regarding nutrition and health; which ultimately became evident as factors that shaped their behavior. These sources include the family, teacher, media, healthcare professionals, and organized wellness and sports programs.



Figure 4.3 Systematic Processing of Nutrition and Physical Activity Messages Among 5th grade Elementary Students

4.4.1.1 Family:

Among the 27 participants, 22 referenced a family member as a source of information regarding health, healthy eating and physical activity. Children reported receiving messages from their entire family. Information included the certain ingredients in some foods, which they perceived made them, unhealthy. They also described being encouraged by parents who explained why certain foods were not healthy, as well as the importance of moderation. Overall, messages from family sources were deemed valid by several or most participants (n=22).

"My mom, my dad, my grandma, my aunt, my uncles and everybody in the family [E1002, Male]."

"...my mom tells me a lot of stories what's healthy for me and so, that's most of the stuff she says. But the reason I didn't say white bread, cause she said they have a lot of preservatives in them so, she said wheat is more healthier [E1014, female]."

"From my mom and my dad..... They teach [taught] me about how carrots are healthy for you and uhh junk food is not healthy [A007, Male]."

"My parents, like they tell us what to eat and like if it's not healthy we can only have like half of it and save the rest for another..[E1005, Female]."

"Probably not my parents, cause my parents taught me nothing wrong [E1002, Male]."

4.1.1.1 Potential Positive and Negative Messages from Family Sources:

It became evident that there were distinctions between the messages reported by children from their family sources. These messages were further categorized into potentially positive and potentially negative messages. Potentially positive messages from family sources were messages that were unbiased and did not pose a potential negative threat to the child's well being, but an unbiased balanced view about health, healthy eating and/or physical activity. As described in section 4.2.3 under family facilitators, many messages perceived and reported by children were both encouraging and positive. Children described parents as not only encouraging engagement in physical activity, but also engaging in the activities themselves.

"Um, my mom's always encouraging us to get up and go outside, and most of the time she's out there with us doing stuff and being active [E1009, Male]."

Children also expressed that making healthy food choices outside of the home was easy because their parents had taught them.

"it's easy because I'll always eat healthy food in the house and umm my mom taught me to eat healthy food when you're out [E1016, Female]."

A distinguishing factor was that parents related healthy eating in a positive manner to their children, and were supportive or encouraging.

"well every time I wanna go to the store and she says you know if you eat well you can be very strong and grow up and my grandma told me if I can get in sports so I can be a better athlete [A002],"

"yeah they tell me to eat healthy everyday [E1018, Female]."

Potentially negative messages from family sources were messages that could bring about fear or feed into insecurities about body image. These messages generally focused around weight, or included adverse consequences for not eating healthy. As described in section, 4.2.3, comments such as the following could result in long-term negative outcomes. Of particular concern was

messages that appeared to induce anxiety about current health status, or were perceived as being threatening.

"My mom says she is going to put me on a diet. So, I still have weight and I weigh up to 80 pounds [umhum], plus the kilometers and my mom said I want to be below 60 [hum]. So that's why she is putting me on a diet [A004, Male]"

"She, she get me very paranoid...... She, she like, I don't want to say threaten me... I guess that's the word I can say, she says if you keep eating sugar, you're going to get diabetes. So I don't, but that[s] mostly my sister [E1014]."

4.4.1.2 Teachers

Teachers were also identified as a source of information regarding health, healthy eating and physical activity by students (n=5). Even the librarian as seen in 4.2.4.provided advice about healthy eating and physical activity. Children reported that teachers provided information about health, through the PE-Nut program's "Fit bit tips", as well as based on their own outlook on health.

"Well, well we got this teacher named [Teacher's Name] every morning she gives us a healthy PE-Nut tip [E1006, Female]."

"Umm, what you eat is what you are made of or something, just like our teacher told me...[E1003, Male].

4.4.1.3 Media

Media sources (n=13) included television (food network programs, movies, commercials) internet, and video games. The majority of the comments concerning media as a source of information pertained to the home environment. However one child described watching a documentary in gym class on the topic of health. The child's description of the movie, although not confirmed, appeared to be from the documentary "Super Size Me".

"Oh when I was in gym, I was watching this movie and it was about how this guy, he was eating lots of hamburgers and he got fat so he had to go to the uh [the], doctors [E1007]."

Television served as a source of information about which foods were considered healthy.

"Yea, they said like eat cereal, low fat stuff and then chocolate milk and stuff.Like to eat healthy and like eat stuff that's healthy and like you can eat a little bit of fat but not a lot ... "yes, like my family and uh the TV and stuff [E1008, Male]." [E1008, Male].

One child's justification for oranges being healthy was because she saw them being advertised on a Michigan commercial:

"Oranges [as a healthy food] ... I just think they healthy cause they always put em on like Michigan good stuff on commercials, so I'm just guessing that's healthy [E1006]."

One child mentioned using the internet as a means of looking up information about food, in addition to watching the cooking network.

"On the internet [source of information about food], Yea like I be watching the cooking show and my grandma tell[s] me what's healthy for me [E1013]."

The media was also a generator of fear and anxiety relative to the development of chronic disease. Participant E1002, fearfully described an event in which a 5 year old passed away of a heart attack due to weight,

"That you should be healthy that you shouldn't get really big cause the bigger you get the more health problems you get and you could die. From how big you are. Cause it's very easy to get a heart attack when you're big. Like a 5 year old on the news, he had a heart attack because of how big he was.

Participant E1014 (female), described feeling fearful about developing diabetes and high blood pressure. Although the mechanism regarding how she would develop diabetes from having high blood pressure was unclear, it was apparent that she was concerned about developing either because she understood that people had died from these diseases after viewing the information from the television.

"Umm. I heard a lot of people dying about it [Diabetes]. Cause like something sugar is a thing that I can't live without, and if my blood pressure goes up that's bad. That's why..... Umm just scared about my blood pressure going up.... If it goes overboard you, you can get very sick or die....

When asked where she got the information from, she replied: "*umm T.V.[source of information]*"

4.4.1.4 Healthcare professionals

Healthcare professionals such as physicians were considered a credible source of information about health, healthy eating and physical activity among some children (n=4). For example, one child believed that zucchini and carrots where healthy because it was mentioned by her doctor,

"the doctor said that's healthy. I forgot what else I named... carrots. They're healthy, because they got vita....mmmins in it [E1006]"

4.4.1.5 Organized Wellness, and Sports Programs

Among the 5th grade girls (n=4) attending School B, a majority of the information gathered regarding health, healthy eating and physical activity was perceived as coming from an afterschool twice a week program called Girls on the Run. Girls on the Run was mentioned as providing a supportive and encouraging environment where children learned about health, and engaged in physical activity. Girls on the Run was also mentioned as the source of information about self-esteem and healthy eating,

"well last year I did girls on the run and we talked about health and a lot of stuff [E1012]"

"Yeah. When I get home, on Mondays and Tuesdays we have Girls on the Run and we have to walk around the school. And so far I've been walking two to three miles every day and then I usually skate, because I like skating. Or I go outside and throw footballs around [E1009]."

"They talk about your health, they talk about how to be healthier and the reason I learned like, like they teach us a lot of things about health and also negativity and that's not really what's it about. But its much, much more about health.But girls on the run still helps me, it says don't eat that much fattening, and it also helps me with the exercise [E1014]."

Organized sports (n=3), served as sources of information about physical activity. Messages concerning health and physical activity were inferred through the child's engagement. Participant A002 viewed organized sports as avenues to enhance physical skills such as running endurance and motor skills.

"umm my football team, my basketball team and my baseball team..... well my football team helps me so I can run better and my basket ball team so I can uhh shoot better and my baseball team helps me so I can swing better and can catch better [A002, Male]."

Participant E1019, reported his team as a source of lifestyle information: "oh yeah umm my team and I play all day, always, [and they] always say like don't eat so you can play,... so you can be active and stuff [E1019, Male]."

Although his interpretation of the information was not factual, the message of not eating right

before engaging in vigorous activity was garnered either through coaches or his team peers.

Participant E020 participated in ballet and received information about the importance of building

muscle, for enhancing her performance as a dancer.

"umm well I go to I don't really know any places but I go to ballet and they, they help me shape my muscles and like be a better dancer...[E1020]"

4.4.1.6 Community Settings

The church was interestingly also listed as a source of information about food and health.

"oh I guess I do that church thing we do in summer and we talk about food and there's like healthy food and stuff like that[E1015]."

Participant E1006, acknowledged the Detroit Eastern Market as a place where she learned about food and health. She described her experience at the Eastern Market as an opportunity to taste, try unfamiliar foods, and not be afraid. She also described the Eastern Market as an environment where "junk food' is limited or not available. The Eastern Market is a place that she and her family have attended for several years.

"Oh, that's easy. In Detroit, at this downtown place, I don't know what it's called- East Market, yeah East Market, and it's real nice too, 'cause it's like they got, they don't sell no junk food or nothing, besides these honey sticks, but they're not junk to be honest, and it's like they got, they got a lot of fruit, vegetables, and that, and they give you samples, and it's like when I first went there, for my first time we tried, I was like three years old, and we still go, but my mom bribes me to eat this, um, I eat it with salad, but the way they put it, they have a lot of pepper and all that on it, but they said it was still healthy, and she begged me to eat but I say I didn't cause they cooked it, then I ran, but she had to catch me. And then I got it, I tried and it was very good, and we just always go there and they always have samples and stuff. Like, it was good. It was a pineapple, and I don't know, it was a different color inside, which I thought would be very disgusting, but it was good..... And I can try different foods without being scared [E006]"

4.4.1.7 PE-Nut Program

Messages from PE-Nut centered primarily on healthy eating and physical activity. This was

directly evident in the response from almost all (n=26) of the children.

"Mmm, a lot of, healthy foods on[and], how to live- how to live healthy [A001, Male]."

Participant responded,

"uhhh I learned how to be more healthy, and how to eat better...[A002]"

"...to be healthy and exercise.[E1004]"

"because they encourage you to eat healthy and not eat unhealthy, so basically, eat healthy more than you do unhealthy and work out and stay fit [E1019,Male]"

It is also important to note, that the children perceived the messages obtained from PE-Nut as valid information. For example when one participant was asked why she thought some of the food items she recalled were healthy, she explained that it was because the PE-Nut Educator told her;

"Apples, Oranges, milk, whole grain bread, whole grain rice... Because, because... (shy and trails off)..... (Quietly) Because Ms. [PE-Nut Educator] told us that they make our bodies stronger [E005, Female]."

Among the concepts learned, were the importance of "coloring your plate." having a variety of foods from all food groups, consuming discretionary calories in moderation and the importance of whole grains as expressed by participant A004 as concepts learned through the PE-Nut educator. They also expressed an interest in continuity of the PE-Nut education, evident in the following quote.

"Well, I learned about the grains and not eating the unhealthy foods. And that uh and that you can eat unhealthy foods but it's like eat it once a day. .. Well she [PE-Nut Educator] taught us about the pyramid, but I haven't seen her, ah, in a while so I'm forgetting about the pyramid.... She taught me, to color your plate I do that a lot.

Other students took away from PE-Nut that you should eat healthy as well as exercise. Participant A003 also introduced the concept of reading ingredient labels and discerning the contents of the food to determine whether they are healthy. "Um that you should eat healthy, and move around a lot, and you should choose like the right things to eat and you should always look on the pack of ingredients and see if it's healthy [A003, Male]."

For some students, the message processed from PE-Nut was to restrict certain foods and consume others in moderation. For example, participant A006, perceived ham as a food item he should not consume and that oil should be consumed in moderation,

"...and she tells you[that you] can't eat too much meat, like umm, she tells us you can't, you can't have ham, like eat the ham, [you can have]some oil but not too much oil in your food."

It also appeared as though the perceived reason why children believed that certain foods and macronutrients should be consumed in moderation was for the purpose of reducing weight gain; and that weight status was equivalent to good or ideal health. In this respect, food items characterized as greasy were perceived as needing to be consumed in moderation.

"I learned that you shouldn't eat greasy food all the time. We should eat good food for you or like we would gain fat [E1016, Female]."

"That you're supposed to eat healthy and not junk food all day...Like you can eat it once in a while but not a lot [E1008]."

"Um, that you should make healthy food choices all the time and it's okay to only sometimes eat unhealthy things, but you should stick to eating healthy [E1009, Female]."

A reoccurring health concern among children, was developing diabetes, which is particularly high among minority groups, "Um, that you should eat healthy and not eat fattening food, cause you can get like, diabetes from eating fattening food, and, that's pretty much it [E1003, Male]."

"Oh, from the PE-Nut lady? Oh I learned a lot. I learned lots of things from 1st grade all the way to 5th. So, one I learned that uh, that everything that has a lot of grease gets you fat and unhealthy. And if you eat a lot of butter, it actually uh it actually messes up your heart. And if you have too much salt, it goes as well [E1007, Male]."

"Umm I learned that we can, like every time we eat, we can, we can have little sweets now and then. But not as much umm; or we could gain weight if we have a lot of sugar or a lot of unhealthy things. And umm, umm you can always try new like; I never tried guacamole before but I tried it with PE-Nut, and it was actually good. So you can try new things and see if you like them [E1020, Male]."

Some children used the expression "good food" and "bad food" while explaining what they

learned from PE-Nut. This was a concern because characterization of foods in such a manner is

discouraged because it may promote food aversions and depending on food availability.

"I learned that don't eat bad foods, that uhh eat healthy food because it'll give you more strengths, and allow you growing up, you can get taller [A007,Male]."

Children also perceived that certain foods give your certain attributes and provide health

benefits, in their interpretation of messages from PE-Nut.

"Like, um what foods are good for you and what foods are not. And everything..... Tells us like if you drink milk or something it will make your bones stronger and everything she tells us what foods will do, will help your body and stuff and everything [E1003]"

"that if you eat healthier you'll get stronger, and if you eat healthier you be healthier [E1017, Male].

Despite the fact that the children associated certain chronic diseases with poor diet quality, it was clear that there was some misunderstanding of how such foods contributed to diet-related comorbidities such as cancer and heart disease (see E1010 response below). However, it appeared overall that children learned, that if you eat healthy and exercise, you will have fewer health problems,

"that the more healthy choices you make, the more you can get active, get out and play and the more you can get your body fit. And your heart- your blood can go through/flow smoothly and you won't have heart problems like cancer, and you could um...they help you enough to live longer [E1010, Male]."

"....she tells like [you] what you should eat that's healthy, and what you need, that's one thing... how you can eat and make, make your heart better [E1013, Male]"

The concept that healthy foods can be eaten in excess, and you can still remain in shape was a concept one student seemed to enjoy and take away from PE-Nut.

"I learned that you can eat all kind of foods any kind of food everything like healthy a whole bunch of healthy food but you can still be fit [E1013]."

