2015

Associations between the Family Nutrition and Physical Activity screening tool and the Youth Activity Profile

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by

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A thesis submitted to the graduate faculty

in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Major: Diet and Exercise

Program of Study Committee:
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Iowa State University

Ames, Iowa

2015

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ABSTRACT

Childhood obesity affects one third of children and adolescents and is expected to increase in coming years. Obesity has been linked to both genetic and environmental factors with more recent research focusing on the role parents play in childhood obesity. The Family Nutrition and Physical Activity (FNPA) Screening tool was developed to provide practical ways to evaluate home obesogenic environments. However, no study to date has examined associations between FNPA scores and child behaviors. Therefore, the purpose of this study was to examine associations between FNPA scores from parents and child reported lifestyle behaviors as assessed by an established self-report tool called the Youth Activity Profile (YAP). There were 464 4th and 5th graders who successfully complete the YAP. Out of the 464 students, 64 parents successfully completely the FNPA with a corresponding student ID number. Correlations were computed to assess associations between parental practices and child's behaviors related to three distinct categories: physical activity (PA), sedentary activity (SA), and nutrition (NUTR). High scores for PA and NUTR parenting practices and low scores for the SA practices indicate healthier parenting practices. High scores for all categories of the YAP indicate healthier behaviors. Within the FNPA survey there was a moderate correlation between positive NUTR practices and positive SA practices (r = 0.51). Within the YAP survey there were negative correlations between PA behaviors and SA behaviors (r = -0.30) and between NUTR behaviors and SA behaviors (r = -0.34, and positive correlations between PA behaviors and NUTR behaviors (r = 0.35). . Between surveys there was a positive correlation between FNPA PA and YAP PA (r = 0.27) and positive correlations between FNPA NUTR and YAP NUTR (r = 0.23). There was a negative correlation between higher FNPA SA scores and negative YAP SA behaviors (r = -0.42). In conclusion, there is a small to moderate association between the home

environment and child's behaviors. Parents who promote physical activity, monitor screen time, and provide access to nutritious foods have children who report being more physically active, have less screen time, and have healthier eating patterns. These results indicate that the FNPA screening tool may be a useful to for school obesity prevent programs or a simple and quick way for parents to evaluate their own parenting practices.

CHAPTER 1. INTRODUCTION

Childhood obesity, as of 2012, is affecting one third of children and adolescents and is expected to increase in coming years.[1] Obesity is the result of a chronic caloric imbalance, with more calories being consumed than expended. Family history of obesity, hereditary factors, environment, metabolism, behavior, culture, and socioeconomic status all play a role in obesity. Evidence is available to support both genetic and environmental components to obesity, with newer research focusing on the effects of parenting.[2,3]

Research has found that obesity at a young age continues through the lifetime, so the most important strategy to reduce the obesity epidemic is to determine ways to prevent childhood obesity.[4] The consequences of childhood and adolescent obesity are vast and incude not only health-related physiological outcomes, such as high blood pressure and cholesterol, metabolic syndrome, type 2 diabetes, orthopedic problems, and fatty liver disease, but also psychological, social, and behavioral consequences, such as risk for problems related to body image, self-esteem, social isolation and discrimination, depression, and reduced quality of life.[5] In 2003, Reilly et al.[6] conducted a systematic review of the literature on the health consequences of childhood obesity. They concluded that childhood obesity has significant short-term and long-term adverse medical and psychosocial effects that are likely to extend into adulthood. Additionally, they found strong evidence relating childhood obesity to increased morbidity and mortality in adulthood.

In recent years there has been considerable attention given to identifying effective obesity treatment programs. However, primary prevention theory suggests that prevention efforts should begin before the child is "at risk" in order to prevent overweigh/obesity from occurring. Parents and families are logical places for intervention programs to target since they directly influence

children's access and lifestyle choices. A key need is to evaluate parenting practices and home environments that may increase the child's likelihood of becoming overweight/obese. These factors could then be targeted early to help prevent the development of overweight/obesity in children.

The Family Nutrition and Physical Activity (FNPA) Screening tool was developed to provide practical ways to evaluate home obesogenic environments.[7] The FNPA was also developed to help facilitate primary prevention since it has been shown to identify home environments that may predispose youth to becoming overweight.[8] The FNPA has been used in several other studies and has been shown to be associated with dimensions of parenting style.[9] Specifically, parents with more favorable (authoritative) parenting styles have been shown to report more favorable FNPA scores. This cross sectional study cannot determine causality but it does support the fact that the FNPA score is associated with parenting practices. While studies have supported the utility of the FNPA as a promising obesity prevention tool no study to date has examined associations between FNPA scores and child behaviors. This is an important question since it is important to better understand how parenting practices and behaviors can influence children's behavioral outcomes.

The present study will address this need by examining associations between FNPA scores from parents and child lifestyle behaviors as assessed by an established self-report tool called the Youth Activity Profile (www.youthactivityprofile.org). An advantage of the Youth Activity Profile (YAP) is that it has been developed to provide estimates of time that children spend in physical activity at home (as opposed to school). The instrument also captures sedentary behavior and home eating behavior. This study will also serve as preliminary construct

validation evidence for FNPA validity. Our hypothesis is that parents with higher scores on the FNPA will have children with healthy lifestyle behaviors.

CHAPTER 2. LITERATURE REVIEW

Childhood obesity has been on the rise for the past three decades and research is needed to reverse this trend. Current research has increasingly highlighted the importance of parents and family involvement in child obesity treatment and prevention. It has been found that parents directly influence their child's lifestyle by establishing environments and policies/practices that dictate access to healthy or unhealthy behaviors.[10] Evaluating parenting practices and the home environment may be an essential area to target since these areas directly impact the child and may increase the child's likelihood of becoming overweight. Factors that increase a child's risk of becoming overweight or obese could then be targeted early in homes to help prevent the development of overweight/obesity. The Family Nutrition and Physical Activity (FNPA) tool has shown promising for family-based obesity prevention but additional research is needed to examine associations between FNPA scores and children's behaviors. The proposed study will provide new insights by determining how specific aspects of the home environment assessed in the FNPA relate to children's corresponding health related behaviors.

The literature review will provide background and justification for the proposed study. The first section will provide a background on the development of the FNPA tool and updates of the literature on key constructs in the FNPA. The second section will summarize research on parenting style since this has important implications for how parents interact with their children. The final section will review past research on the associations between home environments and youth behaviors to provide context for the proposed research.

Family Nutrition and Physical Activity (FNPA) Screening Tool

The Food Nutrition and Physical Activity (FNPA) screening tool was developed by Iowa State University researchers in collaboration with the Academy of Nutrition and Dietetics (AND, formerly the American Dietetic Association, ADA). It was designed to determine the strength of evidence linking overweight/obesity with specific physical activity and diet behaviors.[7] Ten main factors were identified that had positive associations with overweight and obesity (breakfast and family eating, modeling of nutrition, nutrient dense food, high calorie beverages, restriction and reward, parent modeling, physical activity, child's physical activity, screen time, TV in the bedroom, sleep, and routine schedule). The original survey was composed of 21 questions and thus the ten constructs could be captured with at least 2 items. The FNPA is the first instrument that combines information from a variety of behaviors related to child obesity to evaluate family environments, and has potential for use by obesity researchers as well as by a variety of clinical and public health professionals. It offers a quick and easy way to assess a child's home environment and parental behaviors that may increase a child's risk for becoming overweight.

An initial study of the FNPA screening tool by Ihmels and colleagues[8] found that the screening tool captures important elements of the family environment and behaviors that relate to risk for child overweight. Results showed that there were significant correlations ($p < 0.01$) between child's BMI and mother's BMI, father's BMI, school SES, and constructs of breakfast/family meal, model nutrition, high calorie beverages, TV in the bedroom, child's physical activity, and total score. There were also significant correlations ($p < 0.05$) between child's BMI and parent's physical activity and sleep schedule.

A second study by Ihmels and colleagues[7] looked at the ability of the FNPA screening tool to predict BMI changes in a one year prospective cohort of first graders. First graders were chosen because this is the age group that is associated with large annual BMI changes, and children are typically past the "adiposity rebound" by this point. In this study, a total of 854 parents with children in 37 of 39 different school districts in Des Moines, IA, completed the FNPA instrument and changes in BMI were monitored over the subsequent year. The study provided evidence to support the validity of the FNPA screening tool for assessing modifiable home environments and behaviors that are associated with increased risk of childhood overweight. After accounting for school and family factors, results suggest that the FNPA score explained change in child's BMI after controlling for baseline BMI and other parenting variables and socio-economic factors.

The FNPA has also shown cross-sectional effectiveness for identifying children who are at risk of cardiovascular disease. In a study by Yee et al.[11] a sample of 119 parents of fifth graders completed an updated version of the FNPA consisting of 10 questions capturing the same ten constructs. Researchers also assessed height, body mass, BMI, waist circumference (WC), total cholesterol (TC), high-density lipoprotein (HDL), and mean arterial pressure (MAP). A continuous CVD risk score was computed for each child by standardizing individual risk factors (WC, MAP, and TC:HDL) and then by regressing them onto age and gender. The FNPA score was found to significantly correlate with the continuous CVD risk score. The FNPA score was not significantly related to TC:HDL or MAP as the researchers speculated that the association with the continuous CVD risk score was most likely due to WC. The researchers also noted that the prevalence of overweight and obese children (and the mean values for BMI and percent body

fat) were significantly higher in children with worse FNPA scores. These results support the clinical importance of the FNPA score.

Also relevant to the present project is a study that demonstrated that the FNPA was associated with parenting styles. Johnson et al.[9] used Baumrind's parenting typologies to examine associations between parenting styles and the parenting practices associated with childhood obesity. Parenting behaviors were assessed with the Parenting Styles and Dimension Questionnaire (PSDQ) and assigned to one of three clusters (authoritative, authoritarian/authoritative, and permissive/authoritarian). The scores were compared to parent perceptions of the home obesogenic environment using the FNPA, and the BMI of the child. Parents in the permissive/authoritarian cluster exhibited the lowest FNPA scores and the highest child BMI percentile scores compared to parents in the authoritative and authoritarian/authoritative clusters.

In conclusion, the FNPA screening tool captures important elements of the family environment and behaviors that relate to risk of child overweight/obesity and could potentially identify families that may be inadvertently predisposing their children to becoming overweight. It also has the potential to identify children that may be at risk for developing CVD.

Childhood Overweight/Obesity

Obesity is associated with significant health problems in the pediatric age group and is an important early risk factor for much of adult morbidity and mortality. Medical problems are common in obese children and adolescents and can affect cardiovascular health, metabolic health, and mental health.[12] According to the CDC[1] in 2012, more than one third of children and adolescents were categorized as overweight or obese. The report indicated that the prevalence of

childhood obesity has more than doubled in children and quadrupled in adolescents over the past 30 years. Specifically, the percentage of obese children aged 6-11 years in the United States increased from 7% in 1980 to nearly 18% in 2012 while the percentage of obese adolescents aged 12-19 years increased from 5% to nearly 21% over the same period.

Body mass index (BMI) is the most widely used indicator for defining overweight and obesity. BMI is calculated as the ratio of weight in kilograms to the square of height in meters and standardized pediatric growth charts are available to assess normal and overweight status. (A BMI between the 5th and 85th percentile is considered "normal weight", values between 85th and 95th percentile for age and sex are considered to represent overweight, and a BMI at or above the 95th percentile is considered to reflect obesity).[13,14]

This epidemic of childhood obesity has sparked the interest of many researches and public health officials to try to determine the origin of the problem. There is a growing agreement among experts that the child's environment, rather than biology, is driving this epidemic.[15,16] Although biology clearly contributes to individual differences in weight and height, the rapid weight gain that has occurred over the past 3 decades is most likely a result of the changing environment.[17] The current environment in the United States encourages consumption of an energy-dense diet and discourages physical activity. Extensive research has been done to identify factors that may lead to childhood obesity. Four of the most common and preventable factors found are poor and/or over nutrition, lack of physical activity, excessive screen time, and decreased sleep. These will be discussed in the subsequent sections:

Nutrition. A recent literature review of 166 articles[18] looked at the home food environment and how it pertains to childhood obesity. The review found that many children are

consuming excess calories and exceeding recommended intakes of total fat, saturated fat, added sugar, and sodium. Furthermore, a staggering 80% of adolescents reported that they eat less than five servings of fruits and vegetables a day. Over the past decades, soda consumption, snacking, and food portion sizes have increased as well, both in and out of the home, and children get over 50% of their food either prepared outside of the house and/or from fast food restaurants. These dietary shortcomings can lead to obesity and can further contribute to hypertension, dyslipidemia, chronic inflammation, asthma, diabetes, cardiovascular disease and many other comorbidities.[19]

One subtopic of the review looked at family mealtimes and found that these mealtimes have great potential to affect eating behaviors and overweight/obesity in children.[18] Children who eat six or more meals a week with their family have significantly better dietary outcomes and are less likely to do the following: skip breakfast, eat fewer than two servings of fruit, eat fewer than two servings of vegetables, and consume fewer than two servings of dairy products. Eating family dinner has been associated with healthful dietary patterns, better fruit and vegetable intake, and lower intake of fried food and soda. Children who do not have regular family dinners tend to eat sweets and fast foods more often. Overall, there is sufficient cross-sectional evidence showing positive influences of family meals.

Additionally, there is now a large body of evidence demonstrating that regular breakfast consumption is associated with a variety of nutritional and lifestyle-related health outcomes in large diverse samples of adolescents, which may prevent weight gain, nutrient deficiency, and reduce risk factors for chronic disease.[20] Rosenkranz et al. also found that eating breakfast is associated with positive outcomes for both school performance and protection from obesity. Among preschoolers, lack of daily breakfast consumption nearly doubled the odds of being

overweight. Unfortunately, breakfast consumption has declined in children over the past decades.

A third subtopic of the review by Rosenkranz stressed the importance of home availability and accessibility of healthy foods. Children's fruit and vegetable consumption is significantly related to availability of these foods. The better the availability and accessibility of nutrient-dense foods in the home environment, the more likely it is that children will choose to eat these healthy foods. The review states that for obesogenic foods, the home environment is the largest source of sugar-sweetened beverages and many studies show strong evidence for the role of such beverages in the development of obesity in children. Also, stockpiling of high fat foods (including pizza, chips, pastries, and candy) in the home increases consumption of these convenient items when they are visible and accessible.

Physical and Sedentary activity. Sedentary behavior has been increasingly studied as a determinant of childhood obesity. The US Department of Health and Human Services recommended that youth accumulate 60 or more minutes daily of aerobic moderate to vigorous physical activity that is enjoyable and developmentally age-appropriate.[21] Despite all of the known health benefits of regular physical activity, significant percentages of children do not participate in the recommended level of physical activity. Data from the CDC Youth Risk Behavior Survey indicate that only 36% of US high school students meet the 60 minute moderate to vigorous physical activity guideline.[22] Furthermore, in 2003, NHANES objectively measured physical activity and indicated that only 42% of children aged 6-11 years and 7.6% of adolescents aged 16-19 years accumulate 60 minutes or more of moderate to vigorous physical activity.[23]

Adequate physical activity is considered essential for good health and optimal growth and development in children and youth.[24] Recent comprehensive reviews have concluded that regular physical activity is associated with numerous positive health outcomes, including improved cardiovascular fitness, academic achievement, increased bone mass, and improved psychological well-being.[25,26] Physical activity has also be shown to be inversely associated with negative health outcomes such as obesity, elevated blood lipids, insulin resistance, elevated blood pressure, and cigarette smoking. Moreover, because several health outcomes associated with lack of physical activity track from childhood into adulthood, regular physical activity during childhood and adolescence may be of critical importance in the prevention of chronic diseases later in life.[27]

Longitudinal and intervention studies have also found an effect of physical activity on weight status. Moore et al.[28] examined data from the Framingham Children's Study to evaluate the effects of physical activity on adiposity from ages 4 to 11. Physical activity levels were examined at baseline, individual time points and as an average across all time points. At baseline there were no significant differences in BMI found between children based on tertiles of physical activity. Children in the highest tertile of average activity across all time points had significantly lower mean BMI, triceps and sum of five skinfolds at the end of follow-up compared to the lowest tertile of activity.

Screen time. Time spent watching television is another component that contributes to a sedentary lifestyle. The Academy of Pediatrics recommends that children's total media time should be limited to 1-2 hours of quality programming per day. However, data from the 2012 National Health and Nutrition Examination Survey (NHANES) indicated that 33% of youth

exceed the guideline.[29] Among school-aged children, cross-sectional studies reveal a dose-response relationship between the amount of time viewing television or frequency of viewing television and the prevalence of obesity.[30]

Elementary school-based interventions to reduce TV/video viewing have been associated with reduction in adiposity in adolescence. In one study, reductions in TV viewing were associated with lower obesity rates among girls.[31] A second study found that reducing TV/video viewing and decreasing the number of meals eaten in front of the TV yielded significant reductions in BMI and in skin-fold thicknesses among both girls and boys.[32] Clinic-based studies are finding similar results as well. A study consisting of ninety families with obese 8-12 year-old children found that a reduction in sedentary activities (including watching TV and video games and playing computer and board games) was just as effective in reducing obesity measures as a program that increased physical activity levels.[33]

A longitudinal study followed 8,000 children from the start of kindergarten until the spring of third grade.[34] The participants were weighed and measured four times throughout the study and were then classified as overweight (>95th percentile of BMI) or not overweight (≤95th percentile of BMI). Gable and colleagues found that children who watched more television during kindergarten and first grade were more likely to be overweight at third grade. Similarly, children who watched more television from kindergarten through third grade were more likely to be persistently overweight across the same time span.

Another disadvantage to excessive television watching is it is the predominant food marketing tool used to target both children and adults. A review of television and consumption patterns revealed that in Western industrialized countries food is the most frequently advertised product category on children's television programs, with sugary products and fast food

predominating.[18] Children exposed to these advertised products are more likely to request these items from parents and consume them. A recent review of literature found that fast food advertising on television targets children with visual and auditory messages that encourage the consumption of fast food that is primarily high in fat and sugar, and many of these food items do not meet the daily recommended dietary intake requirements. The researchers also found that a number of children snack on food that is also high in fat and sugar while watching television, and research showed that children tend to eat more of these high in fat and sugar foods after being exposed to television advertising.[35]

Sleep. Sleep is vitally important for a child's day-to-day functioning and as the pace of modern life accelerates, many parents and researchers have had increasing concerns about whether children get enough sleep and whether lack of sleep has lasting effects on children's cognitive and physical development. The CDC has recommended that children and adolescents need a minimum of 10 hours of sleep a night.[36] A large longitudinal study found that 13% of all children aged 3-7 years sleep less than 9 hours during the weekdays, 11% of children aged 8-12 years sleep less than 8 hours during the weekdays, and 16% of children aged 13-18 years sleep less than 7 hours on weekday nights.[37]

A cross-sectional study in 2006 looked at 6,324 Australian children from 7-15 years of age and assessed health-related fitness and self-reported health behaviors.[38] Their results indicated significant associations between sleep duration and mean BMI and waist circumference in both girls and boys. These results support previous epidemiological investigations examining the relationship between sleep duration and obesity. Another study with evidence supporting the sleep-obesity hypothesis in children is from the Toyama Birth Cohort Study.[39] In this study, a

dose-response relationship was shown between late bedtime and short sleeping hours and obesity in 8,274 Japanese children aged 6-7 years old. The odds ratio for children sleeping less than 8 hours was 2.87 compared to those sleeping 10 or more hours.

A more recent study of 2,281 children aged 3-12 years old looked at the associations between sleep and BMI and overweight statues.[37] Snell and colleagues found that younger children (aged 3-7.9) experience harmful effects on BMI and overweight statues from staying up late, while older children do not (aged 8-12). However, both groups experience marginally significant negative effects on BMI from getting up early. Similarly, a review of 25 studies all indicated significant associations between short sleep duration and childhood overweight/obesity.[40]

Decreased sleep time has also been associated with higher blood pressure in children and adolescents.[41] Objective measurements of sleep duration and sleep efficiency show strong associations with odds of prehypertension. Additionally, adolescents with low sleep efficiency ($\leq$ 85%) have an average 4.0 $\pm$ 1.2 mmHg increase in systolic blood pressure than those without low sleep efficiency. In a large sample of 10-12 year olds, every hour that sleep is decreased is associated with a 0.31 mmHg increase in systolic blood pressure.[42] This association remained significant after controlling for maternal education, social status, gender, birth weight, maternal BMI, physical activity and other factors.