The use of "Fit Bits" short nutrition messages provided by the PE-Nut program was specifically identified, as a source of information delivered by school faculty and staff,

"Mrs. [Name], the lady something like the PE-Nut lady she gives us PE-Nut bits every day. But in the beginning we never listened to them but when the PE-Nut lady started coming, we always listen to them now [E1006]."

4.4.1.8 Physical Education

Physical educators were also deemed as sources of information providing guidance and advice about healthy eating and physical activity. Children were asked about the most important lesson learned in physical education. Their responses ranged from describing certain foods which should be avoided, to concepts regarding teamwork. Among the food items that were specifically mentioned were candy or "junk food", as well as physical activity;

"oh! Not to eat, not to eat that much junky, junk food and don't just sit there while some, other people [are] exercising. They'll just stand there and watch everybody; 'cuz you really aren't getting stronger or you're not getting enough energy [E017]."

The majority of the (n=15) children indicated that physical education classes promoted physical activity. In addition, they received advice regarding how many hours should be spent engaging in screen time activities.

"Um, gym teacher tells me that he wants us to run around a lot and be active, not sit on the couch and watch TV or play games and stuff. And, she says that, that what you eat is what you made out of [E1003]."

"it tell me like eat right and you get in the food groups like the pyramid and thing and like you should like watch TV for only like an hour or like the computer for hour a day you should always get active [E1019]."

"Um, PE, gym. He talks a lot about food and we run around a lot and he tells us not to give up because if you do you're not gonna grow anymore like you're not gonna be better at it, get better at it [A003]"

Participant E1019 reported that the most important lesson he learned in physical education was

to stay fit and exercise and not to become overweight or obese,

"stay fit, and don't, don't grow up and be a big person [E1019]."

Some messages delivered to children did employ scare tactics, which seemed to generate a shock factor;

"Oh when I was in gym, I was watching this movie and it was about how this guy, he was eating lots of hamburgers and he got fat so he had to go to the uh, doctors. Then I uh uh, I uh our gym teacher told us [to] run 10 laps and we usually play lots of games in gym [E1007]..."

4.4.1.9 Peers

Peers are important sources of information including topics on health and food. Despite the fact

that the messages were inaccurate, and potentially had a negative connotation, children still

appeared to place some value on the messages from friends

"Sometimes, I don't bring anything [break for snack at school]. But if it is to bring something, Hot Fries and I learned from my friend. I don't know but I got paranoid again. She said if you eat hot fries every day you will burn holes in your stomach to make it more fattening [E1014]."

"They teach me not to eat fast food and to always eat good food or you like you will start to get fatter and fatter and won't be able to get friends [E1016]."

Children also provided strong opinions about what made their peers "healthy" versus

"unhealthy" based on the items chosen during lunch and snack time

"Not to eat candy, because not all the time because it's bad for you. And still talking about people, people that's not healthy the ah chips, sodas, doesn't bring healthy lunch. And lunchables, one person in my class brings lunchables to school [umhum] and he always giving it away so he could get healthy foods at lunch [A004]."

4.4.1.10 Additional Sources

Additional sources mentioned where information was gathered about health, healthy eating and physical activity were Social Workers, Guidance Counselors and Fitness Centers (Gym).

"Yes there was Miss [School Counselor], this is where we watch things about bullying and stuff and how healthy and being healthy is important [E1018]."

4.4.2 Internal Conflicts

The theme of internal conflicts emerged, when it became evident that certain children were struggling with their desire to eat healthy and lead a healthy lifestyle as well as resist the desires to consume foods that they identified as unhealthy.

"I think its [eat healthy] easy but hard cause like some days I like to eat healthy food all the time, some days I don't really like to eat healthy [E1005, Female]."

"Yeah it's real bad because yeah I think it's unhealthy because when it comes to junk food, I just love eating so I just get a lot of it.....well I don't want to make changes but I have to, 'cause I'm not trying to be big when I get older [E1007,Male]."

"And it's kinda hard to choose between foods that might have healthy stuff in it and that might not [E1010, Male]."

" [pause] hmmm... I don't know. Kind of in the middle....Cause, I feel like, eating, like, cookies and all but my momma only says you can eat that at least once a day..... Cause I still beg for junk food, but she [Mother] end up saying no, then I just get a apple or something and go upstairs. Cause I kind of still l like junk food, but it's 50-50. I still like vegetables and all, but I still like junk food [E1006, Female]."

4.4.3 Fear, Anxiety, Concerns

The theme of Fear, Anxiety, and Concern was exhibited around messages about health and consequences. The key manifestation seemed to be body image and weight fixation for some.

4.4.3.1 Body Image

It was apparent there was a fixation on weight among the children who participated in the study.

Some students reported restricting food intake in order to maintain their weight. They were also

motivated to engage in physical activity to control weight.

"Well one thing as long as I eat like very little, very little food I can at least like play outside and when I play outside I at least try to lose all bad and all and then pretty much, I'm pretty much fine really!... ummm well that for me, I don't know, just tired![E1022, Male]."

"ummm so I don't get chubby [E1018, Female],"

"I play outside, I ride my bike, I walk my dog, play at the park. Mostly outside since I wanna lose weight... It seems like people can do more things if you're not carrying a lot of weight on you [E1014, Female]."

All the children were ultimately concerned about being overweight, and recognized that food

played an important role. Most were motivated to eat healthy and be physically active (or eat less

n=1) for fear of becoming overweight or obese.

"Well, their good [school meals]. That's why I, they helped me loose weight and I go home I weigh 80 something ah I just don't want to be like that, so that's why I'm trying to get rid of it. My fat that I already have and replace it with healthy, well replace it. And I don't want to be fat no more [A004, Male]."

"Mmm, I'll say um, uh, well I think like I love corn and I like I love a lot of um vegetables and um the things that's like well I love to eat fish because they say fish is like healthy for you...And if you're on a diet, yea so I will I will love like to eat fish a lot. And ... I think they are healthy because like um like they have like they have a lot of calories in it...Well not a lot of calories, because it has less calories [E1013, Male]."

"I don't know, well I don't want to be big and stuff [Motivation to exercise] [A003, Male]."

"Well, I don't want to eat too much fruits because I'll get ,get fat again I, I like the, I just, like it the way they give me it, because its helping me, it really helps a lot.... Fruit Fruits, vegetables!, yeah vegetables! help me..[A004, Male]."

Children however, also viewed excess weight as a barrier to being physical active. There was

also a heightened concern about the health consequences of overweight and a poor diet.

"Um it's good to eat healthy because like you could actually run around and be an athlete or something cause if you're fat you couldn't really do nuthin. But you could get off the weight by eating and running [E1008, Male]."

"Um I think that I'll probably do the same thing because I don't wanna be big and fat and I don't wanna be obese and I don't wanna have heart, diabetes and stuff like that and heart disease. So that's why.... That's why that I'll eat the same way that I'm eating now [A003, Male]."

"Well usually I feel that if I don't get out too much, that I might not live longer--a longer life and that I won't be able to lose some weight. So I run outside and start playing [E1010, Male]."

4.4.4 Family Ecology

4.4.4.1 Parental Positive Reinforcing Behaviors

4.4.4.1.1 MyPyramid/ MyPlate Recommendations

We asked parents to share information regarding MyPyramid/MyPlate USDA recommendations.

Most parents were unaware of the MyPyramid recommendations but several (n=9) had an idea of

the food groups and concept of MyPlate. However, we did notice a difference between parents who had an overall balanced understanding of the USDA Recommendation and those who did not. Parents, who had a more balanced understanding, displayed more confidence as evident in the following responses by E019.

" I do. I don't know much, or exactly what it is. But your plate should be mostly fruits and vegetables, and a sufficient amount of protein, and then um, small portion of carbs and should be no sweets, but low amount of sweets. And for a dinner plate should not have fruits but that whole pyramid thing... Hm, I actually think it's pretty easy but I do think you have to do research as far as like, you're asking serving sizes and I don't know. And I consider myself pretty healthy; I try to make sure we get a well balanced diet and you know do exercise and stuff. But I do stuff that I have to spend time on and make it a lifestyle- better lifestyle. And even without knowing the serving sizes, I can still incorporate them in my diet; and I'm sure- I'm more than, 100% sure- that we get enough and on daily basis. So I do think it's easy to do, I just think I should probably research what the actual serving suggestions are [E1019, Female]."

Parents were partly able to describe the serving sizes, but it was clear that this was an area in

which further clarification and nutrition education was needed.

"Dairy, fruits & vegetables. And I don't know exactly they should eat according to each category every day [E009]."

"I don't know exactly. But she said dairy, fruits, vegetables, and protein, the carbs, and of course the fats. I want to say for protein, 5-6 servings a day..? and then the fruits and vegetables: 2 to 3, and I'm not sure about the carbs and all that other stuff [E019]."

Parents also expressed that they believed that they had control concerning their child's dietary intake. This is a positive position to hold concerning the home food environment. By taking control, parents likely assume responsibility for the foods they bring into the home, as well as for their children's intake.

"I think parents have more control than we realize, because we're the ones that bring the food into the home. The children don't work, they don't get the groceries [E009]."

4.4.4.1.2 Obesity Concerns

Participant E019 also believed that the trends that we see in childhood obesity, did have a lot to do with parenting. However, her approach, was slightly different. She actively engaged in physical activity, with her family, and self-reflected on her dietary habits to see if there were areas in which she could improve. She incorporated a menu, which would allow her to plan out meals in advance, to cut, cost and reduce the amount of convenience food shopping on days when there was a high volume of activities.

"I think it comes from home, is what I think. I think it's a lot of lack of um, lack of knowledge. Parents don't know and so therefore their kids don't know, and before you know it you're looking at an obese kid. Yea and just um as I've gotten older I've noticed that you know my taste has changed and I too am on that bandwagon of wanting to you know be healthier. And just looking at my own diet and you know just seeing where I can make changes. I think I've been a I grew up with a good base for being pretty healthy, but I still you know had changes that I needed to make too so it just kinda made me look at my own eating habits and just to see what I can do better. And actually, since the beginning of the year, I started doing a menu for at home. And I have it up on a board, one of the dry erase boards. And so I do a weekly menu so I can kind of think out you know what- what's gonna be a healthy meal, for Monday, for Tuesday you know for the whole week, and then that helps me grocery shop. And then the kids know what to you know what to do. And sometimes when I make small tweaks to the menu then they're like "well what happened to that?" "That was supposed to be for today." But sometimes I have to make a change because of whatever reason but um but yea, yea "E019."

4.4.4.1.3 Personal Motivation

Parents who tended to reinforce positive balanced understanding were self-motivated to lose

weight and follow a healthy lifestyle at home.

"What's something that helps you- helps me? My own self, I guess [E019], "my children...they keep me busy[E009]."

4.4.4.1.4 Parent Physical Activity Messages

Parents who actively engaged in routine physical activity, were motivated by their personal goals to encourage the family to follow their example.

"uh that it's good for you. You start with what you can do, your personal goal, and you work at it. It's hard but it wouldn't be worth it if it were easy [E019]."

4.4.4.2 Parental Behaviors that Potentially Reinforce Misconceptions

4.4.4.2.1 MyPyramid/MyPlate USDA Recommendations

We asked parents to share information regarding the MyPyramid recommendations. As noted earlier all parents struggled to recall the recommendations and serving sizes for their children according to the USDA MyPyramid/MyPlate. We did notice a difference between parents who had a basic understanding of the USDA recommendations and those who did not. It was also apparent that fundamentally parents, who did not display a balanced understanding were wary

(or afraid) of certain foods, because they linked these foods to certain health complications.

"Um I know I've seen it. (Child's name) brought some information home from school, and we looked through it. It says you're supposed to have more fruits & vegetables on the plate, versus less proteins. Carbohydrates definitely aren't good [E009]."

When asked why she felt this way she responded that,

"you need them but they do, they can..too many carbohydrates can cause you to have problems with your health. Along with diabetes, and things like that [E009]."

4.4.4.2.2 Convenience of Fast Food

For the majority of the parents, meals (especially fast foods) were eaten away from home to accommodate busy work and child activity schedules, for convenience, or as a part of family rituals, such as family night. When asked why foods were eaten away from home, participant E010 mentioned convenience,

"Convenience. I'm not gonna lie- [E1010]."

Family socializing was also a reason for eating convenience foods,

"Sometimes family night. I do Pizza Hut family night once a week. And like she said convenience. McDonalds is closer why not [E006]?"

4.4.4.2.3 Outlook on Food and Health

Parent's outlook on life determined likelihood of engaging in healthy behaviors. The media had interesting mixed influences on parents. It was sometimes not clear if sufficient information was given or if the sources was misinterpreted. Some specific sources of information in this respect were books and day time television shows, such as Dr. Oz and the Doctors.

"I heard suff on TV like Delilah, you know Delilah there on channel 2, about eating healthy but I've never you know actually looked into it. I'm not a real big health fanatic. I kind of live day to day and I figure that what happens happens. I don't think about what I eat, I'm not gonna lie. Cause you only got one life to live, as long as I'm not (indulgent?) and being greedy I live, I eat. Same with my kids, I don't restrict them [E010]."

"No". "I read in a book that we shouldn't eat a lot of red meat due to issues related to digestion, and that's a big part of fatty intake. We should have a lot more dark green vegetables, dark green and orange vegetables and fruits to balance out a healthy lifestyle..... [E010]."

4.4.4.2.4 Views Regarding Childhood Obesity

Parents were asked to share their views on the issues surrounding the childhood obesity crisis. During the focus group, two parents discussed how they addressed weight issues with their children within their own households. Parent E006, addressed the issue by changing the household environment, but also discussed her concern with her child in a more direct manner, not taking into account personal feelings of the child. Participant E010, took a more indirect approach with her child, in an attempt to avoid adverse feelings, which she believed could arise if not handled sensitively. Their fundamental belief was that way too many children were "fat", and lack of supervision or negligence on the parent's part was a key factor to childhood obesity.

"Parents [are] not paying attention to what they kids eat. I don't think there's any excuse for any child to be overweight because I feel like parents should just supervise what their kids eat. Cause like with [Daughters Name] when I realized my baby was wearing a 5-6 Juniors- not 16's no more, I immediately changed everything in the household, ... as far as eating and I talked to [Daughters Name] and I was like look, you don't want to be 12 years old looking like Precious. ...I'm for real though you gotta talk to your kid. Parents these days they don't. I feel like if you're not paying attention to your child and you know what another thing is too? If the parent don't care about their weight, some parents might not care cause I got a god sister and a god mother and the mama is super super fat and [it's] ridiculous and so is the daughter and I don't think she care cause they go and just eat goodies together. ... I said with my daughter, I sat down and I talked to her I explained to her, some of the stuff might of hurt. Cause I know it did hurt her when I told her do you want to go to prom and look like Precious? But I don't care. Cause I rather break her down on the inside and make her drop her weight now and think about what she eat[s] at an early age instead of just and be 12 years old and it be harder for her to lose it. ... [E006]."