Parenting Styles and Parenting Influence

The effects of parenting on child development have been studied for decades. In 1971 psychologist Diana Baumrind identified four patterns of parenting styles based upon two aspects of parenting behavior: control and warmth. Parental control refers to the degree to which parents

manage their children's behaviors. This may range from being very controlling to setting few rules and demands. Parenting styles include warmth, authoritarianism, permissiveness, and involvement. Parental warmth refers to the degree to which parents are accepting and responsive of their children's behavior as opposed to being unresponsive and rejecting. When the two aspects of parenting behavior are combined in different ways, four primary parenting styles emerge: authoritative, authoritarian, permissive, and uninvolved parents. Authoritative parents are warm but firm. They encourage their adolescent to be independent while maintaining limits and controls on their actions. Research demonstrates that adolescents of authoritative parents learn how to negotiate and engage in discussions and they understand that their opinions are valued. As a result, they are more likely to be socially competent, responsible, and autonomous. Authoritarian parents display little warmth and are highly controlling. They are strict disciplinarians, use a restrictive, punitive style, and insist that their adolescent follow parental directions. Research reveals that adolescents of authoritarian parents learn that following parental rules and adherence to strict discipline is valued over independent behavior. As a result, adolescents may become rebellious or dependent. Permissive parents are very warm, but undemanding. They are indulgent and passive in their parenting, and believe that the way to demonstrate their love is to give in to their adolescent's wishes. Research shows that adolescents of permissive parents learn that there are very few rules and that consequences are not likely to be serious. As a result, teens may have difficulty with self-control and demonstrate egocentric tendencies that can interfere with proper development. Lastly, Uninvolved parents are not warm and do not place any demands on their child. They minimize their interaction time, and, in some cases, are uninvolved to the point of being neglectful. Uninvolved parents are indifferent to their adolescent's needs, whereabouts, or experiences at school or with peers. Research supports that

adolescents of uninvolved parents learn that parents tend to be interested in their own lives and less likely to invest much time in parenting. As a result, teens generally show similar patterns of behavior as adolescents raised in permissive homes and they may also demonstrate impulsive behaviors due to issues with self-regulation.[43]

However, research on parenting styles has primarily been conducted among Euro-American, middle-class populations. Research involving samples with greater racial/ethnic and socioeconomic diversity have yielded somewhat different findings. Studies examining the cultural context of parenting in the United States have demonstrated that different racial/ethnic groups hold different goals for their children and therefore use different child-rearing practices. More recently, with the ongoing rise of childhood obesity in the United States, many researchers are moving away from the more broad parenting styles and are now focusing on the associations between parenting practices (what parents do) and child outcomes.[44]

Research focused on parental influences of child's diet has found sufficient data to support the conclusion that in noncontolling, noncoercive conditions, in which children have access to a variety of healthful foods, children are more likely to have the ability to self-regulate the amount of food and energy consumed. It has also been found that parents may negatively influence their children's dietary intake and ability to self-regulate by either applying excessive external control or failing to offer healthful options. A high degree of parental control over a child's dietary intake may disrupt natural systems of self-regulation. Additionally, parents who limit highly palatable foods (i.e. sweets, cakes, pasties) may actually promote the children's desire for such foods. This may lead to dysregulation of energy intake, overeating, and ultimately weight gain. It has also been suggested that food as a reward increases a child's preference for that food. On the other hand, pressuring or prompting a child to eat to obtain a

reward tends to decrease a child's preference for the food that is being promoting by the parent .[45] Cross-sectional comparisons between parental pressure and encouragement and BMI at both baseline and after 2 years of follow-up found a significant, inverse association among a population of non-Hispanic white girls.[44]

Additionally, family meals have been shown to play an important role in promotion of positive dietary intake among children. Research suggests that when parents are present at mealtime, establish a positive atmosphere, and model appropriate food-related behaviors, their children tend to have improved dietary quality. Furthermore, increased frequency of family dinners among 9- to 14-year-old children is associated with healthful dietary patterns.[46]

Parents also play an important role in determining children's physical activity. Moore et al. reported that parents who are more physically active are more likely to have children who are physically active. Similarly, a report by Kalakanis and colleagues[47] found that a hierarchic regression model showed parent activity improved the prediction of obese children's activity levels and number of bouts of moderate-to-vigorous activity. A comprehensive review of correlates of physical activity found that parental support, sibling physical activity, direct help from parents, and opportunities to exercise were associated with children's physical activity.[46] In another comprehensive review of physical activity correlates, one of the strongest and most consistent correlates of physical activity in children was time spent outdoors, a factor largely determined by parents.[45]

Finally, parental screen time has also been linked to child weight status. The amount of time parents spend watching television has been shown to have a positive relations to the amount of time spent watching television in Hispanic boys, but negatively related in African American

boys. Parents' concern about their own fitness was negatively related to television time in Caucasian girls but positively related in African American girls.[45]

Associations between Parent Practices and Child Behaviors

Research has found that parenting practices have a strong influence on the children's dietary intake and activity behavior. Parents have the ability to control the availability and exposure to food and activity opportunities, they act as role models, and provide their children with support and structure.

Multiple studies have examined the influences of food related parenting practices and feeding styles on children's dietary intake and weight. Ray et al.[48] looked at the impact of parenting practices on 1,268 children aged 10-11 years old. The study aimed to examine whether having a higher number of positive parenting practices was associated with more favorable health behaviors among children. Their results indicated that having a higher number of parenting practices was associated with decreased consumption of calorie-dense foods and sedentary activities and increased consumption of nutrient-dense foods and sleep time. Previous studies have also found that food-related parenting practices such as having food rules, monitoring food intake, having fruits and vegetables available, and encouraging children to eat fruit and vegetables are associated with frequent intake of fruit and vegetables, breakfast, increased fiber intake and decreased intake of added sugar.[49-53] By contrast, food-related pressure, parents catering to child's demands and permissiveness have been shown to predict a higher intake of sweets and soft drinks.[50] It has also been found that more restrictive parenting food practices are associated with lower consumption of soft drinks among school aged children and adolescents.[51-57]

Associations between parenting practices and screen time have also been examined. Multiple studies have concluded that rules about not watching TV during mealtimes and stricter rules for watching TV in general are associated with children watching less TV.[58-61] Lloyd et al.[61] surveyed 70 parents and children aged 5 to 12 and examined specific parental styles. The researchers' results indicated that there was a negative association between mothers who have parenting styles related to monitoring screen time and disciplining children when rules are broken and their child's overall screen time. A study by Jago et al.[62] examined opposing parental practices related to screen time. There were 2,670 3rd and 9th graders randomly surveyed about child autonomy, TV environment, and time spent watching TV or playing computer games. The results suggested that children who have fewer rules relating to screen time watch more TV and spend more time playing computer games than children who have more screen time rules given to them by their parents. However, it is important to note that the parental practices examined in this study were not based on parent report. Rather, they were based solely on child's self-reported autonomy.

The amount of physical activity that a child is involved in has been shown to be related to parental practices as well. A review from 2000 of 108 articles looked at the correlates of children's physical activity. The review found that the majority of articles examined concluded that parental support and encouragement was a positive predictor of child's physical activity.[63] However, when this review was updated in 2012 by Ferreira et al.[64] the researchers found that there were many studies published since 2000 that did not find this effect and found no relationship between parental support and encouragement and child's physical activity. A study published after the updated review involving 676 5th and 6th graders found that participation in physical activity with at least one parent predicted a favorable change in children's physical

activity a year and a half later.[65] Other factors such as parenting practices relating to physical activity, sedentary activity, and parental characteristics have also been shown to effect child's physical activity.[48,49,59,61] Grubbels et al.[48] found a small, but significant, correlation between parents who encourage their child to be active and children who are more active and less sedentary. However, Grubbels and colleagues also found a small, but significant, correlation between parents that restrict sedentary time and children who have less physical activity. When examining the effect of parental characteristics, the amount of steps the father of a child takes in a day has been found to be associated with increased steps taken by a child.[61] However, there was no association found between steps taken by the mother and child's steps.

Almost all studies examining the effect of the home environment on child's behavior have data that was gathered through self-report, which is widely known to have more bias than objective methods. Research has shown that children and adolescents have difficulty recalling their past activity behaviors. On average it has been shown that there is a 73.4% agreement between what children report and what the actual amount of physical activity preformed in a day is.[66] However, the percentages ranged from 33% to 100%. Having children report physical activity at multiple times throughout the day, rather than only once at the end of the day, has been shown to increase agreement by about 9%.[66] Children are not the only ones who have inaccurate self-reports. Parents have inaccurate self-reports as well, specifically when bring asked to report their child's physical activity. Colley et al.[67] found that parents considerably over report how active their child is, by about 40 minutes, when it is compared to what objective accelerometer data records. The opposite is true for screen time and sleep. Colley and colleagues found that parents underestimate the amount of time that their child is sedentary by five hours, and also underestimate the amount of sleep their child gets by roughly 30 minutes. It

is important to take these findings into consideration when examining data that has been self-reported.

CHAPTER 3. METHODS

This study was conducted to examine associations between home environments and parenting practices (as assessed from the FNPA) and child behaviors. The study uses a cross-sectional design conducted on families with elementary grade children. This study was exempt from Institutional Review Board approval.

Participants

The participants for the present study were recruited from schools involved in the Iowa FITNESSGRAM Initiative – a large participatory research network involving schools from six different Iowa school districts (www.iowafitnessgram.org). The targeted age groups were 4th and 5th grade since these are the ages where children begin to establish more independent lifestyle behaviors. Schools in the Iowa FITNESSGRAM project are encouraged to complete the YAP as part of normal assessment procedures, but members of the research team provided specific assistance during designated physical education classes to facilitate the completion of the YAP. Children were provided with information about the FNPA on a handout to be given to their parents. Booths at parent-teacher conferences were also set up to inform parents about the FNPA and to enable them to fill out the survey.

Instruments

Youth Physical Activity Profile (YAP). The YAP is a self-report instrument that assesses physical activity (PA) at school and at home while also providing information about sedentary behavior. The original survey includes 15 items. The 15 items evaluate PA at home (questions 1-5), PA at school (questions 6-10), and sedentary activity (SA) (questions 11-15). Five

additional items were recently developed to capture nutrition behaviors (NUTR) (questions 16-20). The specific YAP questions and their abbreviation are provided in table 1. The full survey can be found in Appendix A. The YAP has been calibrated to estimate time spent in PA and time spent in sedentary behavior but validity of the newly developed nutrition items has not been established to date.

The YAP was administered to children using a customized web-based assessment designed for use in schools (www.switch.youthactivityprofile.org). Students completed the assessment in their school's computer lab. The survey required the children to enter their student ID, grade, and gender before completing the YAP survey.

Family Nutrition and Physical Activity (FNPA) Screening Tool. The FNPA is a 20 item screening tool designed to evaluate the obesogenic nature of home environments and parenting practices. The FNPA was developed to capture overall home environments but for the present study, separate subscales were used to capture items pertaining to PA (questions 14-18), SA (questions 11-13), and NUTR (questions 1-9). Questions 10, 19, and 20 were excluded from analyses because they were not relevant to the three categories. The specific FNPA questions and their abbreviation are provided in table 2. The full survey can be found in Appendix A. The FNPA has been shown to have good internal consistency ($\alpha = 0.74$) and construct and predictive validity for detecting risk of children becoming overweight.[8]

Data from the FNPA were obtained from a customized web-based application developed by the Academy of Nutrition and Dietetics for our research group (www.switch.eatright-fnpa.org). Parents were provided with a link to the tool by the flier that was sent home with their child from school. The flier provided information about the tool and the study and provided their child's ID number and how to complete the assessment electronically. They were required to

complete a field containing the child's ID number in order to enable the data to be linked to the child's data.

Analyses

The primary goal of the study was to examine associations between dimensions of parenting practices (assessed by the FNPA) and corresponding dimensions of child behavior (assessed by the YAP). To facilitate evaluation, data from the two instruments were merged by ID and combined into a single database. The analyses included descriptive evaluations of the two instruments as well as correlational analyses examining between the two instruments and their subscales.

The descriptive analyses were conducted separately for each instrument. Frequencies and summary scores were computed for each of the individual FNPA and YAP items to understand the measurement characteristics of the items. The YAP items are already separated into constructs of PA, SA and NUTR so parallel subscales were established for the FNPA tool to enable parenting influence on these behaviors to be examined. The overall mean FNPA score (FNPA) was computed to capture an indicator of the overall home obesogenic environment. This was based on all 20 items. The three proposed subscales were computed as follows: FNPA PA: (questions 14-18), FNPA SA (questions 11-13), and FNPA NUTR (questions 1-9). Because some of items captured assessments of child behavior, a separate reduced version of the FNPA was computed based on the mean of the 11 items that captured parenting influence related to PA, SA and NUTR behaviors (FNPA2). Separate reduced subscales were also computed that

Table 1. YAP questions (*abbreviations*).
Question 1. How many day did you walk or bike to school? (*PAtoSchool*)
Question 2. Activity during Physical Education Class: During physical education, how often were you running and moving as part of the planned games or activities? (*PAinPE*)
Question 3. Activity During Recess: During recess, how often were you playing sports, walking, running, or playing active games? (*PAatRecess*)
Question 4. Activity During Lunch: During lunch break, how often were you moving around, walking or playing (*PAatLunch*)
Question 5. Activity From School: How many days did you walk or bike from school? (*PAfromSchool*)
Question 6. Activity before School: How many days before school (6:00-8:00 am) did you do some form of physical activity for at least 10 minutes? (*PAbeforeSchool*)
Question 7. Activity after School: How many days after school (between 3:00 - 6:00 pm) did you do some form of physical activity for at least 10 minutes? (*PAafterSchool*)
Question 8. Activity on Weeknights: How many school evenings (6:00 - 10:00 pm) did you do some form of physical activity for at least 10 minutes? (*PAonWeeknights*)
Question 9. Activity on Saturday: How much physical activity did you do last Saturday? (*PAonSaturday*)
Question 10. Activity on Sunday: How much physical activity did you do last Sunday? (*PAonSunday*)
Question 11. TV Time: How much time did you spend watching TV outside of school time ? (*TVtime*)
Question 12. Video Game Time: How much time did you spend playing video games outside of school time? (*VideoGameTime*)
Question 13. Computer Time: How much time did you spend using computers outside of school time? (*ComputerTime*)
Question 14. Phone / Text Time: How much time did you spend using your cell phone after school? (*PhoneTextTime*)
Question 15. Overall Sedentary Habits: Which of the following best describes your typical sedentary habits at home? (*SedentaryHabits*)
Question 16. Fruit: In the last week, estimate how many days you ate at least 2-3 servings of fruit? (*Fruit*)
Question 17. Veggies: In the last week, estimate how many days you ate at least 2-3 servings of vegetables? (*Veggies*)
Question 18. Breakfast: In the last week, how many days did you eat breakfast? (*Breakfast*)
Question 19. Sugar Drinks: In the last week, how many days did you drink a sugar sweetened beverages like regular or diet soda pop or Kool-Aid-like juices? (*SugarDrinks*)
Question 20. Fast Food: In the last week, how many days have you eaten fast food as a meal? (*FastFood*)

Table 2. FNPA questions (*abbreviations*).

Question 1. How often does your child eat breakfast, either at home or at school? (*Breakfast*)

Question 2. How often does your child eat at least one meal a day with at least one other family member? (*FamilyMeals*)

Question 3. How often does your child eat while watching TV? (*EatWithTV*)

Question 4. How often does your family eat "fast food"? (*FastFood*)

Question 5. How often does your family use packaged "ready-to-eat" foods? (*PreparedFood*)

Question 6. How often does your child eat fruits and vegetables at meals or snacks? (*FVSnacks*)

Question 7. How often does your child drink soda pop or sweetened beverages? (*Soda*)

Question 8. How often does your child drink low-fat milk for meals or snacks? (*Milk*)

Question 9. How often does your family monitor the amount of candy, chips and cookies your child eats? (*MonitoringFood*)

Question 10. How often does your family use candy, ice cream, or other food as a reward for good behavior? (*Reward*)

Question 11. How often does your child have less than 2 hours of "screen time" in a day? (*LowScreenTime*)

Question 12. How often does your family monitor the amount of "screen time"? (*MonitoringScreenTime*)

Question 13. How often does your child engage in screen time in his/her bedroom? (*BedroomScreen*)

Question 14. How often does your family provide opportunities for physical activity? (*PAopportunities*)

Question 15. How often does your family encourage your child to be physically active? (*PAencouragement*)

Question 16. How often does your child do physical activities with at least one other family member? (*PAfamily*)

Question 17. How often does your child do something physically active when he/she has free time? (*PAfreetime*)

Question 18. How often does your child participate in organized sports or physical activities with a coach or leader? (*PAsports*)

Question 19. How often does your child follow a regular routine for your child's bedtime? (*Bedtime*)

Question 20. How often does your child get enough sleep at night? (*Sleep*)

reflected the separate parenting practices for each behavior: FNPA PA2: (questions 14-16); FNPA SA2: questions 12,13), and FNPA NUTR2: (questions 1-3,5,8, 9). Additionally, a third scale was computed to capture only the 6 items related to parent assessments of behavior (FNPA proxy). The three separate subscales for evaluating proxy reports of child behaviors were as follows: FNPA PA proxy: (questions 17,18); FNPA SA proxy: (question 11) and FNPA NUTR proxy: (questions 4,6,7). The creation of separate versions of the FNPA enabled relationships to be examined in more detail.

Internal consistency of the three different versions of the FNPA and YAP scales were examined by computing alpha reliability scores. Relationships among the individual subscales in both the YAP and the various FNPA versions were examined with Pearson correlation coefficients. Two-way Analyses of Variance (ANOVA) was used to examine grade and gender differences in the YAP scores to determine if samples could be collapsed by grade and gender for a more aggregated analyses.

The primary analyses focused on examining correlations between the FNPA scales (and subscales) and the various YAP subscales. These analyses examined the relative magnitude of correlations for the full FNPA version compared to the reduced FNPA2 scales and subscales. The separate scales capturing parent proxy variables enabled an ancillary evaluation of the relationship between parent reported behaviors and child reported behaviors.

CHAPTER 4. RESULTS

Participants

Data were collected from four elementary schools in Indianola, IA. A total of 467 students completed the YAP survey (Table 3). Three participants were removed from the YAP data due to a grade reported other than 4th or 5th. Therefore, there were a total of 464 participants included in the final YAP data set (47.4% female, 52.6% male). A total of 85 parent/guardians completed the FNPA survey. Data from 21 participants did not provide their child's student ID number or failed to complete all of the FNPA questions and these cases were removed. The remaining 64 cases were matched by student ID with the YAP scores.

Table 3. Descriptive participant statistics for YAP

	Boys	Girls	Total
4th Grade	126	105	**231**
5th Grade	118	115	**233**
Total	**244**	**220**	

Family Nutrition and Physical Activity Screening Tool

Figure 1 shows the mean responses for the 20 FNPA questions. Scores are on a scale of 1 to 4 with higher scores indicating healthier parenting practices and lower scores indicate unhealthy or less healthy practices. The majority of the items, 15 out of the 20, had mean scores between 3 and 4 indicating generally healthy practices. The lowest score was for low screen time with a mean of 2.41, while the highest score was family meals with a mean of 3.83.

To further explore the responses, frequency distributions were computed for each question (Figure 2). There were reasonable distributions across the four choices and few

noteworthy patterns were evident. For the family meal item, nearly all parents (90.6%) chose 4 (almost always) as their response. However, for the low screen time item only 12.5% chose 4 as their response, and the majority (53.1%) chose either a 1 or 2 as their response (almost never or sometimes). Along with family meals, breakfast, monitoring food, reward, bedroom screen, PA opportunities, PA encouragement, bedtime, and sleep all had a response of 4 for at least 50% of parents. The least desirable response (score 1) was never selected for questions on fast food, PA opportunities, PA encouragement, bedtime, and sleep. A response of 1 was never the most common answer for any of the questions. A score of 2 was the more common response for monitoring screen time, and PA free time. A score of 3 was the most common response for fast food, prepared food, soda, milk, and PA family. A score of 4 was the most popular response for breakfast, family meals, eat with TV, monitoring, reward, bedroom screen, PA opportunities, PA encouragement, PA sports, bedtime, and sleep. For the low screen time item the most common response was both a 2 and 3. FV snacks' most common response was both a 3 and 4.

The focus of the analyses was on combined indicators related to supportive environments for specific youth behaviors so the items were grouped into three distinct subcategories: nutrition (NUTR), sedentary activity (SA), and physical activity (PA) (Figure 3). Responses to the NUTR questions had the highest mean (3.29) while responses to SA had the lowest overall mean (2.89), and the mean for PA was 3.13.

The alpha reliability was computed for both the full FNPA scale as well as for the proposed subscales. The alpha reliability for the full scale had good internal consistency (α = 0.74). The alpha reliability for the three scales showed low internal consistency for NUTR (α = 0.53), low/acceptable internal consistency for SA (α = 0.62) and moderate/good internal consistency for PA (α = 0.78). Some of the items on the FNPA capture parenting practices while

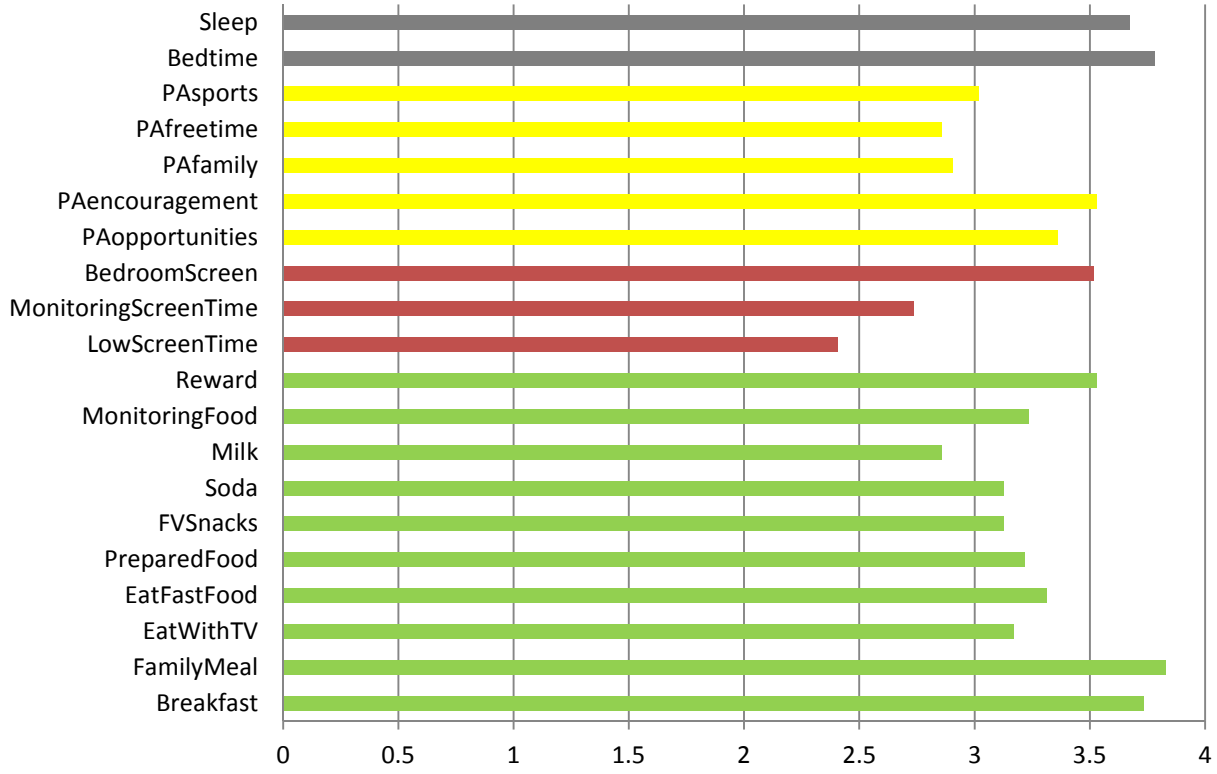

Figure 1. Mean responses to questions on the FNPA (1 = almost never, 2 = sometimes, 3 = usually, 4 =almost always).