The direct approach, was viewed as a little harsh for the other parent, who responded

"You don't want to sit there and get your kids so upset that they feel like they're being cut down though, you know what I'm saying?.... Like cause I do say stuff to [Son's Name] like dude you need to slow down cause you're getting fat. And then I look at it and I'm like ok you know I'm not trying to make you go throw up or be bulimic anemic but you need to really slow down. And I do the same thing with [Child's Name] and [Child's Name]do you really need seconds? I mean look were trying to eat healthy here do you really need seconds? You can have some jello before bed or something. [E1010]" "You don't want to be too mean though [E010, Female]"

"Yea but I feel like with today's society and with today's kids it works better that way. Because I'd rather herself [be] conscience think about what I said 3 days later whether it was mean or not instead of do it. I don't care if I did say you was gonna look like Precious. Every time you sit in front of that plate you're goona think 'damn. I might get fat like Precious.' Oh well I bet you gonna push the plate away [E006, Female]."

"Or you're gonna eat it and you just won't care [E010, Female]."

"Yea and that's when you get to the point where you know your child needs help and that means nothing you're doing is working [E006, Female]."

"Cause I always tell my daughter do you want to get big like me and not be able to lose it [E010, Female]?"

Participant E006, believed that her daughter, was able to handle such criticism as opposed to other children who may need a more sensitive approach; that it depends on the child and the family.

"You know some people- some kids like, like I said, I guess this will fall back to what I said before, like I do say rude stuff to my daughter to make her think about it later but not all kids can take that some. Kids their parents might say that to them and they might want to go kill theyself or something so to each his own and it all depends on the kid and the family [E006]"

Another distinction between the two family ecologies (families that reinforce positive understanding and families that potentially elicit negative behaviors in children) was the source of motivation. Parents were motivated to make healthy food choices in their home environments because of their children's weight status (overweight) or because they themselves were overweight or obese. This is likely why they had such strong emotions towards the children's weight status.

"My kids already being overweight. Me being overweight, and I'm trying to lose weight and I want my kids to lose weight [E010]."

"Same thing me being overweight and just wanting to cook healthy and wanting to be healthy so yea that's it [E006]."

4.4.4.2.5 What Parents tell Their Children about being Physically Active

Parents' response to talking to their children about physical activity was also interesting; one parent took a more direct approach, telling her child that they should engage in physical activity so that she could lose weight. Although similar views were held by parents behind motivating their child to exercise, the parent's did not reach a consensus on the approach. Messages portrayed to their children included:

"Need to lose weight, work out [E010]"

"Yea. You need to lose weight work out and in order to lose weight you got to exerciseand eat healthy [E006]."

Parent E006, also mentioned that her messages regarding the need to engage in physical activity differed between her two children in the same household, based on child's weight status.

"I don't say it to my skinny one I just say it to my medium built one because I want her to lose weight. Yea the skinny one I don't bother, matter of fact she needs to eat more cause she's bony [E006]."

Parents who were exhibiting parental behaviors that might negatively reinforce child behaviors tended to be motivated to engage in physical activity for fear of dying. Despite this being a motivation to work out, E006 viewed family activity as a time for family fun, and did not view it as exercise.

"Life. Like what she said I don't want to die at the age of 40.... I want to live to be long and I don't want to have diabetes high blood pressure any of them things that be killing people ... Family time. It's things that I don't even consider it to be exercise we just get up and do stuff. Yea, I don't base stuff on exercising" [E006]."

4.4.5 Child Understanding

Child understanding of food and nutrition emerged as a grounded theory theme as we evaluated the children's views on their food environments, personal eating habits, the potential to change their eating habits, level of understanding regarding healthy eating and physical activity, personal views on school meals and snacks, understanding of weight, and the relationship between weight and foods. We found that children responded in a manner that exhibited personal reflection and reasoning.

4.4.5.1 MyPyramid/MyPlate

In the assessment of knowledge concerning MyPyramid/MyPlate, most children a demonstrated basic understanding of MyPyramid or MyPlate recommendations. This was evident in the following quote,

"Um, I know you should have vegetables, dairy, um, protein, and um, [pause] I forgot the other one but you should have it on your plate every time you eat something. Um, I think half the plate of fruits and vegetables, a cup of dairy, and then oh um, ¼ of protein [E1009, Female]."

The children who demonstrated a sound understanding of MyPyramid/MyPlate

recommendations provided either an overall objective of the recommendations or a description

of the food groups,

"yes, the MyPlate pyramid. I mean the MyPyramid- is like a pyramid that tells all about healthy food choices. And I'll give you some examples. Like the fruits, vegetables, grains, meats, and dairy. And they have specific stuff that go in each category. And there's the sometimes category at the bottom, that let's you know sometimes you can have it, sometimes you can't. And depending on the category, you should have at least 1 thing from each category [E1010, Male]."

"Um I think that's what you should do because um they give you ideas how you can be more healthier and that you should exercise more like they have it on the pyramid. They have a lot of comments they say that you should exercise more [A003, Male]."

A notable concept, aside from mentioning the food groups, was coloring your plate.

" (quickly) eat the right foods....Color your plate.... Eating colorful things, like vegetables [A005, Female].

4.4.5.2 Personal Eating Habits

Personal eating habits were assessed to acquire, information concerning how the individual felt about personal eating habits. A majority of the students (n=15) felt that their eating habits were acceptable, while others understood that improvements could be made but were content without making changes.

"...I eat a lot of fruits and vegetables and I always have every food from the food groups [A003, Male],"

"yeah yeah most, most of the time [eating habits healthy] hmph fruits, vegetables, pasta, spaghetti, umm and some other stuff I don't really know what to call them my mom

cooks some stuff I don't really know but it's good [provided examples] I always eat healthy [E1019, Male] "

When probed on how to maintain a healthy diet participant A002 responded as follows,

"Just pay attention....don't uhh don't get the greasy stuff you don't want to get to your plate just get fruits and some stuff you want. [pauses] I really don't know, ummm try not to, uh don't pay attention to the other stuff just eat what you have [A002, Male]."

The remaining students (n=7) were well aware of the changes that could be made to improve

their personal eating habits, but were content with not making change.

"I eat a lot of junk food mostly.. and then like if I, well, at home I usually eat a lot of apples and celery is really all I eat for fruits and vegetables and the rest I just eat junk food ... my junk food is unhealthy... [Views on overall diet] mostly unhealthy."

"hmm hmph.. I don't like it... no...: yeah [I would be able to make changes] but I don't... I can but I don't want to because I don't want to [E017, Male]"

The children were asked to explain if they felt there was any relationship to their current diet and what will happen as they age. Responses were mixed, but essentially suggested that future circumstances may change, and some did not see a relationship between current eating behaviors and health.

"Well, when I eat now it's good, when I get older. I don't know if I'm going to eat the same things [A004, Male],"

"umm no because I could've change my eating habits when I'm older than when I'm younger [E1020, Female]."

"no....because like you could, you could change while you, like say you were eating fast food and umm like you stopped eating fast food and start eating healthy and then you'll lose weight and stuff like that [E006, Female].

4.4.5.3 Relationship between the Foods and Weight.

The children were asked if they believed there was a relationship between the foods consumed and weight. The majority of the students (n=17) agreed. They were then asked to explain why they thought there was a relationship between the foods consumed and weight. Some students expressed a more balanced understanding that certain foods if eaten in excess could result in weight gain (n=10). Sample responses were;

"That um, it, if you eat healthier foods it can help maintain your weight and the more greasy foods you eat, it makes you overweight and helps you gain weight [E1009, Female]"

"Like, if you don't eat healthy and you just eat non-healthy foods and don't exercise you'll get fat. But if you exercise and eat pears and apples and snack and stuff and have like a small piece of chicken and get active you can get healthy [E1018, Female]."

4.4.5.4 Physical Activity Habits.

The participants were also asked to discuss their current physical activity habits. Some students (n=11) expressed that they were confident with the amount of physical activity they engaged in, on a regular basis. Others indicated that this was something they needed to improve.

"I need to get out more, outside more... Cause um I spend a lot of time in front of the TV."

For some students (n=5), the amount of physical activity they should engage in daily was unclear.

"well one, at least an hour I guess [be physically active] [E1019, Male]"
4.4.5.5 Views on School Lunch

Children were asked to explain their views on school lunch, and whether or not they believed it was healthier to bring lunch from home or eat the lunch provided by the school. The responses varied,

"I think its' healthier to eat lunch at school 'cuz mostly everything on the food menu is whole grain ... and whole grain and healthy for you [A001, Male]."

Participant E018, relied on school meals due to financial constraints at home, but was of the opinion that schools should offer both healthy and "non-healthy snacks."

"I think there should be more healthier snack choices at school but I also like to eat chips once in a while you know. I think they should have healthy and non-healthy snacks at the snack cart so they have two always you can have a healthy snack and non healthy snack..... umm lunch provided by the school. They can't do stuff at my house because uhh we're running short on money [E1018, Female]."

4.4.5.6 Food Environment

Children who lived in environments that had limited access to grocery stores or parks were

cognitively aware of certain changes, which could be made to the environment to promote

healthy eating and physical activity. Participant E1002, for example shared his views on what

environment changes he would make.

"I would make it- I'd make sure that it's easy to get them... Um healthy foods.... I'd go to the grocery store. Ok, if I was the mayor I would put a grocery store where um eagle's market liquor store is [E1002, Male]."

4.4.6 Child Misconceptions

Misconceptions emerged as a theme, because it became evident that some children were combining error with truth. Their understanding of food (n=9), healthy eating (n=20), health (n=11) and physical activity (n=17) was slightly skewed. Some interesting examples follow, which included the notion that certain fruits were unhealthy and would cause weight gain.

" Um, all the vegetables, fruits, [umhum], but not fattening fruits[umhum], and healthy drinks [umhum], like milk and dairy products, like yogurt and..and yogurt and .. something and oils that doesn't including fattening and grains.....I think grapes [umhum], oranges, mango are fattening fruits, not the apple.....That's, that's because it made me fat, and my mom, and I had to go to the gym with my dad to help me workout and be skinny again [A004, Male]."

"Cause of the calories.... It has salt and stuff and olive oils and stuff and it um builds up in molecules I think and they come together and make fat.... It makes you bigger [E1002, Male]."

4.4.6.1 Healthy Eating and Physical Activity

Most children viewed (n=26) eating healthy as being associated with being smart, tall, and fast,

"Hm, they are- they are strong, mmm.... smart and They don't get sick a lot. They don't get colds and stuff like that. They viewed children who were unhealthy as slow, weak, sickly, and not as intelligent "Um, not that strong and...they get- they get sick a lot.... and they ...well, they are lazy in class [A001, Male]."

Misconceptions were identified concerning the amount of time and types of physical activity

children should engage in (n=15).

"Hm, well, I don't think hiking or um, walking or is good exercise 'cuz you're not doing nothing much.... at least half an hour..like, 4 times[a week] [A001, Male]."

4.4.7 Data Triangulation:

Data triangulation occurred in several ways: objective vs. qualitative, parent vs. child, child vs. school menu. The FNPA tool, used to identify obesogenic environments, was triangulated against the parents' report of their home environments and the child's current BMI percentile for age status. Parents whose overall FNPA score fell into the at risk category tended to have children who were overweight, and whose family ecology appeared to support a more unbalanced view concerning health, healthy eating and physical activity reported among children. Parents whose FNPA score fell into the acceptable category, tended to have a family ecologies that appeared to support a more balanced view on health, healthy eating and physical activity. The children's account of the dietary intake was crossed checked against the items available on the school menus. The use of this method assisted in both verifying and validating the child's ability to accurately recall items eaten within a 24 hour time period. Child and parent qualitative interviews were crossed checked against one another for accounts of similar events for example, children and parents account of family activities,

"We play on the trampoline, sometimes we play little big game of baseball [Child]."

"Like if they're having fun they don't even like realize that they're getting exercise so right now I've got the pool going in the back yard so they're swimming like all day every day and we've got the trampoline in the backyard so they're either on the trampoline or in the pool or going back and forth [Parent]."

"oh and bikes, bikes, bike sometimes... oh boy umm I tried and it was not a good sight. So that's something that I'll set a goal for over the summer but I got on the bike and umm I was clearly winded, and my legs hurt really really bad after, after going around the block maybe like one time. That that one time [laughs] so that's my goalactually get on a bike umm but I thought since I've been doing elliptical thing that would be a breeze but I guess maybe it's a different form of yeah so... [Pause] that's my plan to buy a bike and still have to do that this summer [Parent]. "When my mom was not old. Not saying she's old she turning forty though. Umm wait she already forty because her birthday is today. So I guess, umm when, when she was like 37 or 38 we used to ride bikes together. I think the only reason why we can't do that any more is because she maybe doesn't feel like it [Child].

Similar perceptions and concerns regarding their weight.

"" "great I mean ... mommy daughter time ...because we need to lose weight so it's so much better working on it together, make the effort together[Parent]."

"I play outside, I ride my bike, I walk my dog, play at the park. Mostly outside since I wanna lose weight [Child]."

"My parents always said how my sister was so skinny and I was the "chunky" one; and how she was the pretty one and I wasn't. It started from there [Parent]"

"That's, that's because it made me fat, and my mom, and I had to go to the gym with my dad to help me workout and be skinny again [ChildA004]"

Perceptions concerning healthy foods,

"I make myself drink the juice. I am not a vegetable eater because I have six children and I don't have time to watch what I eat. I'm always on the go so I go to the grocery store and get the fresh juices [Parent]."

"Well, some foods make you skinny. Like protein drinks, and healthy drinks like apple juice ... [Child]."

Barriers to physical activity due to concerns regarding neighborhood safety,

"Nothing... Cause we live in the projects and it's just a bad place [Parent]."

"Sometimes the place isn't safe. Most of the time and there is enough area to play [Child]."

Triangulation of the child's survey questionnaire across the parent's qualitative interviews also occurred. For example a child reported being bullied in the survey questionnaire and the parent also discussed this event in the qualitative interview,

"[Child's Name] is smaller than a lot children and tender hearted, So [Child's Name] can be the kid pick on. I think once they've seen him cry [other children] and everyone knows they can make him cry I mean, he gets picked on, on the bus, he gets picked on in school, he gets picked on a lunch, he gets picked on at recess, he gets picked on outside at my house... [Parent]."

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Discussion:

Diet and physical activity play a key role in weight status and overall health. In order to describe the demographics of the 5th grade students and their primary caregivers, we evaluated their weight status, dietary intake via the Healthy Eating Index (Weinstein, 2004), food security, and physical activity behaviors. Childhood overweight and obesity were found to be a major health concern among the children within this study. Fifty-nine percent of the children were identified as either overweight or obese. Recent data for the state of Michigan, showed that 15% of youth were overweight and 12.1% obese (YRBSS, 2011). The proportion of children who were obese among our population was therefore higher than both the national prevalence of 18% and state for children between the ages of 6-11 yrs. Although a small sample due to the qualitative nature of the study and limited parent response, overweight and obesity was staggering for the adults. Ninety percent of the adults who participated in the study were either overweight or obese, some of which exceeded a BMI greater than 36 (BMI ranged from 22-44). Research has shown that children who are obese in childhood and adolescence are more likely to become overweight or obese adults (Brio, 2010; Whitaker, 1997; Sreula, 1993; Han, 2010).

We were able to identify parents (and potentially children) who are at risk for chronic diseases such as Type 2 diabetes, cardiovascular disease and hypertension based on family history, waist circumference and weight status. Although waist circumferences cut off points have not been established for children, it may be plausible to assume that based on family history, dietary intake and BMI percentile for age that these children may also be at increased risk for developing a chronic related disease. Therefore, our data showed that both children and adults were at risk for developing chronic diet-related diseases (especially Type 2 Diabetes) based on their current weight status and family history related disease.

When dietary quality was assessed, children who were obese had an average HEI score of 61.4/100, which falls into the "need to improve category" (Kennedy et al. 1995). Regardless of weight status, children showed the need for improvement in the areas of consuming whole grains (1.3/5), total vegetables (2.6/5), dark leafy greens (2.6/5), total fruit (3.3/5), and whole fruit (3.1/5). The sodium intake was also relatively high (2.6/5) supporting the greater intake of "fast" and processed foods reported within the children's diet. This data supports findings from the YRBSS 2011. Among adolescent youth in the state of Michigan, 36% reported eating vegetables and 38% reported eating fruit, less than once per day (CDC, 2011); indicating that the low consumption of fruits and vegetables among the middle to young adolescent population needs to be addressed. This was also true for the subset of parents who showed very few inconsistencies between their dietary quality and that of their children. Encouragement of diets high in fiber and promotion of fresh fruits and vegetables through nutrition education is vital to ensure adequate diet quality and reduce the risk for development of diet-related diseases. Diets high in fiber and adequate in fruits and vegetables are key to reducing cholesterol levels, controlling blood sugar levels and to maintaining a healthy weight (USDA, 2010).

The Family Nutrition and Physical Activity (FNPA) screener, served as an important instrument for capturing parental practices in the home environment. Among the parents, 81% were at risk for creating and obesogenic household environments for their children. Among the family behaviors assessed were physical and sedentary activities such as screen time and television monitoring, environmental support, and engagement in family activities. Seventy percent of the

children whose parents FNPA score indicated a household environment that was at risk of being obesogenic, had children who were identified as being overweight or obese. Therefore, as shown in numerous studies the family home environment is an important consideration when assessing lifestyle factors and health (Strauss & Knight 1999; Campbell et al. 2006; Campbell et al. 2007; Larson et al. 2013; Boles et al. 2013).

Food insecurity was also an issue among children and their families. Forty-one percent of children mentioned experiencing some degree of food insecurity and 48% of children reported being concerned that food would run out within their households before they would be able to purchase more. In the United States, 14% of households reported being food insecure for some period of time over the course of the year in 2009 (Nord M, 2009). Specifically in Michigan, 21.4 % of children were living in households which reported being food insecure (Virginia Common Wealth University Center on Human Needs, 2011). Among the avenues in which parents and children reported dealing with issues of food security in the households were going to relatives and receiving food and the use of food banks. In light of the current economic situation and newly implemented government policies concerning food assistance programs such as new policy requirements for the Supplemental Nutrition Assistance Program and a decrease in the dollar amount of benefits received November 1, 2013 due to the end of extra benefits offered through the stimulus package provided to participants, food insecurity could potentially be a concern for ensuring adequate dietary quality(Nord 2013; Smith 2013; Michigan Department of Heuman Services n.d.). It was interesting that among the 27 students who participated in the study 25 reported eating school meals every day, (only 3 of whom were not eligible for free or reduced price meals.) Among the eligible participants one student reported never eating school

meals and 3 students reported eating school meals only a few times per week (once to three times per week). Therefore, in this group of evidently food insecure students, school meals were an important source of daily food and nutrition.

Eight percent of children were not meeting the recommendation of 60 minutes of daily physical activity. Eight-one percent of children engaged in physical activity less than or equal to 3 times per week for 30 minutes compared to the recommended 60 minutes of physical activity daily (USDHHS, 2008). Within the state of Michigan, physical activity was also a concern for children. Overall, in 2009, only 47% of youth reported engaging in physical activity for 60 minutes five or more days per week (Boinapally, 2011). Physical activity within the state of Michigan has since increased in 2011 to 49% of youth reporting engaging in physical activity for 60 minutes five or more days per week (YRBS, 2012). Contrary to Parrish et al. (2011), peer bullying among our subset appeared to have a minimal effect on willingness to engage in physical activity. Only 11% of children within our study reported not wanting to engage in physical activity because of peer bullying. However, teasing was mentioned by both the children and parents as a barrier to engaging in physical activity. In addition, parents were unaware of the recommended amount physical activity required for adults; their response ranged from 3-4 hours of physical activity to 40 minutes. Only three parents were able to identify the correct amount of daily physical activity required, two of which determined this information from reading literature and the other through a weight management class.

While the majority of the students reported watching television for 2 hours or less (55%), 44% of children reported engaging in 3 hours or more to television viewing. This was higher in comparison to the 30% of Michigan youth who spent 3 or more hours watching television in the year 2009 (Boinapally, 2011). Eleven percent of children within our study spent greater than

5hrs playing video games in comparison to the 23% of Michigan youth who spent 3 or more hours either on the computer or playing video games (Boinapally, 2011). Therefore screen time, which is perceived to be a major concern by many (Wagner et al, 2012; Rey-Lopez et al.2008;), is also notable in this vulnerable group.

The qualitative findings provided a more in-depth insight in to what children, and their primary caregivers perceived as barriers and facilitators to healthy eating and physical activity within the home, school and neighborhood environments. The major contributors to healthy eating and physical activity within the home were positive family support and interestingly use of media. Family encouragement and involvement in healthy eating and physical activity behaviors was deemed especially important. Similar findings were evident in a study by O'dea (2003), where children also acknowledged family support and engagement in physical activity as a contributor to healthy lifestyle behavior. Family involvement, engagement and support is key to both a positive outlook on healthy eating and physical activity, as well as to ensure adequate food intake among adolescents. Fisher et al. (2002) found parents fruit and vegetable intake to be a predictor of children's dietary intake. This implied that parents who eat the recommended amounts of fruits and vegetables will also have children who will meet the requirements.

It was interesting to note that while we typically view television as a potentially negative influence (Marshall ,2004; Eisenmann , 2002), our findings showed that children reported the television and interactive video games (exergames) as facilitators to healthy eating and physical activity. Recently, more child friendly networks have begun to embed nutrition and physical activity messages into commercials and programming. Linebarger et al. 2008 displayed embedded nutrition messages within televised public service announcements and found that children were able to apply the nutrition concepts within a natural setting. The use of video

games, more specifically those which promote physical activity, as a facilitator is a fairly new concept emerging over the past several years. Exergames have been linked to improvements in self-confidence and esteem, by reducing social anxiety that may arise from engaging in physical activity with large groups of people (Song, 2011). We found that some students enjoyed certain activities such as dance, however, avoided doing so in the presence of peers; but reported spending at least an hour playing the exergame "Just Dance". The use of exergames to increase self-confidence in engaging in physical activity is therefore a novel idea worth exploring where warranted. Among the participants in this study, some reported peer bullying and exclusion from group physical activities. In addition, several students reported purposefully not bringing proper gym attire, and sitting out during physical activity. If children could improve their selfconfidence and motor skill development through exergames within a safe environment at home, they may also be able to translate this new self-confidence into a larger social setting among their peers. Exergames are assumed to increase skill and physical fitness overtime (Warburton, 2007). The child's sense of achievement may serve as motivation and encouragement to continue. Sixteen of the children who reported playing video games (not necessarily exergames) were either overweight or obese. Therefore, exergames could be a "healthier" alternative to more sedentary screen activities. Parents also viewed family time spent playing exergames as facilitators to physical activity. Parents reported that by allowing children to engage in physical activity through the use of exergames, the safety of their children within their neighborhood environment was not compromised. This is especially important to mention given the reports by both children and parents that physical activity was a problem because of unsafe neighborhood environments.

A key facilitator in the home environment, to healthy eating mentioned by parents, was limiting the amount of "junk food" in the home. Numerous studies have indicated that improving the home environment will promote healthy eating (Anderson SE et al. 2010; Hanson NI et al. 2004; Haire-Joshu et al. 2008). Messages from PE-Nut also contributed as facilitators within the home environment as specifically mentioned by both children and parents.

Physical activity barriers identified within the home environment by parents were time, lack of interest in physical activity, and cost associated with paying for gym memberships and physical activity programs for their children. Similar reporting's of barriers to physical activity were expressed by children such as parents being tired and their parents going to work. Media, in form of television, was also viewed as a barrier to physical activity among children.

The barriers found in the home environment included established family practices, which sometimes included the use of a non-factual information as scare tactic to increase intake of fruits and vegetables, negative comments regarding weight status and body image, use of food as a reward, family gatherings, and insufficient monetary resources to purchase fruits and vegetables. These are all serious considerations for intervention in this or similar communities. Participant E006 for example possessed an authoritarian parenting style who was very proactive in changing the home environment. However, the authoritarian parenting style has shown some adverse effects especially in relation to healthy eating, physical activity and the need to control weight status (Enten et al. 2009; Darling et al. 1999; Golan et al. 2004). Children who have had authoritarian parents have been shown to develop disordered eating behaviors (Kluck, 2008;Golan et al. 2004). The barriers to healthy eating expressed among parents were family members disinterest in healthy eating, finances and the cost of fruits and vegetables, as well as conflicts with family meals due to work related commitments. In terms of weight, most children

felt that they were of normal weight status. It is evident through, children were struggling with their weight perceptions. Thirteen children felt that they needed to lose weight; of which 3 were of normal BMI percentile. They indicated that they felt that their weight was too high in comparison to their peers. In terms of perception by weight status, 37% of the children identified as overweight or obese partly agreed with the statement exercising and playing can reduce future health problem. Sixty-two percent partly believed that being overweight put them at risk for health problems like cancer. Children who were overweight or obese tended therefore to exhibit self-denial, regarding how their current weight could impact their own health, despite verbally expressing how poor dietary habits and inadequate physical activity related to health. These finding are not unusual, especially since the literature supports a parental lack of sensitivity to accurately perceiving children's weight status (overweight or obese) and their associated health risk complications. A study conducted by Hyman et al. 2000, among African American and their child weight perceptions showed that among the identified 57% obese and 12% super-obese children identified only 44% of the care givers perceived their children's weight to be a potential health problem. Hyman et al 200 associated the minimization of child health risk to cultural differences, knowledge deficient concern the future health implications of childhood obesity, and optimism bias regarding personal health risk perceptions (Young-Hyman et al. 2000). Etelson et al. 2003 found similar finding among the parents of obese children. According to Etelson et al. 2003 study, only 10.5% of parents of obese children (2/19) perceived their child's weight accurately compared to the 59.4% of other parents (38/64; p = 0.001) (Etelson et al. 2003). Among the school facilitators children found the PE-Nut program as a valid source of information concerning healthy eating and physical activity. The PE-Nut program was

instrumental in children trying new foods, learning both MyPyramid and MyPlate

recommendations and sharing this information with family, which was mentioned as also encouraging healthful eating in certain households. Teacher modeling was also found as contributor to healthful eating. One participant specifically mentioned that by seeing a particular teacher practice healthy eating, it made her feel as though eating healthy everyday could be easy. Subliminal messages, as also shown by Nairn & Fine (2008), Townsend et al. (2011) and Crawford et al. (2010), within the environment (having those around you eat healthy) promoting healthy eating and physical activity were positive influences and served as personal motivators. In the schools, where the salad bar was available, children found that to be a facilitator to healthy eating. Children enjoyed having the option to choose fruits and vegetables during lunch. Availability of fresh fruits and vegetables was a contributor in both schools. However, children and parents both wanted to see meals prepared onsite and have more fruits and vegetables offered during school meals. School meals were prepared at the local high school and transported to the elementary school for dispersal during lunch. Parents found the school offering of whole wheat products and school breakfast as facilitators to healthy eating for their children. Children expressed events such as classroom socials as barriers to healthy eating. School meal preparation was reported as a barrier by children. Children expressed the certain items prepared for school lunch appeared to contain a high amount of fat and meat items not thoroughly cooked as a barrier to eating school meals. The replacement/the alternating of physical education with art and media classes was also mentioned as a barriers to physical activity among children in the school.

Girls on the Run, an afterschool program designed specifically for girls, which is voluntarily supervised and run by teachers. Students engaged in physical activity twice a week in preparation for a 5K run upon the completion of the program at the end of the year. Parents found this program to be a facilitator to physical activity, especially since the program did not

cost them anything. Due to budgetary constraints, parents desired to see more such free afterschool programs. This program was also viewed positivity by children and appeared to be an influential source of learning about a healthy lifestyle. Mckenzie et al. (2004) study found an increase in the engagement of moderate to vigorous physical activity among middle school within their physical education program over the course of two years. Aguilar et al. (2010) found similar results in their two year study. Aguilar et al. (2010) found a reduction in the frequency of overweight among girl, lower levels of total cholesterol and apolipoprotein B in both boy and girl within the invention group in comparison to the control group. Prosper et al. (2009) discovered a significant decrease in the BMI of students at or above the 85th percentile as well as significant improvements in self-esteem and lifestyle behaviors among student who participated in the SPARK program. Stating that they believed their program has the potential to improve the health of underprivileged youth who resided in neighborhoods that are unsafe and lack facilities for exercise.

Among the lifestyle-related school barriers identified by children were social events such as parties, school meal preparation (meat perceived as being uncooked and greasy items offered), and replacement of Physical Education with an Art and Media class. There has been a growing expression of concern about recess and physical activity time allowance in schools (The Michigan Department of Education, 2001; Institute of Medicine, 2013). Our data confirm this concern not only from a health care perspective as stated in the literature (Zametkin et al., 2004, Daniels et al. 2005; Dietz 2004; CDC, 2002; Institute of Medicine, 2004, USDHHS, 2008), but also from perceptions of both the children and parents. Therefore, changing school policy to be

inclusive of not only physical education but allotting adequate time for physical activity specifically should not be a key issue for those who are involved in school policy determination.

Certain students also reported being criticized by peers during physical activity and the competitive nature of physical education among their peers as barriers to physical activity. One student reported receiving poor grades during Physical Education as barrier to her wanting to participate. This was an interesting point. Should physical activity be a contributing factor to ones' grade point average?