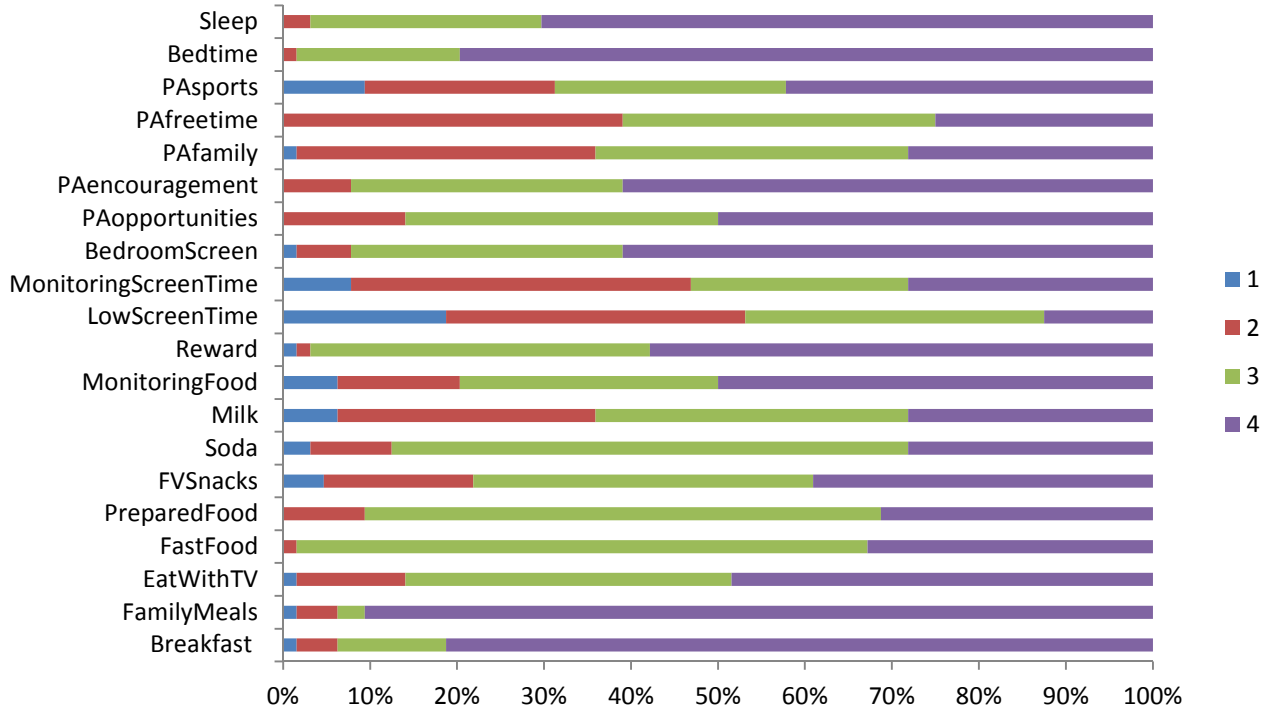

Figure 2. Frequency of responses within the FNPA questions (1 = almost never, 2 = sometimes, 3 = usually, 4 =almost always).

others serve somewhat as proxy measures of the child's behavior. Since the focus in the analyses was on the relationships with parenting practice it was important to also compute alpha reliability for these reduced scales (labelled as FNPA2). The reduced FNPA2 scale had a slightly lower internal consistency ($\alpha = 0.66$).

Correlations were run between the composite FNPA scales and the subscales and also among the subscales. Separate analyses were run for the Full FNPA version, as well for the Reduced and Proxy subscales and these are shown in Table 4. The overall FNPA scale had moderate to high correlations with the three subscales (PA: r = 0.73, SA: r = 0.65, and NUTR: r = 0.80). There were moderate correlations between parental NUTR practices and parental SA practices (r = 0.51) and between parental NUTR practices and PA practices (r = 0.34). There was a small, but positive, correlation between PA practices and SA practices (r = 0.19). The relationships with the reduced FNPA2 scale and the associated reduced subscales were a bit smaller but the same patterns were evident (PA: r = .63, SA: r = .34, and NUTR: r = .79). Similar associations were evident with the FNPA proxy relationships (PA: r = .63, SA: r = .34, and NUTR: r = .79). In general, high correlations were observed between the full and reduced versions of the FNPA and associated subscales (FNPA/FNPA2: r = .90; FNPA PA/PA2: r = 0.91; FNPA SA/SA2: r = 0.83; FNPA NUTR/NUTR2: r = 0.88). Correlations were also high between the full scales and proxy items (FNPA/FNPAproxy: r = .91; FNPA PA/PAproxy: r = 0.64; FNPA SA/SAproxy: r = 0.92; FNPA NUTR/NUTRproxy: r = 0.70).

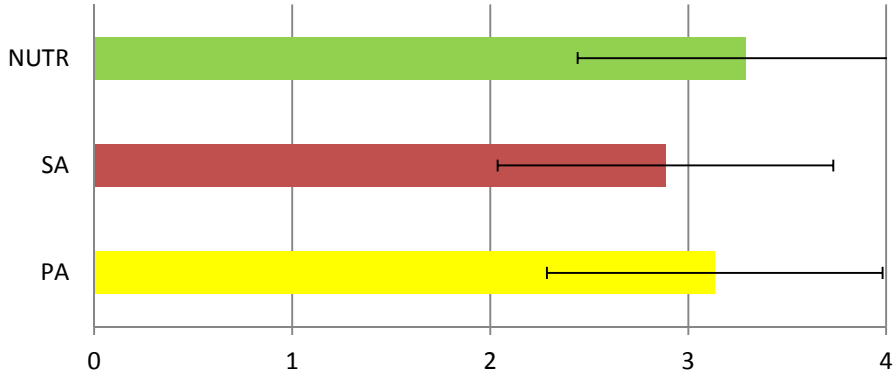

Figure 3. Mean responses for the three subcategories of the

Table 4. Correlations for physical activity (PA), sedentary activities (SA), and nutrition (NUTR) within the FNPA.

FULL SCALES	FNPA PA	FNPA SA	FNPA NUTR
FNPA	0.73	0.65	0.80
FNPA PA		0.19	0.34
FNPA SA			0.51

REDUCED SCALES	FNPA PA2	FNPA SA2	FNPA NUTR2
FNPA2	0.63	0.34	0.79
FNPA PA2		0.05	0.23
FNPA SA2			0.26

PROXY SCALES	FNPA PA proxy	FNPA SA proxy	FNPA NUTR proxy
FNPA proxy	0.65	0.70	0.74
FNPA PA proxy		0.16	0.18
FNPA SA proxy			0.36

Youth Activity Profile

Figure 4 shows the mean responses for the 20 YAP questions. The scale ranges from 1 to 5 for questions on the YAP. For PA and NUTR questions (questions 1-10, 16-20, respectively) higher responses indicate healthier habits, and higher responses to SA questions (questions 11-15) indicate less healthy habits. Most of the questions (70%) had a mean response in between 2 and 4. Four questions (PA in PE, PA at recess, breakfast, and fast food) had that a mean response above 4 and two questions that had a mean response less than 2 (computer and phone/text time).

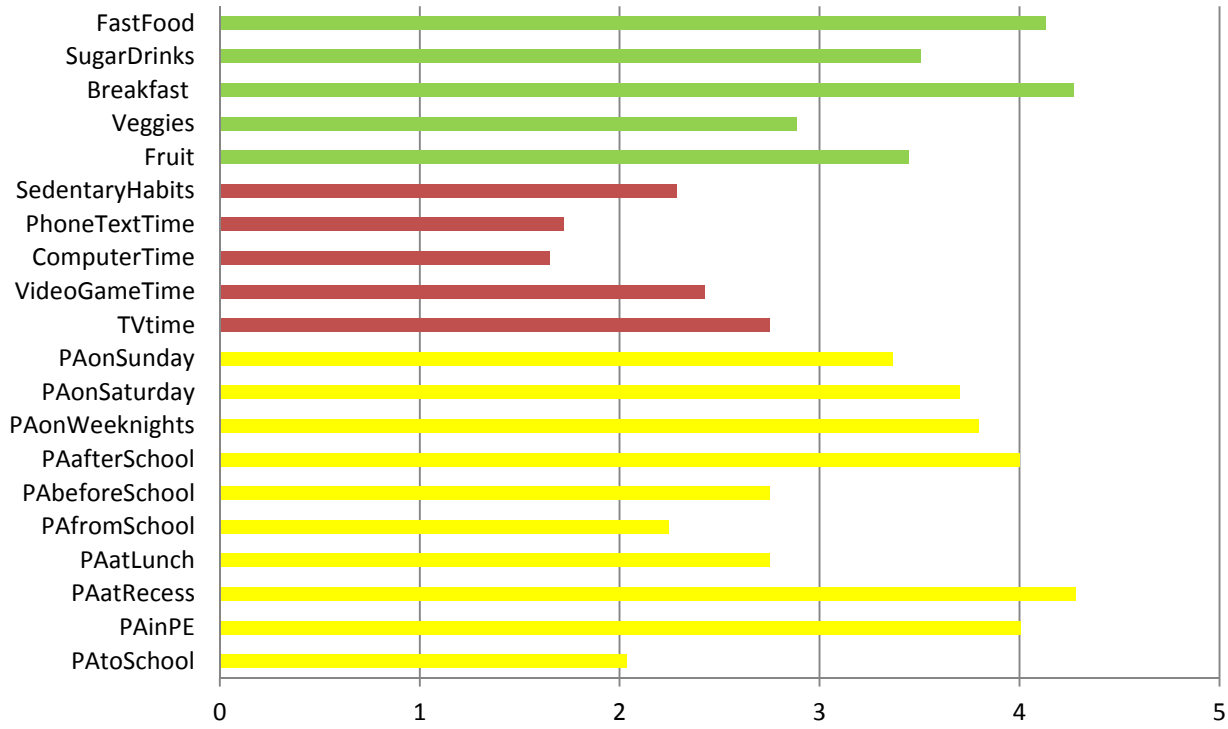

Figure 4. Mean responses to questions on the YAP.