Within the community environment children mentioned having access to major chain grocery stores as a facilitator to healthy eating and physical activity. They also found that communities that actively engage in physical activity and healthy eating to be a facilitator. This highlights the importance of not only changing the school and family environments, but community environments as well. Promotion of healthy eating and physical activity at all levels of the ecological systems is beneficial to promoting and sustain change at it appears. Development into community infrastructure and increasing neighborhood safety is a start to changing the community environments ((Design Council, 2001). This is evident in the children's reporting of both the lack of community modeling, neighborhood safety and modeling of healthy lifestyle within their neighborhood environments as barriers, as well as lack of community sharing. Research findings from Molnar et al. (2004), Bennett et al. (2007), Larson et al. (2013) and the 1999 MMWR. Morbidity and mortality weekly report on effects of perceptions of neighborhood safety and physical activity (CDC, 1999) also support this.

Parents also did not find their community environment as facilitators to healthy eating and physical activity. Parents discussed concerns regarding child-peer relationships in regards to socializing, lack of promotion of healthy eating and physical activity within the communities and

the lack of quality supermarkets in close proximity. This "food desert" phenomenon has been especially of concern in low income population (Smith & Morton, 2009; Weatherspoon et al. 2012). In terms of facilities, parents found the lack of gyms and safe recreational centers (including parks) as barriers within their neighborhoods. The issues regarding neighborhood safety was a major concern among parents and has definitely been mentioned as a similar concern by other researchers (Bennett et al. 2007; CDC, 1999; Molnar et al. 2004).

Parents expressed that providing a healthy environment for their children, the desire to lose weight, and the fear of dying as personal motivators for healthy eating and engaging in physical activity. However, time and lack of motivation were their key barriers to engaging in routine physical activity and healthy eating. This is likely due to overwhelming work schedules and other pressing priorities.

The grounded theory allowed us to explore beyond what has been previously been published in numerous intervention programs. By employing the grounded theory methodology, we were able to determine that despite calculated efforts to design age appropriate distinctively tailored messages for children, aimed at addressing the concepts of healthy eating and physical activity through helpful programs like the PE-Nut, some children were having difficulty processing the associated benefits of healthy eating and physical activity positively due to their perceptions of their own weight status. How children are processing and internalizing lifestyle behavior messages from valid sources such as PE-Nut program in conjunction with messages from surrounding sources (i.e. family, social environment, television, peers, adults) which may not be accurate (or realistic in terms of body image/weight status), is not fully understood and still needs to be further explored. The data from this study raised some interesting questions about the program and how other sources of information may impact the child's perception of weight, diet

and health. The children within the middle childhood (n=25) and young teen (n=2), stage of development are more conscious of their body image, which could lead to issues of disordered eating problems (CDC, 2012; Sweeney & Zionts, 1989; Lopez et al. 2013; Neumark-Sztainer et al. 2010). Currently there is a plethora of messages from various sources either directly or indirectly addressing the issue of overweight or obesity. With the fight against childhood obesity in America gaining much needed attention, it is almost improbable to believe that children are not processing some of these messages. This was clearly evident from the data.

Our qualitative findings found there were distinct differences in the way children interpreted messages concerning healthy eating and physical activity. Children who characterized a positive family environment (such as eating family meal together, engaging in outdoor physical activities on a regularly basis ether individually and with family, or reported a healthy food environment), and who translated messages from family members positively were more likely to have a positive balanced understanding of health and healthy eating. Children who reported potentially negative messages from family sources and who expressed characteristics that described a negative family environment, were more likely to have an unbalanced view of healthy eating and physical activity; either reporting a distorted view of body image or concepts related to weight.

As seen in figure 3, children received messages from various sources (T.V., internet, doctors, educators, peers, and family). These messages appeared generally to be delivered in a manner in which the children are able to process the information heuristically. These messages as interpreted by the child, in many cases resulted in feelings of fear, anxiety, and concern. These feelings of concern manifested from messages, relating poor diet quality and inadequate physical activity to adverse diet-related health effects, were further reinforced either positively or negatively by influences generated from within the home environment. Children who reported

having adequate resources at their disposal, such as a safe environment to play, grocery stores in close proximity, and an active or strong community environment tended to have balanced views relating to health, healthy eating and physical activity.

Parents of children who fell into a negative family ecology, tended to have children who struggled with body image and skewed or unstable views concerning weight. Families characterized in the negative ecology group, tended to have a parent who struggled with weight and were not confident with their current weight status. It can be inferred from the literature that parents who have had negative experiences with weight, impose these insecurities on their children, thereby heightening their children's sensitivity to messages concerning weight status (Coulthard et al 2003; Agras et al 1999; Russel et al 1998).

The PE-Nut goal is to "present 1) simple 2) consistent 3) and ubiquitous nutrition and physical activity messages by 1) increased participation in a physically active lifestyle, 2) increased consumption of fruits and vegetables, whole grains, and non-fat or low fat milk or dairy products 3) balanced caloric intake from food and beverages with calories expended, 4) trying new foods, 5) choosing healthy snacks, and 6) washing hands before eating."

It is evident that these messages were well received by children. However, some interpretations needed further explanation. For example, findings from this study suggest that some children may have misconceptions of how weight relates to the foods we eat, and need further explanation of how foods are balanced calorically from a nutrient and caloric perspective. It was evident that children within this age group are concerned/fearful of gaining weight for various reasons (health, body image, maintaining of peer relationships, parental approval). Some students expressed, not consuming or eating less as a way in which they maintained health. It is not recommended that growing children restrict intake of food as a way to maintain weight (Dunger

et al. 2006). It is natural for children within this age group to experience weight gain followed by a growth spurt. The fact that the majority of the students were overweight or obese, does not warrant the restriction of foods. Rather, engagement in more physical activities and incorporating a variety of foods in their diet that are high in fiber and nutrient dense is preferably recommended. However, some children expressed financial constraints within their households as a reason for not consuming fruits and vegetables. Eating less or having food aversions may be a concern for children who live in food insecure households and categorize foods as being either "healthy" vs. "unhealthy" when financial constraints limit the availability of "healthy" foods within their households. Research shows that foods consumed in households that are on a restricted income tend to be high in starch, fat, and oils (Drewnowski, 2009;Stang & Story, 2008; Croll, 2005). This is evident in the food mentioned by children such as some form of sandwich, spaghetti, or ramen noodles.

The findings of this study were important in that they provided important biometric, family environment, detailed dietary and physical activity information for the SNAP-ED founded program because funding restrictively predicted such assessments in the past. It is clearly evident that while childhood obesity is a serious concern barriers and facilitators to healthy lifestyle behaviors are important to consider.

5.2 Implications

Our study found that children who reported potentially negative messages from parents with regard to healthy eating and physical activity were more likely to exhibit fears and concern regarding their weight and body perceptions as well as experience internal conflicts and

expressed feelings of guilt regarding food (enjoyment of foods that they deemed "unhealthy"). Similar findings of guilt associated with eating of junk food was found by O'dea, (2003). Although, such scare tactics are also sometimes used for adults (Spahn et al. 2010; Witte 1992), it is apparent that children and parents may be receiving information about health and healthy eating that only requires heuristic processing. Receiving messages in this manner sometimes result in misinterpretation of information concerning health, and as a result may lead to the avoidance of certain foods, highlighted as a contributor to certain chronic diseases.

Given that the potential for disordered eating is elevated during early adolescents and young adulthood (CDC, 2012; Sweeney & Zionts, 1989; Lopez et al. 2013; Neumark-Sztainer et al. 2010), nutrition information provided to children should be sound and address issues surrounding healthful eating not weight. There is an intense focus on childhood obesity; therefore, we should be aware of and draw a distinction between a healthy diet and lifestyle versus purely focusing on "good" vs. "bad" foods, and weight gain as the outcome.

5.3 Strengths and Limitations

The study provided in-depth information in conjunction with facilitators and barriers to healthy eating and physical activity among 5th grade students and their parents who participated in an ongoing nutrition education program. Anthropometric data for both children and parents included heights, weights and waist circumference. We were able to triangulate, child data with parent data for a subset of the sample population.

A limitation to the study was our inability to successfully recruit an equal number of parents and children within the study to capture the full family environment of all 27 child participants. We were also unable to obtain one week day and one weekend day 24-hour dietary recall for one

child participant. Children had difficulty recalling the brand names of items during the 24-hour dietary recall. However, students often checked the labels at home and reported the brand names during their second visit. Another limitation to the study were the multiple qualitative interviewers using the grounder theory method. Opportunities were missed to expound about interesting point of view mentioned by participants.

5.4 Summary and Conclusions

Childhood overweight and obesity was a major health concern among the children within this study. Through the use of the grounded theory we found that there were distinct differences in the manner in which children processed information about health, healthy eating and physical activity from various external sources. It was evident within the data that children had concerns about health problems associated with an overweight or obese weight status, which may have been amplified through televised programs and various other sources of information. We were able to distinguish how different children were able to handle and process this information based on the stability and supportiveness of the home environment. Key differences were seen in family ecologies, which promoted a positive balanced understanding of a nutrition and physical activity and those which potentially elicited potentially unbalanced views of nutrition and physical activity.

Key implications of our study were that there is a continued need for nutrition education and physical education programs that promote healthy lifestyle through increasing consumption of fruits and vegetables and engaging in regular physical activity. Parents are important for fully understanding the entire perspective of the family environment and should be included in such interventions. More importantly, it was evident that there is also a need for parental nutrition and physical activity education. It is apparent that children need sufficient nutrition education to

combat external messages about nutrition and health which may be invalid, especially as they transition into adolescence, but the family and community environments in addition to the school are also who strongly influential. Children whose family environment did not fully support balanced views on health and physical activity, were more self-conscious and concerned about weight and health related issues and tended to have families that struggled with weight related issues as well. It was also apparent that some students from this family environment were at risk for disordered eating, another serious concern. Therefore it is imperative that federally funded nutrition programs, such as PE-Nut remain a key source to providing sound nutrition education for children and develop more interactive ways in to reach families and communities.

APPENDICES

Appendix A: Michigan State University IRB

MICHIGAN STATE

November 7, 2011

- To: Lorraine Weatherspoon 334 Trout FSHN Bldg MSU
- Re: IRB# 11-878 Calegory: EXPEDITED 4, 6, 7 Approval Date: October 25, 2011 Expiration Date: October 24, 2012

Title: A Physical Activity and Nutrition Education Program in Schools: Barriers, and Facilitators, to Healthy Eating and Physical Activity.

The Institutional Review Board has completed their review of your project. I am pleased to advise you that your project has been approved.

This approval letter stipulates that the PI has applied for site approval and research board approvals from the Ypsilanti Public School System and these documents are currently pending. The PI has confirmed that a copy will be provided to the MSU IRB as soon as they are secured.

The approval also includes the deletion of one initial study team member, Shu Lee, due to a lapse in current IRB training. Please be advised that when this investigator has completed required modules, you are free to submit a revision to include them on the study.

The committee has found that your research project is appropriate in design, protects the rights and welfare of human subjects, and meets the requirements of MSU's Federal Wide Assurance and the Federal Guidelines (45 CFR 46 and 21 CFR Part 50). The protection of human subjects in research is a partnership between the IRB and the investigators. We look forward to working with you as we both fulfill our responsibilities.

Renewals: IRB approval is valid until the expiration date listed above. If you are continuing your project, you must submit an *Application for Renewal* application at least one month before expiration. If the project is completed, please submit an *Application for Permanent Closure*.



Office of Regulatory Affairs Human Research Protection Programs

Biomedical & Health Institutional Review Board (BIRB)

Community Research Institutional Review Board (CRIRB)

Social Science Behavioral/Education Institutional Review Board (SIRB)

207 Olds Hall East Lansing, MI 48824 (517) 355-2180 Fax: (517) 432-4503 Email: Irb@msu.edu www.humanresearch.msu.edu

MSU is an affirmative-action, equal-opportunity employer. **Revisions:** The IRB must review any changes in the project, prior to initiation of the change. Please submit an *Application for Revision* to have your changes reviewed. If changes are made at the time of renewal, please include an *Application for Revision* with the renewal application.

Problems: If issues should arise during the conduct of the research, such as unanticipated problems, adverse events, or any problem that may increase the risk to the human subjects, notify the IRB office promptly. Forms are available to report these issues.

Please use the IRB number listed above on any forms submitted which relate to this project, or on any correspondence with the IRB office.

Good luck in your research. If we can be of further assistance, please contact us at 517-355-2180 or via email at IRB@msu.edu. Thank you for your cooperation.

Sincerely,

q/

Harry McGee BIRB Vice Chair

c: Simone Wilson, Myrica Gale

Figure 5.1 Michigan State University IRB

Initial IRB Application Approval

Appendix B: School Letters of Support



GOVERNOR'S COUNCIL ON PHYSICAL FITNESS

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Ted Hillary Lila Lazarus

Guwwar

Rick Sowier





Dear Dr. Thompson,

Thank you for supporting PE-Nut in your School. As you already know, near the end of every program year we conduct a project evaluation, which requests participation and program teedback from the school staff and students. This year we are adding a new project evaluation in partnership with the Department of Food Science and Human Nutrition at Michigan State University (MSU) in an attempt to evaluate, and therein enhance, the parent and child connections made through our project.

The PE-Nut Project is working with evaluators from MSU to learn more about facilitators and barriers encountered by parents and children in regards to healthy eating and physical activity. The purpose of this portion of the PE-Nut evaluation is to explore what parents and children think hinder and support engaging in healthy cating and physical activity behaviors. The evaluation will involve interviews with children and focus group discussions with parents at a convenient location in the school as well as having them answer a short written survey.

Because this is a new component of PE-Nut evaluations, we are writing to confirm your permission to recruit participants at Adams STHM Academy. With your permission, your PE-Nut nutrition educator Beth Darnell will provide flyers to the school staff to give to eligible students who have completed PE-Nut to take home in order to inform parents about this opportunity and request their participation.

If you have further questions about this project, please contact:

Sarah Collen, RD, SNAP-Ed Project Manager at <u>scullen@michiganfilness.org</u> or by phone at 517-908-3840.

Mary Beno, Consultant, Regional School Health & PE-NUT Coordinator, Livingston Educational Service Agency at marybeno@Livingstonesa.org or by phone at (517) 540-6838.

Simone Wilson, MS Candidate, Department of Food Science and Human Nutrition., Michigan State University, at <u>wilso946@msu.edu</u> or by phone at (517)355-8474 x 164 or (954)634-2324.

Lorraine Weatherspoon PhD, RD, Associate Professor, Department of Food Science and Human Nutrition., Michigan State University, at <u>weathe43@msn.edu</u> or by phone (517) 353-8474 x 136.

Your signature below indicates that you confirm permission to allow recruitment in your schools.

Signature

<u>12-20-2011</u> Date

Thank you, The PE-Nut Team

P.O. Box 27187 Lansing, MI 48809 800-434-8642 517-347-7891 Fex: 517-347-8145 www.michigarithtess.org

Figure 5.2a Letter of Support



GOVERNOR'S COUNCIL ON PHYSICAL FITNESS

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Barry Franklin, Ph.D.

Terence A. Thomas, Sr.



October 17, 2011

Dear Mr. Carney,

Thank you for supporting PE-Nut in your School. As you already know, near the end of every program year we conduct a project evaluation, which requests participation and program feedback from the school staff and students. This year we are adding a new project evaluation in partnership with the Department of Food Science and Human Nutrition at Michigan State University (MSU) in an attempt to evaluate, and therein enhance, the parent and child connections made through our project.

The PE-Nut Project is working with evaluators from MSU to learn more about facilitators and barriers encountered by parents and children in regards to healthy eating and physical activity. The purpose of this portion of the PE-Nut evaluation is to explore what parents and children think hinder and support engaging in healthy eating and physical activity behaviors. The evaluation will involve interviews with children and focus group discussions with parents at a convenient location in the school as well as having them answer a short written survey.

Because this is a new component of PE-Nut evaluations, we are writing to confirm your permission to recruit participants at Erickson Elementary. With your permission, PE-Nut nutrition educator Beth Darnell will provide flyers to the school staff to give to eligible students who have completed PE-Nut to take home in order to inform parents about this opportunity and request their participation.

If you have further questions about this project, please contact:

Sarah Cullen, RD, SNAP-Ed Project Manager at <u>scullen@michiganfitness.org</u> or by phone at 517-908-3840.

Mary Beno, Consultant, Regional School Health & PE-NUT Coordinator, Livingston Educational Service Agency at marybeno@Livingstonesa.org or by phone at (517) 540-6838.

Simone Wilson, MS Candidate, Department of Food Science and Human Nutrition., Michigan State University, at <u>wilso946@msu.edu</u> or by phone at (517)355-8474 x 164 or (954)634-2324.

Lorraine Weatherspoon PhD, RD, Associate Professor, Department of Food Science and Human Nutrition., Michigan State University, at <u>weathe43@msu.edu</u> or by phone (517) 353-8474 x 136.

Your signature below indicates that you confirm permission to allow recruitment in your schools.

Signature

12/21/11 Date

Thank you, The PE-Nut Team

P.O. Box 27187 Lansing, MI 48909 800-434-8642 517-347-7891 Fax: 517-347-8145 www.michiganfitness.org

Figure 5.2b. Letter of Support

Appendix C: Recruitment Flyer



Figure 5.3 Recruitment Flyer

Appendix D: Consent Forms

A Physical Activity and Nutrition Education Program in Schools: Target Population Barriers and Facilitators to Healthy Eating and Physical Activity.

Parent/Primary Caregiver Consent Form

Dr. Lorraine Weatherspoon, Associate Professor Department for Food Science and Human Nutrition Michigan State University 332 G.M. Trout Food Science Bldg. Email: weathe43@msu.edu Phone: (517) 355-8474 ex 136

Dear Parent/Caregiver,

You and your child are being asked to participate in a research project: "A Physical Activity and Nutrition Education Program in Schools: Barriers and Facilitators to Healthy Eating and Physical Activity" that is being conducted by Michigan State University and Physical Education and Nutrition Program Working Together (PE-Nut) program. Anticipated participation time for parents/primary caregiver is an estimated 1hr and children an estimated 45 minutes.

Purpose of the Research:

- ✓ You are being asked to participate in a research study aimed at identifying facilitators and barriers in regards to healthy eating and physical activity behaviors experienced by children and their families.
- ✓ You have been selected as a possible participant in this study due to your child's enrollment in Ypsilanti's School District, which is participating in an ongoing Physical Education and Nutrition program. Up to 40 schoolchildren and their parents are being asked to participate in the study.

What you are being asked to do:

Parents:

- ✓ Parents/primary caregivers will be asked to be a part of 1 of 2 group discussions, where you will be asked to complete a brief survey, provide information on foods that you eat and self-report height, weight, and waist circumference. These discussions/focus groups will be held at your child's school or in the community, whichever is most convenient for the group. If you are not aware of your current height, weight and waist circumference instruments will be available for you to weigh and measure yourself if you so desire. Dietary intake information for parents/primary caregivers will be collected in person or over the phone. In the event that you are unable to make the group discussions, we may be able to accommodate you via a telephone interview, only with your permission.
- \checkmark Provide signed consent for yourself and for your child to participate in the study.
- ✓ Grant permission to contact you, to schedule the group discussion (focus group)
- ✓ Send signed consent form back to your child's classroom teacher.

What your child is being asked to do at school:

✓ Your child will be asked to complete an interviewer-assisted survey (demographic, physical activity, food security, dietary intake) as well as be measured for height, weight, and waist circumference to see how well they are growing.

You Should Know:

- ✓ We hope that this study will improve how school-based interventions are done in the future as well as provide information about why they are important to do.
- ✓ Although you may not directly benefit from your participation in this study; your responses will help us better understand things that help or prevent you and others in your community from following recommended physical activity behaviors and healthy eating.

- ✓ A \$20.00 gift card to Meijer will be given to you after you complete both the survey and focus group and your child will receive school supplies valued at about \$20 (eg. textbooks, school supplies) upon completion of the study as a thank you for being a part of the study. This should not be considered as a benefit for participation.
- ✓ There are no physical risks to you or your child. You might feel uncomfortable answering some questions. In addition, you may not feel comfortable telling us about your weight or your waist circumference. If you are uncomfortable answering any questions or providing a self-report of measurements, you can say no at any time.
- ✓ To make sure we are correctly recording your views, in addition to pencil and paper documentation, the interviews and group discussion will be audio recorded.
- ✓ The data (which includes audio recordings) for this project will be kept confidential. Names will be replaced with a participant ID number. Information obtained from the study will be kept confidential to the maximum extent allowable by law.
- ✓ Data will be stored and protected in a locked storage cabinet on Michigan State University's campus.
- ✓ Only Simone Wilson (researcher), Dr. Weatherspoon (PI) and 2-3 undergraduate student research staff will have access to the data.
- ✓ Instructors/teachers of Ypsilanti School District will not have access to any data with names. They will be provided with a summary of what we find.
- ✓ The results of this study may be published or presented at professional meetings, but the identities of all research participants will remain anonymous/ confidential.
- ✓ Participation in this research project is completely voluntary. You have the right to say no and may change your mind at any time and withdraw. You may choose not to answer specific questions or to stop participating at any time. You will receive a \$20 Meijer gift certificate card as a thank you, for the completion of the group discussion (focus groups) and survey.
- ✓ Choosing not to participate or withdrawing from this study will not make any difference in the quality of any services you or your child may receive and benefits to which you or your child are otherwise entitled.
- ✓ You will be told of any significant findings that develop during the course of the study that may influence your willingness to continue to participate in the research.

If you have concerns or questions about this study, such as scientific issues, how to do any part of it, or to report an injury, please contact the researcher.

Dr. Lorraine Weatherspoon, Associate Professor Department for Food Science and Human Nutrition Michigan State University 332 G.M. Trout Food Science Bldg. Email: weathe43@msu.edu Phone: (517) 355-8474 ex 136

If you have questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact, anonymously if you wish, the Michigan State University's Human Research Protection Program at 517-355-2180, Fax 517-432-4503, or e-mail irb@msu.edu or regular mail at 207 Olds Hall, MSU, East Lansing, MI 48824.

Your signature below means that you voluntarily agree and grant permission for your child to participate in this research study, which includes participating in an assisted survey and interview, providing information about food intake and having his/her measurements taken (height, weight, and waist circumference). Signature Date

Your signature below means that you voluntarily agree to participate in this research study which includes filling out a survey, participating in a focus group (group discussion), providing information about your food intake, and self-reporting height, weight, and waist circumference.

Signature Date

You have permission to contact me at the following number to schedule the focus group (group discussion), collect dietary assessment information, and if any additional information is needed.

Contact Number



Physical Activity and Nutrition Education Program in Schools: Barriers and Facilitators to Healthy Eating and Physical Activity

Student Assent Script

We are working on a project at your school to learn about what helps or prevents you from eating healthy and/or exercising. We hope that the information we learn can be used to help school programs better help you and other students within the state of Michigan to eat healthy and exercise regularly. In order to participate, one year of PENut's Healthy Classrooms, Healthy Schools Curriculum should be completed. As a thank you for participating in the study, you will receive school supplies valued at about \$20 (eg. textbooks, school supplies). Information collected today will be written and recorded but it will be kept anonymous. Your name will not be used at any time, and be replaced with a number.

We hope that you will agree to participate in this project. By doing this, you will allow us to do nine things:

- 1) Understand what things help you to eat healthy and exercise.
- 2) Understand what thing stops you from eating healthy and exercising.
- 3) Collect information about what you find helps and stops you from eating healthy and exercising.
- 4) Learn about what kinds of exercise you do.
- 5) Find out if you feel safe at school.
- 6) Find out if other kids make fun of you.
- 7) Find out if you have enough food to eat at school and at home.
- 8) Understand if there is enough money to buy food at home.
- See how you are growing: to do this we would like to weigh you, measure your waist, and see how tall you are.

Your parent/the person who takes care of you, has already agreed that you can participate. You can quit being in this project at any time and you can refuse to interact with the researcher at any time. This project will not affect your grades.

There are no physical risks to you. You may be uncomfortable answering some questions. In addition, you may not feel comfortable with being weighed or having your waist circumference measured. If you are uncomfortable about any of these, you can say no at any time.

Would you like to be a part of the research project?

Yes_____ No_____



This project was funded by Michigan State University Alliance for Graduate Education and the Professoriate and by the State of Michigan with federal funds from the United States Department of Agriculture Supplemental Nutrition Assistance Program by way of the Michigan Nutrition Network at the Michigan Fitness Foundation. These institutions are prohibited from discriminating on the basis of race, color, national origin, sex, age, religion, political beliefs or disability. People who need help buying nutritious food for a better diet call the toil free Michigan Food Assistance Program Hotline; (BSS) ASIA-MICH.

This consent form was approved by the Biomedical and Health Institutional Review Board (BIRB) at Michigan State University. Valid 01/27/2012 – through 10/24/2012. This version supersedes all previous versions. IRB #11-878

Figure 5.4 Child Assent Form
Appendix E: Child Survey Questionnaire

Partici	pant	ID Date		
Age		Gender		
	1.	Ethnicity	5.	Religious Affiliation
		Non-Hispanic White		Episcopalian
		Non-Hispanic Black		Baptist
		Hispanic		Catholic
		Asian		Presbyterian
		Indian (Native American)		Jew
		Other		Seventh Day Adventist
				Hindu
	2.	Dominant Language Spoken in your		Muslim
		household?		Non-denominational
		English		Other specify,
		Spanish		
		Other	6.	Total number of people in your household
	3.	Who takes care of you most of the		1
		time?		2
		Mother and Father		3
		Mother		4
		Father		Other
		Grandparent(s)		
		Other	7.	Number of Children in household
	4.	Are your Parents		including yourself
		Single		
		Married		
		Separated		3
		Divorced		4
		Widowed		Other
		Other		

Figure 5.5 Child Survey Questionnaire

- 8. Does your parent or the person that takes care of you most of the time
 - Work Full time
 - Work Part time
 - Work seasonally
 - Unemployed
 - **Full-time student**
 - Sick or disabled
- 9. Do you know of anyone in your family who has

Heart Disease

Who?_____

Cancer

What type? _____

Who?_____

High Blood Pressure

Who?_____

Glaucoma/eye problems

Who?_____

Diabetes

Who?_____

10. Do you know of anyone in your family who..

Smokes

Who?_____

Drinks Alcohol

Who?_____

- 11. Last week, on which days did you exercise or take part in physical activity that made your heart beat fast and made you breathe hard for at least 30 minutes? (For example: basketball, soccer, running or jogging, fast dancing, swimming laps, tennis, fast bicycling, or similar aerobic activities)
 - □ I didn't do any exercise last week that made my heart beat fast for 30 minutes.

Figure 5.5 Child Survey Questionnaire (Cont'd)





- 12. Last week, on which days did you play outdoors for **30 minutes or more**? *Do not count* outdoor play during school hours.
- □ I didn't play outdoors any days last week for 30 minutes or more.
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday
- Sunday
- 13. **During the past 12 months**, on how many sports teams did you play? Sports teams include soccer, basketball, baseball, softball, swimming, gymnastics, cheerleading, wrestling, track, football, dance, tennis, and volleyball teams. *Do not include* PE classes.
- □ 0 teams
- \Box 1 team
- \Box 2 teams
- 3 or more teams







14. Do you currently take part in any other organized physical activities or take lessons, such as martial arts, dance, gymnastics, or tennis?



□ Not sure	\Box A little sure	Very sure
------------	----------------------	-----------

18. On most school days, how many hours per day do you spend on a computer away from school? (Time on the computer includes time spent surfing the Internet, instant messaging, and playing online video or computer games.)



19. On most school days, how many hours **per day** do you usually spend playing video games like Nintendo® Wii or DS, Sega®, PlayStation®, Xbox®, GameBoy®, or arcade games **away from school**?



20. What are you trying to do about your weight?

Lose weight	🗆 Gain weigh	t 🗆 Stay	the same weight	Nothing
21. Compared weigh:	to other students in	n your grade who	are as tall as you, do	you think you
🗆 Too much	🗆 The rig	ht amount	🗆 Too little	(or not enough)
22. How many of the week	minutes of physic	al activity/exercis	e should you have o	n all or most days
Less than 20 minutes	utes 🗆 30 r — 45 r	ninutes 🗆 ninutes 🗆	50 minutes 60 minutes	I don't know
23. If I run and	l play every day, I	will have fewer h	ealth problems.	
Agree		In between		Disagree
24. If I am ove	rweight I am more	likely to have mo	re health problems	like cancer or heart
disease.		incery to nave inc	fe health problems	like cancer of neart
disease.	— In b	oetween	 Disagr 	ee
 disease. Agree 25. How safe d 	In boost the second	between	Disagre	ee
disease. Agree 25. How safe d Not safe \square A	In the safe States of Stat	oetween ol? Somewhat safe ⊂⊂	 Disagr Mostly safe 	ee Very safe
 disease. Agree 25. How safe d Not safe A 26. How often 	In b Io you feel at schoo A little safe S during the last wa	between bl? Somewhat safe ⊂ eek , at school hav	 Disagre Mostly safe e others 	ee Very safe
disease. Agree 25. How safe d Not safe A 26. How often amade fun of you often	In b Io you feel at schoo A little safe S during the last wo or insulted you?	between bl? Somewhat safe ⊂ eek, at school hav	 Disagre Mostly safe e others 	ee Very safe
 disease. Agree 25. How safe d Not safe A 26. How often amade fun of you o Never A 	In b Io you feel at school A little safe S during the last we or insulted you? 1 time 2	oetween ol? Somewhat safe eek, at school hav or 3 times	 Disagre Mostly safe e others Almost every day 	ee Very safe — Every day
 disease. Agree 25. How safe d Not safe A 26. How often amade fun of you of Never battacked or ill-treated 	In bound of the first of the fi	oetween ol? Somewhat safe cek, at school hav or 3 times	 Disagre Mostly safe re others Almost every day 	ee Very safe
 Agree 25. How safe d Not safe A 26. How often amade fun of you d Never battacked or ill-treation 	□ In b lo you feel at school A little safe □ S during the last we or insulted you? □ 1 time □ 2 ated you? □ 1 time □ 2	oetween ol? Somewhat safe eek, at school hav or 3 times or 3 times	 Disagre Mostly safe re others Almost every day Almost every day 	ee Very safe Every day Every day
 Agree 25. How safe d Not safe A 26. How often amade fun of you d Never battacked or ill-treation cexcluded you interview 	In b Io you feel at school A little safe S during the last we or insulted you? 1 time 2 ated you? 1 time 2 ated you?	oetween ol? Somewhat safe eek, at school hav or 3 times or 3 times ted you from part	 Disagree Mostly safe Mostly safe e others Almost every day Almost every day icipation? 	ee Very safe Every day Every day

- 27. Over the last 6 months, how often have you been bullied at school? (A student is being bullied when another student, or a group of students, say or do nasty and unpleasant things to him or her. It is also bullying when a student is teased repeatedly in a way he or she doesn't like. But it is **NOT BULLYING** when two students of about the same strength quarrel or fight.)
- \Box I haven't been bullied at school over the last 6 months \Box About once a week
- □ It has only happened once or twice

Several times a week

- \bigcirc 2 or 3 times a month
 - 28. Does this make you not want to participate in group physical activity during school?