To further explore the responses, frequency distributions were computed for each question (figure 5). For NUTR questions a response of 2 was most common for veggies, a 3 was most common for fruit, a 4 was most common for sugar drinks and fast food, and a 5 was most

common for breakfast. For PA questions a response of 1 was most common for PA to school, PA from school, PA at lunch, and PA before school, a 4 was most common for PA on Sunday, and a 5 was most common for PA in PE, PA at recess, PA after school, PA on weeknights, and PA on Saturday (answer options 2 and 3 were never the most popular answer). For SA a 1 was the most common response for computer time, a 2 was most common for video game time and sedentary habits, a 3 was most common for TV time (answer options 4 and 5 were never the most common choice).

Similar to the FNPA processing, the YAP questions were aggregated into PA (at home and at school), SA, and NUTR subcategories. The alpha reliability of the four component scales were low for PA at school ($\alpha = 0.51$) and SA ($\alpha = 0.59$) but considerably higher for PA at home ($\alpha = 0.79$) and NUTR ($\alpha = 0.74$). The means of the component scales are displayed in Figure 6

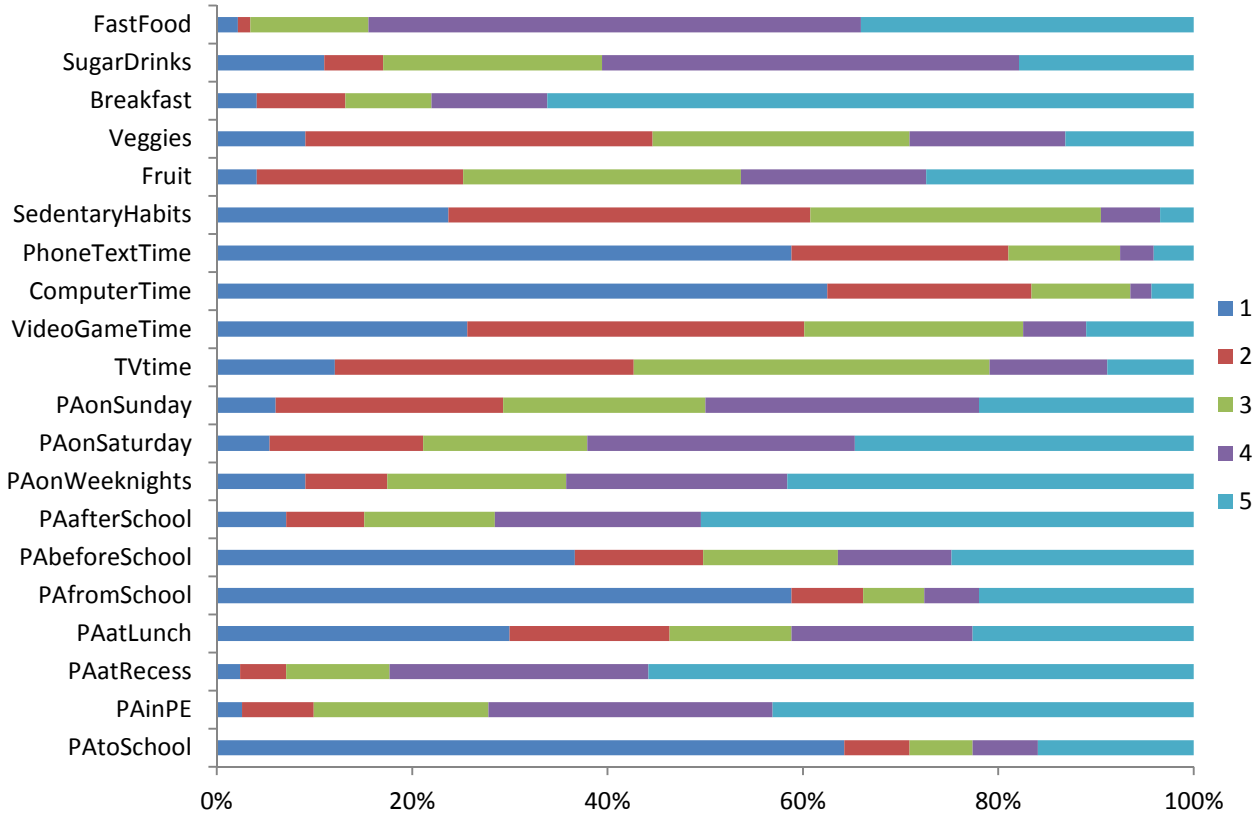

Figure 5. Frequency of responses within the YAP questions.

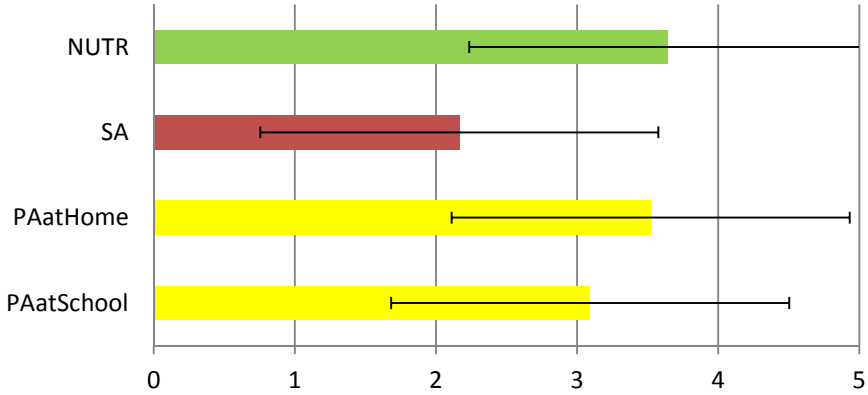

Figure 6. Mean responses for the four subcategories of the YAP.

The overall mean for the NUTR subcategory was the highest at 3.65 and lowest for SA (2.17). Separate one-way ANOVAs were conducted for each of the subscales. The ANOVA results revealed few noteworthy differences in the age and gender patterns (Table 5). The only exception was sedentary behavior which yielded a significant gender main effect ($p < 0.05$) favoring girls.

Table 5. One-way ANOVA between genders within the YAP.

	Boys			Girls			
	N	**Mean**	**SD**	**N**	**Mean**	**SD**	**P**
Combined							
YAP Total PA	244	3.29	0.78	220	3.33	0.72	0.64
YAP School	244	3.10	0.84	220	3.08	0.83	0.77
YAP Home	244	3.48	1.14	220	3.55	1.03	0.49
YAP Weekend	244	3.48	1.20	220	3.60	1.01	0.26
YAP SA	244	2.22*	0.69	220	2.10*	0.65	0.05*
YAP NUTR	244	3.59	0.69	220	3.71	0.64	0.07

* Significant difference between boys and girls ($p > 0.05$).

There were moderate correlations between the overall PA, SA, and NUTR (Table 6). There was a moderate negative correlation between PA and SA and between SA and NUTR

scores. By contrast, there was a moderately positive correlation between amount of PA and NUTR.

Table 6. Correlations for physical activity (PA), sedentary activities (SA), and nutrition (NUTR) within the YAP

	YAP PA	YAP SA	YAP NUTR
YAP PA	1.00	-0.30	0.35
YAP SA		1.00	-0.34
YAP NUTR			1.00

Associations between the FNPA and YAP

Correlations between the FNPA and the YAP were computed to determine the association between parental practices and child behaviors. Table 7 shows the correlations between the three subcategories of the FNPA and the YAP. All correlations were in the expected direction. The correlations between the overall FNPA and the YAP subscales were as follows: (PA: r = 0.20; SA: r = -0.42; NUTR: r = 0.25). The correlations were generally a bit larger when the relationships were examined with the associated FNPA subscales (PA: r = 0.32; SA: r = -0.39; NUTR: r = 0.36). The bolded cells in the table show that that strongest correlations for the FNPA scales tended to be with the associated subscale of the YAP although some exceptions are noteworthy. For example, the FNPA PA scale yielded a negative correlation with the child's reported YAP SA score indicating that efforts to promote PA may have ancillary effects on reducing SA.

Table 7. Correlations for physical activity (PA), sedentary activities (SA), and nutrition (NUTR) between the FNPA and the YAP.

	YAP PA	YAP SA	YAP NUTR
FNPA	0.20	-0.43	0.25
FNPA PA	**0.32**	-0.36	0.05
FNPA SA	0.03	**-0.39**	0.19
FNPA NUTR	-0.03	-0.19	**0.36**

Because some of the FNPA questions asked directly about the child's behavior, associations were also examined with the additional FNPA subscales. Associations with the reduced FNPA2 scales would look at the parent/child relationship purely based off of parenting practices/environment while associations with the FNPA proxy scales would reflect the agreement between parent reported behaviors and child reported behaviors. The FNPA PA2 scale only consisted of questions 14-16, the FNPA SA2 scale consisted of questions 12 and 13, and the FNPA NUTR2 scale consisted of questions 1-3, 5, and 8. Correlations between the adjusted subcategories of the FNPA and the YAP were determined (Table 8). The correlations in this table tended to be smaller than in Table 7 but some exceptions are noteworthy. The association with FNPA SA2 was higher with YAP SA indicating that the exclusion of parent reports of SA actually improves the relationship. Similar to Table 7, the bolded cells in the table show that that strongest correlations for the FNPA scales tended to be with the associated subscale of the YAP.

Associations between the FNPA behavioral proxy measures and YAP

Correlations between the FNPA proxy measures and the YAP were computed to determine the strength of associations between parental reports of child behaviors and the child's

report of these behaviors on the YAP. Table 9 shows the correlations with the FNPA scales (overall proxy score and three proxy subscales) and the YAP scales. The correlations were modest and similar in magnitude to the values in Table 8.

Table 8. Correlations for physical activity (PA), sedentary activities (SA), and nutrition (NUTR) between the FNPA and the YAP using adjusted subcategories.

	YAP PA	YAP SA	YAP NUTR
FNPA2	0.10	-0.31	0.13
FNPA PA2	**0.27**	-0.30	-0.02
FNPA SA2	0.15	**-0.42**	0.20
FNPA NUTR2	-0.06	-0.17	**0.23**

Table 9. Correlations for physical activity (PA), sedentary activities (SA), and nutrition (NUTR) between the FNPA proxy measures and the YAP items.

	YAP PA	YAP SA	YAP NUTR
FNPA proxy	0.13	-0.37	0.31
FNPA PA proxy	**0.30**	-0.36	0.12
FNPA SA proxy	-0.06	**-0.28**	0.14
FNPA NUTR proxy	0.02	-0.14	**0.39**

CHAPTER 5. DISCUSSION

The study of parent influence on child behaviors is important since parents have a strong and sustained impact on child adoption of healthy lifestyle behaviors. A number of studies have examined the impact of the home environment on children's weight status and found that specific parental practices can increase or decrease a child's risk of becoming overweight/obese.[18,30,34,45-47,49,61] However, parents may influence weight status in a number of ways. For instance, parents are the primary provider of food to their children. In the home environment children's nutrition habits are limited by what their parents provide/cook for meals and snacks. Parents can also influence children's physical activity by fostering opportunities for physical activity in many ways, such as actively commuting to school, going for bike rides, supporting athletic endeavors and engaging in activity with their children. Finally, parents can influence sedentary behaviors by monitoring children's exposure to and time spent on screen-based activities (TV, video games, computers, cellphones, etc.).