🗌 Yes	🗌 No
-------	------

29. Are your parents physically active?

- 🗌 Yes 🛛 No
- 30. Do your parents tell you about why you should or should not be physically active?
 - 🗌 Yes 🛛 No

31. How often do you eat school meals?

□ 1 time/week □	2 times/week 🗌	3 times/week	□ 4 times/week
5 times/week			

- Never
- 32. Do you bring lunch from home?
 - 🗌 Yes 📃 No

33. Do you eat anything before or after school?

🗌 Yes 📃 No

34. Snacks eaten during break areBrought from home Purchased at school Both

Don't eat snacks during school

- 35. Do your parents know what you are eating at school?
 - 🗌 Yes 📃 No

36. Do you tell your parents what you eat during school?

🗌 Yes 🛛 No

37. Who is in charge of what you eat at home?

Mom Dad Grandparents Older sibling You
38. Which meals are most frequently eaten away from home?
Breakfast Lunch Dinner
39. How often do you eat meals away from home?
□ 1 time/week □ 2 times/week □ 3 times/week □ 4 times/week
□ Never
40. How often do you eat meals with your entire family?
□ 1 time/week □ 2 times/week □ 3 times/week □ 4 times/week
Never
41. If not often, who in particular is missing from your family meals?
Mom Dad Sibling You Other
42. Are you worried that food at home will run out before your family can buy more? A LOT (Almost all the time) SOMETIMES (2-6 times) NEVER OTHER

- 43. In the past, has the food that your family bought **run out**, and your family did not have enough money to get more?
 - _____A LOT (Almost all the time)

_____ SOMETIMES (2-6 times)

- _____NEVER
- ____ OTHER
- 44. In cases where your family was running out of money, what type of meals did you and our family eat?

1	
2	
3	

- 45. How often were you not able to eat foods from all of the **food groups** because your family did not have enough money?
 - _____ A LOT (Almost all the time)
 - _____ SOMETIMES (2-6 times)
 - _____ NEVER
 - OTHER
- 46. Did you have to **eat less** because your family did not have enough money to buy food?
 - _____ A LOT (Almost all the time)
 - _____ SOMETIMES (2-6 times)
 - _____NEVER
 - ____ OTHER
- 47. Has the size of your meals **been smaller** because your family did not have enough money for food?

A LOT (Almost all the time) SOMETIMES (2-6 times) NEVER OTHER

48. Did you have to **skip a meal** because your family did not have enough money for food?

A LOT (Almost all the time) SOMETIMES (2-6 times) NEVER OTHER

49. How often have you been **hungry**, in the past month, and did not eat because your family did not have enough food?

A LOT (Almost all the time) SOMETIMES (2-6 times) NEVER OTHER

50. Did you not eat for a **whole day, in the past month,** because your family didn't have enough money for food?

A LOT (Almost all the time) SOMETIMES (2-6 times) NEVER OTHER

Anthropometrics (Official Use Only)

Height (cm)	BMI
Weight (Kg)	
Waist Circumference (cm)	

Multiple Pass 24-Hour Dietary Recall Process

- Explain why the assessment is being done
- Reassure the subjects it will be kept confidential
- ✤ Begin Recall
 - 1. Quick List- Collect a list of foods and beverages consumed the previous day
 - a. What was the first thing you ate after you go up yesterday?
 - i. Avoid terms like breakfast, lunch, or dinner
 - b. Record only food at this time; do not worry about portion sizes until later
 - c. Allow extra space for adding things later
 - d. Do Not interrupt
 - 2. Forgotten Foods-Probe for foods forgotten during the Quick List
 - a. Your turn to talk
 - b. Probe with open ended questions (how, what, describe)
 - c. Do not forget
 - i. Condiments
 - ii. Beverages
 - iii. Alcohol
 - iv. "Little bites" of food
 - d. Frequently missed foods
 - 3. Time and Occasion- Collect time and eating occasion for each food
 - a. Review the day to them
 - b. Ask the subject to tell you the time of day each food was eaten
 - c. Ask if there are additions or corrections
 - 4. Detail Cycle- For each food collect detailed description, amount, and additions. Review the 24-hour day
 - a. Obtain four kinds of information about each food/beverage
 - b. Kind of food/beverage
 - i. Fresh, frozen, canned
 - ii. Skim, 2%, whole milk

- c. Preparation of food
 - i. Fried or baked
 - ii. Ingredients added
- d. Portion size of food
 - i. Participant may underestimate so use models or examples
 - ii. Make sure EVERY item has some measuring unit
- e. How served
 - i. Butter, gravy, or cream added?
- f. If you are not sure about a food, ask the participant to describe it to you
 - i. Is it a drink? Energy bar?
- g. Get the details (color, ingredients, etc)
 - i. Same food, different ingredients
- h. Record dietary supplements or vitamins/minerals
- i. Record any herbal supplements or home remedies
- 5. Final Probe- Final probe for anything else consumed
 - a. Remember....
 - i. Double-check the name on each dietary assessment form
 - ii. Check for completeness

24-HOUR DIETARY RECALL

FOOD LIST	TIME	DESCRIPTION OF	COOKING	BRAND	AMOUNT/
		FOOD OR BEVERAGE	METHOD		DODTION
					PORTION

Appendix F: Parent Survey Questionnaire

Date				
Participant ID Dominant Language spoken				
Childs Age Gender				
For questions 1-20, Please select the answers that best represents you	ır Child/ Fa	mily.		
	Almost Never	Some- times	Usually	Almost Always
My child eats breakfast				
Our family eats meals together				
Our family eats while watching TV				
Our family eats fast food				
Our family uses microwave or ready to eat foods				
My child eats fruits and vegetables at meals or snacks				
My child drinks soda pop or sugar drinks				
My child drinks low fat milk at meals or snacks				
Our family monitors eating of chips, cookies, and candy				
Our family uses candy as a reward for good behavior				
My child spends less than 2 hours on TV/games/computer per day				
Our family limits the amount of TV our child watches				
Our family allows our child to watch TV in their bedroom				
Our family provides opportunities for physical activity				
Our family encourages our child to be active every day				
Our family finds ways to be physically active togethe				
My child does physical activity during his/her free time				
My child is enrolled in sports or activities with a coach or leader				
Our family has a daily routine for our child's bedtime				
My child gets 9 hours of sleep a night				
wry china gets 7 nours of sleep a night				

What are the mypyramid	or plate method recomm	endations for children?
212	1	

Have you ever been to the school to look at the menu?
How many minutes of physical activity are children supposed engage in per day?
b) How do you know this?
How much physical activity should you engage in per day?
b) How do you know this?
Which meals do you eat away from home?
Where do you and your family eat meals during the week?
Where do you and your family eat meals on the weekend?
Are the children allowed to go and get their own snacks?
Are fruit and vegetables available, ready and cut up at home?
Do you like that girls and hows have P.F. together? Why or why not?

- 10. Does your child enjoy P.E. lessons?
- **11.** Do they tell you what they have been doing during P.E. or do you have to ask?

12. Do you feel that you encourage them to do exercise or are they motivated enough to go and do it themselves?

- 13. Do you ask your children about what they eat at school? Why or why not?
- 14. Do you give your child extra snacks to take to school?

 Why?
- 15. What snacks to you provide your child to take to school?_____
- 16. Do you give your child extra money to purchase snacks at school? Why or why not?

17. Do you enjoy exercising? ______

18. Do you enjoy exercising as a family?

19. Ethnicity	22. Schooling Level
Non-Hispanic White	<pre> < Middle School</pre>
Non-Hispanic Black	$\Box \leq$ High School
Hispanic	College
Asian	
Indian	 Diploma
Other	
20. Marital Status (Please Indicate)	$\square Post graduate$
Single	23 Total number of people in your
Married	household
Separated	1
Divorced	2
Widowed	3
Other	4
21. Religious Affiliation	Other
Anglican	24. Number of Children in household
Baptist	1
Catholic	2
Hindu	3
Judaism	4
Muslim	Other
Non-denominational	
Presbyterian	25. Occupation
Seventh Day Adventist	
Other	
	26. Employment Status
	Employed Full time
	Employed Part time
	Seasonally Employed
	Unemployed

Annual Income

<\$20,000	
< \$20,000	

- \$20,000-34,999
- \$35,000-\$44,999
- \$45,000-\$54,999
- \$55, 00 -\$59,999
- \$60,000-\$69,999
- □ \$70,000 above

Check the following boxes below if you have a family history of any of the following conditions, and then specify all who you know of in the immediate family.

Cardiovascular Disease	
Who?	
Cancer specify type	
Who?	
WII0?	
UHypertension/High Blood Pressure	
Who?	
Glaucoma/eve problems	
Who?	
······	
Disbatos	
who?	
_	
Smoking	
Who?	
Drinking Alcohol	
Who?	
YY IIO (

Self-reported height, weight, and waist circumference. Please let us know if you need assistance.

Participant ID	
Height	
Weight	

Appendix G: Qualitative Interview Guide for Children

Children's In-depth Qualitative Interview

*Adapted from the Deal Children's School Study

Qualitative Schedule: Children's interview in school

Introducing the In-depth Qualitative Interview

- Welcome them to the study and thank him/her for taking part
- Tell him/her your name
- Check to make sure the child has signed assent and parental consent forms which are necessary in order to participate. Explain that everything he/she says will be confidential/ kept a secret so no one else will be able to tell who said what. Explain that the conversation will be recorded, but that no one else other than the primary researcher and their interviewers on the project will be able to hear it.

Explain that the topics for discussion include

- Food and eating
- Physical activity participation
- Health in general
- Providing advice about things that we think will be helpful for school children and their health
- "The aim of this interview is to understand what you think about the topics I have just mentioned. We are really interested in finding out your opinions about what helps you and your family and what stops you from being healthy."
- Explain that you just ask the questions and follow up certain points. What they say is up to them but remind him/her verbally that confidentiality will be maintained, everyone will be given a random number and no names, or the name of any places that are mentioned will be used.
- Encourage them to share their views.
- Explain that the interview will last no longer than about 45 minutes to an hour unless they have lots to say!
- Thank him/her again for taking part; remind him/her that his/her help is greatly appreciated.

Aim 2. What are the children's perceived barriers and facilitators to living a healthy lifestyle (dietary intake and physical activity) within the school and home environment?

Individual

- 1. What in your opinion are healthy food choices? Why?
- 2. What are unhealthy food choices? Why?
- 3. What activities do you consider to be physical activity/exercise? Why?(probe to give examples: walking, running, dancing, playing basketball, soccer, baseball, softball, swimming, Nintendo Wii)
- Can you tell me what activities you would not consider to be physical activity? Why? (Probe to give examples: playing video games, watching television, using the computer)
- 5. What do you know about how weight is related to foods we eat?
- 6. What programs or classes at school have helped you better understand
 - a. Health
 - b. Healthy eating
 - c. Physical activity
- 7. Besides school, where else to you gather information about food and health? (Probe: It could be from siblings, parents, TV commercial etc.)
- 8. Do you think what you eat now is related to what will happen when you are older?
- 9. In your opinion how would you describe children at your school who are healthy? Name at least 3 things
- 10. In your opinion how would you describe children at your school who are unhealthy? Name at least 3 things
- 11. Can you tell me about the Mypyramid (or plate method) and its recommendations?
- 12. What have you learned from PENut?

Environment

SCHOOL

Healthy food Choices

- 13. What are things that help you make healthy food choices at school? Probe-Parents, family friends, community, food access/availability, cost, personal taste, likes/dislikes, routine/habit,.
- 14. What do you think about school meals?
- 15. What do you think about the food and/or snack choices available at school?
- 16. Do you think it is healthier to bring lunch from home or eat lunch provided by the school? Why?
- 17. What do you eat during break time?

- a. Do you bring anything from home?
- 18. What foods do you enjoy eating at school?
- 19. What foods do you not enjoy eating a school?
- 20. If you were in charge, what would you like to see offered in school meals?
- 21. What are things that prevent you from making healthy food choices at school? *Probe- Parents, family friends, community, food access/availability, cost, personal taste, likes/dislikes, routine/habit, physical activity.*
- 22. Think about the things you do at school.
 - a. How easy is it to eat healthy?
 - b. What stops you? What would make things easier?

Physical Activity

- 23. What are things that help you practice healthy physical activity behaviors at school? Probe to get an understanding of access to sports/activities in the area, whether some activities are better than others, who with, gender and ethnic differences as well as other potential facilitators to exercise
- 24. Can you tell me about the activities that you do in P.E. (EPEC)?
 - a. Do you like having girls and boys do P.E. together?
 - b. What are the most important lessons you learned in P.E. (Nutrition, Health, Teamwork, or Sportsmanship)?
- 25. If you could do anything you wanted in P.E., what would you choose to do?
- 26. What do you do during break times or before/after school?
- 27. What are things that prevent you from practicing healthy physical activity behaviors at school?

Home

- 28. What are things that help you make healthy food choices at home? *Probe-Parents, family friends, community, food access/availability, cost, personal taste likes/dislikes, routine/habit, physical activity?*
- 29. Where do you eat meals at home?
- 30. Where do your family members eat meals most of the time?
- 31. Are there any rules about what you can/cannot eat at home?