The present study sought to directly examine the associations between these parenting practices and child-reported actual behaviors using two web-based research tools, the Family Nutrition and Physical Activity (FNPA) screening tool and the Youth Activity Profile (YAP). The FNPA tool has been shown to have utility for capturing the obesogenic nature of the home environment.[7] It has been used in a number of studies to evaluate the home environmetn[8,9,11,68] and has been shown to be related to change in weight status from first to second grade.[8] However, this is the first study to report descriptive and correlational findings related to FNPA scores and child behaviors. An advantage of the FNPA and YAP tools used in the present study is that they capture items designed to directly assess three targeted behaviors that have been shown to impact risk of obesity (nutrition, physical activity and sedentary activity).[7] To fully

examine these associations it was important to better understand the distribution of the responses and the relationships among the three subscales in both the FNPA and the YAP. This will be discussed first followed by the correlation results.

Family Nutrition and Physical Activity screening tool

The analyses of the FNPA revealed relatively acceptable consistency for the nutrition items, moderate internal consistency of the sedentary items and good internal consistency of the activity items. These are similar but slightly better than internal consistencies found in previous studies that used different surveys.[48,49,65,69,70] The FNPA was not developed to be a multi-dimensional instrument but rather to capture the overall obesogenic environments. However, the Cronbach alphas indicate that the full FNPA and the reduced FNPA are capable of capturing the three parental practices (PA, SA, and NUTR).

The present study added new insights by recognize the variability in responses within the proposed subscales and by examining associations between subscales. The associations within the FNPA revealed a moderate association between the nutrition and sedentary scale indicating that positive parenting policies/practices in one area may relate to positive aspects in another. Conversely, low correlations between activity items and sedentary and nutrition item shows that physical activity practices may be more independent. This is similar to multiple studies[48,65,69] that found a significant association between parental practices relating to nutrition and child's sedentary time, and studies that found that there was not a significant association between parental practices related to physically activity and child's sedentary[65] time and dietary intake.[51] Similar correlations were found with the reduced and proxy FNPA however, the correlations tended to be slightly weaker.

Youth Activity Profile

The analyses of the YAP show relatively low internal consistency for the school PA and sedentary items which makes sense because the items were designed to capture behavior in distinct time periods or in categories. The internal consistency of the nutrition and physical activity at home items were stronger. This shows that nutrition behaviors were related to each other and that children's activity patterns at home were also more linked (i.e. kids active in one time block were more likely to be active in another block). The correlations among the subscales show some logical associations. There were negative correlations between physical activity and sedentary activities and positive correlations between physical activity and nutrition. Nutrition and sedentary activities were also negatively correlated. These patterns demonstrate that children's lifestyle behaviors that may protect against obesity tend to cluster together in ways that are consistent with results of previous studies.[65,70] However, it is important to note that the correlations are fairly low indication the relationships are still fairly modest. A number of studies have demonstrated that youth can be physically active while also having a lot of sedentary time.[71,72]

Associations between the FNPA and YAP

The home environment and parenting practices have been shown to play a key role in influencing child's behaviors. While the FNPA has been widely used, this is the first study to look at associations between the FNPA and children's health behaviors. The small to moderate correlations found in the present study indicate that parents who encourage and provide opportunities to be active have children who are more active ($r = 0.27$), parents who monitor and

limit screen time have children who are less sedentary (r = -0.42), and parents that encourage and provide nutrient-dense foods and limit sugar sweetened beverages have children who have more nutritious diets (r = 0.23). The home environment and parenting practices have a small to moderate effect on child's behaviors in and outside of the home. Correlations tend to be low because of the challenges in assessing children's behavior as well as parental influence of these behaviors. Details of the association of each behavior will be covered in the subsequent sections.

Associations with Specific Behaviors

Influences on Nutrition Behaviors: The study shows that parenting practices related to nutrition have an effect on child's food behaviors. Correlations between specific NUTR parenting practices (FNPA NUTR) and child's NUTR behaviors were stronger than the correlation between overall parenting practices (FNPA NUTR). This may indicate that specific NUTR related parenting practices have greater impact on child's NUTR behaviors compared to overall parenting practices. The correlation decreased with the reduced version of the FNPA subscale (FNPA NUTR2) but the relationship was similar.

The results specifically indicate that there was a small to moderate positive correlation between parenting nutrition practices (e.g. providing breakfast and healthy snacks and limiting fast / prepackaged foods) and children's nutrition behaviors (e.g. consuming more fruits and vegetables and less sugar sweetened beverages and fast food). These finding are consistent with multiple studies that have found that children's consumption of nutrient-dense foods is significantly related to the availability of these foods in the home environment.[48-53,61,65,73,74] Similar food related correlations were found in a study by Lloyd et al.[61] results indicated that there is a positive correlation between mothers that monitored and limited energy-dense food and

child's intake of nutrient-dense foods (r = 0.39 to 0.48). Similarly, Gattshall et al.[74] found significant positive correlations between healthy eating parenting practices (eating meals with their child, offering healthy snacks, and planning meals) and child's fruit and vegetable intake (r = 0.28; r = 0.36) and significant negative correlations with child's percent of calories from sweets (r = -0.17). Gubbels et al.[49] also found positive correlations between parents that encourage and monitor healthy eating and children's fiber intake(r = 0.09 to 0.18), as well as negative correlations with child's added sugar intake (r = -0.07 to -0.08). However, these correlations were weaker than those observed in the present study. Higher correlations in the present study and previous studies[61,73] were found when the surveys captured a wide range of parenting behaviors and multiple areas of the child's diet, while the survey used by Gubbels et al.[49] focused on only three parenting practices and only selected components of the diet (i.e. sugar sweetened beverages and fruits).

Multiple studies, including the current study, have used the cross-sectional design and are not able to determine how parenting practices affect child's behavior over a period of time.[48-53,61,73,74] However, a longitudinal study by Ray et al.[65] examined how specific parenting practices affected child's behavior over a two year period. They found that there was a significant association between parents that ate meals with their children and child's fruit and vegetable consumptions at baseline. Furthermore, they found that child's fruit and vegetable intake increased two years after baseline if they ate meals with a parent.

Similar to the current study, most studies examining associations between parental practices and child behaviors survey both parents and children.[48-50,61] However, there have been numerous studies that have only surveyed children and assumed parental practices based off of the child's responses.[51-53] The current study's ability to survey both parents and children allows

for more accurate reports of parent practices and child behaviors related to nutrition, which in turn, increases the validity of our results.

It is important to note that most studies (including this one) have relied on a self-report questionnaire. A study by Warren et al.[75] reported that 64% of the children were able to accurately recall 75-100% of what they had for lunch when comparing self-report diet recall and objective measures. However, individual responses ranged from 0 – 100%. To increase self-report accuracy it has been found that using prompts such as 'Is that everything?' increased recall accuracy by 14%.[75] This process leads to greater accuracy but it is also more time consuming and may not be a practical way to collect data with large sample sizes. The relatively crude indicators of energy intake in the YAP and the inability to conduct follow up probes for validity checks could have added error into the assessments in the present study.

Influences on Sedentary Behaviors: Correlations between specific SA parenting practices (FNPA SA) and child's SA behaviors were stronger than the correlation between overall parenting practices (FNPA). This may indicate that specific SA related parenting practices have greater impact on child's SA behaviors compared to overall parenting practices. The relationship was actually higher when the reduce FNPA subscale was used suggesting that the removal of the proxy items did not alter the relationship.

The results show that there is a small to moderate negative correlation between parents who monitor and limit the availability and time spent in sedentary activities and children who engage in more sedentary activities, which is consistent with previous studies.[58-61,69] Lloyd and colleagues[61] found similar, but slightly stronger correlations between mothers that monitor their child's screen time and child's overall screen time (r = -0.44). However, slightly weaker

correlations we found for fathers monitoring their child's screen time (r = -0.24). The present sample was too small to examine mother / father differences but the magnitude of associations were similar. Smaller but similar associations were found by Rodenburg et al.[69] for parental screen time rules and child's screen time (r = -0.11). Other cross-sectional studies have found significant associations between parents that restrict screen time, specifically during meals and homework, and children who watch less TV.[58,59]

Most studies to date [49,58,61,69] have relied on parental report of child sedentary behaviors while the present study obtained the information directly from children. A parent report may have some advantages for capturing information about home environments but evidence suggests that parents may not be best positioned to provide accurate indicators of youth behavior. For example, one study found that parents underestimated the amount of time their child spends doing sedentary activities by roughly five hours per day.[67]

Child's sedentary behaviors in the present study also showed a small to moderate negative correlation to physical activity parenting practices. These findings are consistent with some previous findings[48,49,69] but not all.[61,65] Cross-sectional studies have found that parents that monitor, encourage, and provide opportunities to be physically active have children who are less sedentary, but correlations were small (r = -0.12 to -0.19).[48,49] Alternatively, a longitudinal study found that being physically active with one's child was not significantly associated with the child's sedentary time at baseline or after two years.[65] This is also consistent with a cross-sectional study that found that parenting practices that were significantly correlated to physical activity in children were not also correlated to sedentary time.[61] High correlations in the present study may be explained by parents that have positive physical activity practices have children who are spending more time being active which results in less time involved in sedentary

activity. This is consistent with correlations found within the YAP that showed that children who are generally more active are also less sedentary.

A limitation of the measurements in the present study is that the FNPA only has three items that are related to parenting practices with regard to sedentary behaviors. The FNPA was designed to capture overall environments not just sedentary behavior, so it may be possible to examine these relationships with more specific measures. The small to moderate correlations found in the present study and previous studies are also likely due to multiple other factors besides the home environment affecting child's sedentary behaviors that were not able to be captured in the surveys. However, when surveying large samples with limited time it is difficult to incorporate all factors of sedentary behavior into one survey.

Influences on Physical Activity Behaviors: Correlations between specific PA parenting practices (FNPA SA) and child's PA behaviors were stronger than the correlation between overall parenting practices (FNPA). This may indicate that specific PA related parenting practices have greater impact on child's PA behaviors compared to overall parenting practices. The correlation was a bit lower when the reduced subscale was used (FNPA SA2) but the relationships were still evident.

The findings from the present study indicate that parenting practices related to physical activity (encouragement of physical activity, providing opportunities for children to be physically active, and being physically active with your child) positively correlate with children reporting higher amounts of physical activity, similar to multiple previous studies.[48,61,65,73] There are also studies that have found similar positive correlations between physical activity parenting practices and the amount of physical activity their child reported, however the correlations were

smaller.[49,61,73] Lloyd et al.[61] found that mothers who monitor their child's physical activity and reinforce their child for being physically active have children who report being more physically active (r = 0.07; r = 0.11). Interestingly, they found that these same parenting practices, when exhibited by fathers, were negatively associated with child's activity (r = -0.13; r = -0.42). The present study did not examine differences in correlations between mothers and fathers, but the findings related to paternal practices are inconsistent with our overall findings for parental practices and child's physical activity behaviors. Slightly higher correlations were found by Gattshall et al.[73] between parental policies related to encouraging and providing opportunities to be active and child's physical activity (r = 0.21). However, Gubbels et al.[49] also examined parental policies related to encouraging and providing opportunities to be active and child's physical activity and found weaker correlations (r = 0.12). Correlations in the present study may be stronger than what previous studies have found due to the use of different surveys, as well as the differences in the range of ages used in the two studies (10-11 year olds in this study and 5-12 years in the Lloyd study). Additionally, in the study by Gubbels parents reported their child's physical activity level and it has been found that parents tend to overestimate how active their child is.[75] Higher correlations may also be due to the ability of the FNPA to provide more context specific information. Furthermore, an advantage of the YAP is that it segments out portions of the day to capture periods when children may be active. The segmentation may also help children to better recall their physical activity and therefore provide a more accurate assessment.