- 32. Tell me about if you try to get around these rules.
- 33. How is meal time with your family (quiet, loud, enjoyable etc)?
- 34. How has information from PENut, helped you and your family at home?
- 35. What are some additional, ways PENut can help you and your family at home?

36. What are things that prevent you from making healthy food choices at home?

- 37. Think about the things you do at home.
 - a. How easy is it to eat healthy?
 - b. What stops you?
- **38.** What are things that help you practice healthy physical activity behaviors at home?
- 39. What kind of activities do you do with your family?
- 40. Who decides what to do?
- 41. What types of things do you and your sibling do to get some exercise?
- 42. Who would you really like to do physical activity with?
- 43. How much physical activity are you supposed to do?
 - a. In a day/week?
- 44. What are the different types of physical activities?
 - a. intensity/duration

45. What are things that prevent you from practicing healthy physical activity behaviors at home?

Neighborhood

46. What are things that help you make healthy food choices in your neighborhood? *Probe-community, food access/availability, cost.*

47. What are things that prevent you from making healthy food choices in your neighborhood?

- 48. Think about the things you do in your community.
 - a. How easy is it to eat healthy or find healthy foods?
 - b. What stops you? What things would you change?
- **49.** What are things that help you practice healthy physical activity behaviors in your neighborhood?

- 50. Where can you go to take part in physical activities in the local area?
- 51. What do you think about the local area in general (enough area/facilities to play safe, etc)?
- 52. What makes you decide to exercise?
 - a. Do you enjoy exercising by yourself, with family, with friends?

53. What are things that prevent you from practicing healthy physical activity behaviors in your neighborhood?

- 54. Can you go to the parks/playground?
 - a. Tell me about it
- 55. Are you allowed to go without adult supervision?
 - a. Where can you go?
- 56. Which physical activities do you dislike?

Behavior

- 57. What would you say about your eating habits/what you eat (are they healthy/unhealthy) and why?
- 58. If unhealthy,
 - a. How do you feel about making changes to what you eat?
- 59. What can you tell me about your current physical activity habits?
 - a. If you are not as physically active as you wish,
 - b. How willing are you to improve your physical activity habits?
- 60. Imagine that you had a friend who wanted to be more active but they did not know how to. What could you say/do to help them?
- 61. Finally, if you were in charge, what 3 things would you do to encourage people to be healthy?

Appendix H: Focus Group /Qualitative Interview Guide for Parents

Parental Qualitative Focus Group Questions

*Adapted from the Deal Children School Study

Qualitative Schedule: Parent/primary caregiver's focus group interview guide

Introducing the In-depth Qualitative Interview

- Welcome them to the study and thank them for taking part
- Tell them your name
- Check that they have all signed consent forms in order to participate and explain that everything they say will be confidential/ kept a secret so no one else will be able to tell who said what. Explain that the conversation will be recorded, but that no one else other than the primary researcher and their interviewers on the project will be able to hear it.
- Explain that the topics for discussion include
 - Food and eating
 - Physical activity participation
 - Health in general
 - Providing advice about things that we think will be helpful for school children and their health
- "The aim of this interview is to understand what you think about the topics I have just mentioned. We are really interested in finding out your opinions about what helps you and your family and what stops you from being healthy.
- Explain that you just ask the questions and follow up certain points. What they say is up to them but remind them of the ground rules
- Assure them verbally that that confidentiality will be maintained, everyone will be given a random number and no names, or the name of any places that are mentioned will be used.
- Encourage them to share their views, even if their views are different from other.
- Ask them to remember to respect other people's point of view by allowing others to speak.
- Explain that the interview will last no longer than about 45 minutes unless they have lots to say!
- Thank them again for taking part; remind them that their help is greatly appreciated.

Aim 3. What are the underlying perceptions (facilitators and barriers), parents encounter with regard to healthy food intake and physical activity behaviors for their children?

Individual

- 1. What makes a healthy diet?
- 2. Can you think about how your diet is related to health later in life?
- 3. What have you read or heard about weight, healthy eating, and the importance of physical activity?
- 4. Can you tell me about the MyPyramid (or plate method) and its recommendations?
- 5. Do you know about how many portions of fruit and vegetables you/your children should eat in a day?
- 6. What about different food groups- what are they and how much should you eat from each group?
 - a. How easy is it to meet healthy eating recommendations?
 - b. What are some things that prevent you from following the recommendations? Why?
 - c. What are things that are easy to follow in the recommendations? Why?
- 7. How much control do you believe you have concerning what your children eat?
 - a. How does this make you feel?
- 8. How do you feel about making healthy changes in the way you and your family eat?
- 9. What do you think about the meals that your child eats at school?
- 10. Are you aware of any changes in the school meals that have taken place recently?
 - a. Can you tell me what they were
- 11. If you were to eat healthier, what are some of the changes (results) you would expect to see?
- 12. What assistance would you need, if any, to improve eating habits
 - a. For you?
 - b. For your child/ren?
- 13. What assistance would you need, if any, to improve physical activity habits?
 - a. For you?
 - b. For your child/ren?

Environment

- 14. Where do you get most of your information about food and physical activity?
- 15. What are some of the concerns you have with the increasing rates of overweight?
 - a. What about the weight problems in children?
- 16. How have programs such as "Let's Move" spear headed by Michelle Obama influenced the way you feel?

Home

- 1. What helps you to make healthy food choices at home?
- 2. Why are meals eaten away from home?
- 3. How often, do you eat meals with your entire family?
 - a. Which meals?
- 4. If, not often who in particular is missing from your meal gathering?
- 5. If you do eat together, do you talk around the table?
- 6. Are there any rules about what, where and when your child/ren can/cannot eat at home?
 - a. Tell me about how they might get around these
- 7. Tell me about cooking at home, who is in charge?
- 8. Are you/have you been showing your child/ren how to cook?
 - a. What can they do?
 - b. Do they offer to help you to cook or do you ask them for help?
- 9. How often do you cook meals 'from scratch'?
 - a. Why some and not others?
- 10. What types of food do you cook?
 - a. Mainly from your own/other cultures?
- 11. What are things that prevent you from making healthy food choices at home?
- 12. Think about the things you and your child/ren eat at home. How easy is it to make healthy food choices?
- 13. What are things that help you practice healthy physical activity behaviors at home?

14. What are things that prevent you from practicing healthy physical activity behaviors at home?

Neighborhood

- 1. What are things in your neighborhood that help you make healthy food choices?
- Think about the differences between what you do in your community and at home.
 a. How easy is it to make healthy food choices in the neighborhood?
- 3. What are things that prevent you from making healthy food choices in your neighborhood?
- 4. Think about the differences between what you do for exercise/physical activity in your community and at home.
 - a. What stops you? What would you change?
- 5. What are things that help you practice healthy physical activity behaviors in your neighborhood?
- 6. What are things that prevent you from practicing healthy physical activity behaviors in your neighborhood?

School

- 1. If you were in charge, what are some of the meal items you would like to see offered in school?
- 2. Who has the responsibility for ensuring a healthy diet for children?
- 3. How much of that responsibility should be issued to the school?
- 4. Think about the things your child/ren eat at school. How easy is it for them to make healthy food choices?
- 5. Does your child have school meals or packed lunches?
 - a. Why?
- 6. What types of things would you like your children to eat at school?
 - a. Why?
- 7. What do you know about Physical Education at your child/ren's school(s)?
- 8. Is your child a member of a school or local exercise or physical activity or sports community team? Which ones?
- 9. If your child came to you and wanted to do more exercise/sporting activities, what could you say/do to help them?

Behavioral

- 1. How do you feel about making changes to your diet?
- 2. What would prevent you from changing how you eat if you wanted to?
- 3. How willing are you to improve how you eat?
- 4. How willing are you to improve how physical active you are?
- 5. Are you open to tasting new foods?
- 6. Is your child open to tasting new foods?
- 7. Is your family open to tasting new foods?
- 8. Who does the food shopping?
- 9. What things don't you eat?
 - a. Why?
 - b. Would you offer those things to your children?
- 10. What are some things you tell your child about being physically active?
- 11. What are some of the activities that you do with your child to be physically active?
 - a. How does it make you feel?
- 12. What are some of the activities your child does on their own? With others? And where?
- 13. What makes you decide to do some exercise?
- 14. Which activities do you dis/like?
 - a. How do you think this affects your child's outlook on that activity?
- 15. If you could do any activity what would it be?
- 16. If you were in charge, what 3 things would you do to encourage people to be healthy?
 - a. What would you say to parents?
 - b. What would you say to children?
 - c. What would you say to school administrators?
 - d. What would you say to the government?

Appendix I: Sample Code Book of Interview Responses for Children

Main Theme	Sub-Theme	Ν	Quote
Personal Facilitator	Motivation	15	"because I really want to be a football and basketball player so I like to I try my best and I like to run and stuff."
Personal Barrier	Lack of Motivation Tired Personal taste preference	8	"The taste, and um, I don't like yea I don't like the taste, so usually I just don't get it or I don't eat it."
Health Condition Barrier	Sick	4	"I hate running cuz I have asthma"
Community Facilitator	Neighborhood Environment	4	"It's easy to eat healthy because it's (neighborhood) surrounded by healthy" We have this car it like a healthy car and it
	Community Support	5	comes in our neighborhood and I don't understandit kinda, it gives us, it gives you a book of healthy tips. And it gives you something you can try that's healthy."
Family Facilitator	Support	16	"my mom always makes sure that I eat food from each food group and sometimes we'll eat a piece of cake but not every day, or we'll have a cookie but not every day."
Media Facilitator	Nutrition and PA embedded programming/ exergames	5	"well based on what I see on TV is people always eating healthy" "we play Mario Karts or Wii sports"
Community Barrier	Lack of Neighborhood Food Access	14	"There is not, there is not a lot of grocery stores and places to get food in my neighborhood."
Neighborhood safety Barrier	Unsafe environment	9	"Well there is a lot of like bad people there I don't really play with my friends. I just stay inside because I am afraid that people I don't know might attack me or something."

 Table 5.1 Sample Qualitative Chart of Child Themes and Sub-Themes

Lack of	Lack of		"because they're not welking and that makes
Community	Community		me not went to well?"
Support	Remodeling	8	The not want to walk
Weather Barrier	Winter Weather Summer Heat	6	"Cus the days when its when it was really,like it was no snow and it was cold, and I couldn't ride my bike and I was really really angry. I was angry at the weather that time."
	Busy	4	"nothing, all my parents do is watch TV"
Family Barriers	Use of foods as rewards/purchasi ng unhealthy foods	5	"well I can't because my mom, plus she, she buys healthy drinks but not healthy, not all the time healthy foods."
	Money (purchase food)	3	"Sometimes my parents don't have enough money to buy it uhm, I would change not, my parents not having that much money."
	Television, Computer, Video games	13	"When like a TV show or a move comes on"
	Uncooked meat	7	
School Food Preparation	Vegetable Preparation School	3	pink in the meat sometimes so that's why I think it not healthy, because it not all the way
	meals/greasy	13	COOKCU.
Peer Dynamics	Teasing Modeling (bringing unhealthy snacks) Corrected by Peers	9	"calling me fat and then you get stressed out and eat more"

Table 5.1 (Cont'd)

Appendix J: Sample Code Book of Interview Responses for Parents
Main Theme	Sub-Theme	Ν	Quote
Personal Facilitator	Self-Motivation	5	E0014: okay I'm trying to do better because we are all overweight in my house so I try to do better. I mean we pretty much just eat like chicken. You know that's the biggest of the meats we eat but I'm trying not to do as much frying as I use too, you know I try to do a lot of baking now or have the George Forman's out
	Providing Healthy Environment For Children	5	E0014: that help me make choices at home? Umm I'll have to say my children and I want them to be healthy and happy and you know I stopped smoking I smoked for many years and they weren't happy and they didn't want their mom to die I didn't want them to get them infections and to stay like that they motivate me to want to make healthier choices at home
	Health Concern/ Benefits	6	E003_E012: Um I feel good about it because I know in the long run it's gonna help you family, yea.
Personal Barrier	Lack of Self- Motivation	7	E001: seems like lots of work. it's pretty much [an] opportunity-type thing. If I have the chance to eatif I don't, I don't.
	Time	10	E0014: tired ,out of shape, time
	Cost/Budgetary Constraints	8	E003_E012: Um not having a lot of time sometimes money, like the vegetables are expensive so money.
	Monitor Foods Within the Home Environment (Healthy Eating)	6	003_E012: I have all the control. Yea because I'm buying all the foodUh pretty good because they're eating right so you know I'm not worried about it.
Home Environment Facilitator	PE-Nut Program (Healthy Eating)	3	E003_E012: Um they help me cook, um they tell me about programs in school like the PE- Nut program
	Children (Facilitator)	3	E003_E012: Mostly my kids

Table 5.2 Sample Qualitative Chart of Parent Themes and Sub-Themes

Table 5.2 (Cont'd)

	Parent Modeling (Healthy Eating)	2	E003_E012: Um, well my kids would probably benefit from it also because they would learn that this is the correct way to eat, and then you know if they see me do it then they'll want to eat healthier also and if they see me eat healthy and lose weight and later on in life they were overweight then they probably would do what I did
	Family Participation in Physical Activity	7	E001: Ok, I can think of- my daughter just got a bike and I ride my bike while I'm with her.
Home Environment Barriers	Time (Physical Activity)	5	Time, lack of products and I'm just having more processed type much quicker and easier
Child's School Environment	Expected Improvement in School meals	8	I think they could be better (laughs); E0014: I have heard they consider ketchup a vegetable and someone said that someone said and consider ketchup a vegetable and the lunch can use that as a vegetable
	Appreciative of Health improvements in School Meals	5	Uh yea my daughter was saying something about them eating a lot more vegetables and having fresh fruit. Um but usually they'll get that at home like they'll eat fruits and stuff from my house so I'm not really worried about them getting enough-

Table 5.2 (Cont'd)

Community Barriers	Neighborhood Environment/ safety (Physical Activity)	5	yeah I mean like my oldest, my oldest used to get on his bike and ride around the neighborhood and then go on to the next neighborhood but I can't let him do that anymore he has to stay in this side of the neighborhood because like of the trouble that's going on in that side of neighborhood I don't want him on this street because it's a bad street
	Access to grocery store	3	Nothing, nothing but fast food for miles.
	Lack of facilities	5	I don't know anything, there's no community center over here so it's an hour to the next across.
Community Facilitator	Recreational Facilities	1	Recreation centers if I get time to go.
	Access to grocery store	4	I think that I'm close to places to purchase healthy food and the neighborhood also has fast food places too and makes me stop from home and a minute from work
	If they had a class	3	but if you maybe if you take a little class or something and then you're doing it by your memory and not just by having to look on a chart or something like that. That's much better because when you're cooking you're adding everything in it that you really need that's healthy so it's not something that you have to keep checking on you know because you don't have a lot of time to do everything (laughs)

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