The present study and the majority of previous studies[48,61,73] use a cross-sectional design which allows insight during one moment in time but it is not possible to know if parenting practices related to physical activity have an effect on children over time. A longitudinal study

by Ray et al.[65] examined physical activity at baseline and then again two years later. They found that at baseline parents that were physically active with their children were significantly correlated with children who were active in their leisure time. At a two year follow up they found that children's time spent involved in physical activity in their leisure time significantly increased if they were physically active with a parent. This study by Ray et al. provides evidence to support the long term effects of parent involvement in physical activity.

Overall Parenting Practices/Styles

It has been found that certain parenting practices tend to cluster together into specific parenting styles such as authoritarian, authoritative, and permissive.[43] Previous research with the FNPA found that specific parenting styles (i.e. authoritative and permissive/authoritarian) were associated with FNPA scores and the home environment.[9] Parents with a more permissive parenting style had lower scores on the FNPA and were associated with a more obesogenic environment, while parents with a more authoritative parenting style had higher scores on the FNPA and were associated with a less obesogenic environment. However, Johnson and colleagues were unable to associate these parenting styles with specific child behaviors that could influence their future risk of overweight and obesity. The present study has sought to associate such parenting styles with specific child behaviors. An authoritative parenting style is generally associated with children who have a more nutritious diet, spend more time being physically active and less time being sedentary. Lifestyle behaviors tend to be worse in children who have parents with permissive/authoritarian parenting styles. The correlations in FNPA scores in the present study demonstrate clustering of parenting behaviors indicating that parenting style or involvement may carry over to several behaviors. The observed associations

are consistent with previous studies assessing parenting styles and child behaviors.[48,50,57,61] Ray et al.[48] found stronger associations between positive parenting practices and children who had less screen time and more nutritious diets when children perceived parents as warm and responsive (authoritative). Additionally, parents that monitor their child's behaviors but are not overbearing and controlling have children who report having less screen time, eating more nutrient-dense foods, and being more active.[57,61] Conversely, more unhealthy behaviors in children have been found with authoritarian parenting styles (i.e. controlling and pressuring).[50,57,61] Unhealthy behaviors include decreased fruit and vegetable intake, increased sweets and soft drink intake, and decreased activity.

While child behaviors found in the present study may be associated with parenting styles, it is unlikely that all of a parents practices fall into a single parenting style. It has been found that parents likely use a mixture of parenting styles depending on different circumstances, and parenting styles may also differ between parents.[43] More detailed analyses of larger samples of parents would be needed to more fully explore the role of parenting style of parenting behaviors related to childhood obesity.

Parental Report of Child Behaviors

The proxy scale allowed us to assess the accuracy of parental report of child behaviors. Correlations between the FNPA proxy scale and child behaviors were small to moderate for all subcategories (PA, SA, NUTR) indicating that parents may have an idea of their child's behaviors related to these areas are, but it is likely that their report on their child's behaviors is inaccurate. There was a small to moderate positive correlation between FNPA PA proxy and YAP PA and between FNPA NUTR proxy and YAP NUTR. It should be noted that the NUTR

questions on the YAP have not been validated at this time so we cannot be certain that what the children are reporting is accurate. There was also small to moderate negative correlation between FNPA SA proxy and YAP SA. The results are in the expected direction but smaller than one would expect for a parent's assessment of their child's behavior. However, previous research supports the finding that parents do not accurately report their child's behaviors. A study by Colley et al.[67] found that parents underestimate the amount of time that their child is sedentary by roughly five hours. Gather data on child behaviors would be more· The study also found that parents considerably over report how active their child is, by about 40 minutes, when it was compared to what objective accelerometer data records.

Strengths and Limitations

The study provides novel information about the FNPA and associations with child behaviors as assessed with the YAP. The FNPA screening tool captures a wide variety of parental practices related to physical activity, sedentary activity, nutrition, and sleep that contribute to an obesogenic environment. It has already been shown to have utility to predict child BMI and the findings from this study show that the FNPA may be a suitable tool for examining the associations between parental influence/home environment and children's behaviors.

An important strength of the current study is that it was conducted under real-world conditions with direct cooperation of the school district. The YAP was designed to facilitate school-based data collection and the current study was the first to directly evaluate the use of the instrument within intact physical education classes. With modest support from the research team, the school personnel were able to facilitate data collection with their own students. The

large and representative sample of 4th and 5th graders provided insights about the variability in the responses by grades and gender. Capturing data on intact classes provides unique insights about the variability in children's lifestyle behaviors.

A related limitation of the study is the limited sample of parents completing the FNPA assessment. Out of the 464 students surveyed only 64 of their parents provided completed FNPA surveys. There was minimal direct access to the parents so there was a high amount of reliance on the teachers and students to inform the parents about the FNPA. Fliers were sent home with the students to give to their parents and the school sent out emails and newsletters to promote the FNPA; however, it proved difficult to persuade parents to voluntarily visit the website to complete the assessment. The online assessment format has many advantages (ease of access for both parents and researchers) but it may also have presented an additional barrier in that parents were asked to independently visit the website. With a limited sample, it is possible that the parent responses are not representative of typical parents. Therefore, it is premature to assume that these responses would generalize to a sample of all parents.

Self-report of practices and behaviors is another limitation due to possible reporting bias. Accuracy of self-reported practices and behaviors may have been influenced by a number of factors including social desirability, misinterpretation of question, and recall errors. The YAP has been validate to accurately predict PA and SA behaviors in children but has not been validated for the NUTR behaviors questions at this point.[76] Therefore, it is not possible to know if the children accurately reported their nutrition behaviors. Additionally, it is also not possible to know if the parents accurately reported their parenting practices.

There is limited information available on the FNPA to compare scores but it is possible that healthier or more involved parents may be more likely to complete the survey. This would

likely restrict the range of scores and would tend to weaken associations, suggesting that the actual relationship between parenting practices and child behaviors may actually be stronger than those found in the present study. A key need is to obtain data on a larger and more representative sample of children and parents.

Conclusion

There are small to moderate associations between parent assessments of the home environment fostered by parents and a child's physical activity, sedentary activity, and nutrition behaviors. Consistent with the hypothesis, the results revealed that parents who reported more favorable parenting behaviors on the three subcategories of the FNPA had children who reported being more physically active, had less screen time, and had healthier eating patterns. The FNPA survey is a simple tool for parents to use at home to self-evaluate their parenting practices and potentially identify practices that need improvement. The information and insight gained from completing the FNPA could guide parents towards healthier practices which in turn may translate into improved health behaviors for their children.

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APPENDIX. INSTRUMENTS

FNPA Survey

Demographics

Enter your child's school ID

Child's Year of Birth (enter 4 digits example: 1998)

Role in Family as it Relates to Child

Gender

- o Male
- o Female

School Building

Today's Date

Family Meals

How often does your child eat breakfast, either at home or at school?

- o Almost Never
- o Sometimes
- o Usually
- o Almost Always

How often does your child eat at least one meal a day with at least one other family member?

- o Almost Never
- o Sometimes
- o Usually
- o Almost Always

Family Eating Practices

How often does your child eat while watching TV (includes meals or snacks)?

- o Almost Never
- o Sometimes
- o Usually
- o Almost Always

How often does your family eat "fast food"?

- o Almost Never
- o Sometimes
- o Usually
- o Almost Always

Food Choices

How often does your family use packaged "ready-to-eat" foods (includes purchased frozen or on-the-shelf entrees, often designed to be microwaved)?

- o Almost Never

- Sometimes
- Usually
- Almost Always

How often does your child eat fruits and vegetables at meals and snacks?

- Almost Never
- Sometimes
- Usually
- Almost Always

Beverage Choices

How often does your child drink soda pop or sweetened beverages (includes regular or diet soda pop, Kool-Aid, Sunny-D, Capri Sun, fruit or vegetable juice, caffeinated energy drinks (Monster/Red Bull), Powerade/Gatorade, etc.)?

- Almost Never
- Sometimes
- Usually
- Almost Always

How often does your child drink low-fat milk for meals or snacks (includes 1% or skim dairy, flavored, soy, almond, etc.,)?

- Almost Never
- Sometimes
- Usually
- Almost Always

Restrictions / Reward

How often does your family monitor the amount of candy, chips and cookies your child eats?

- Almost Never
- Sometimes
- Usually
- Almost Always

How often does your family use candy, ice cream or other food as a reward for good behavior?

- Almost Never
- Sometimes
- Usually
- Almost Always

Screen Time

How often does your child have less than 2 hours of "screen time" in a day (includes TV, computer, game system or any mobile device with visual screens)?

- Almost Never
- Sometimes
- Usually
- Almost Always

How often does your family monitor the amount of "screen time" your child has?

- Almost Never
- Sometimes

- Usually
- Almost Always

Healthy Environment

How often does your child engage in screen time his/her bedroom?

- Almost Never
- Sometimes
- Usually
- Almost Always

How often does your family provide opportunities for physical activity?

- Almost Never
- Sometimes
- Usually
- Almost Always

Family Activity

How often does your family encourage your child to be physically active?

- Almost Never
- Sometimes
- Usually
- Almost Always

How often does your child do physical activities with at least one other family member?

- Almost Never
- Sometimes
- Usually
- Almost Always

Child Activity

How often does your child do something physically active when he/she has free time?

- Almost Never
- Sometimes
- Usually
- Almost Always

How often does your child participate in organized sports or physical activities with a coach or leader?

- Almost Never
- Sometimes
- Usually
- Almost Always

Family Schedule/Sleep Routine

How often does your child follow a regular routine for your child's bedtime?

- Almost Never
- Sometimes
- Usually
- Almost Always

How often does your child get enough sleep at night?

- Almost Never
- Sometimes
- Usually

- Almost Always

YAP Survey

1. Activity to School: How many days did you **walk or bike to school**?*(If you can't remember, try to estimate)*

- **0 days (never)**
- **1 day**
- **2 days**
- **3 days**
- **4-5 days (most every day)**

2. Activity during Physical Education Class: During **physical education**, how often were you running and moving as part of the planned games or activities? *(If you didn't have PE, choose "I didn't have physical education")*

- **I didn't have physical education**
- **Almost none of the time**
- **A little bit of the time**
- **A moderate amount of the time**
- **Almost all of the time**

3. Activity During Recess: During **recess**, how often were you playing sports, walking, running, or playing active games? *(If you didn't have a break at school, choose "I didn't have recess")*

- **I didn't have recess**
- **Almost none of the time**
- **A little bit of the time**
- **A moderate amount of the time**
- **A lot of the time**
- **Almost all of the time**

4. Activity During Lunch: During **lunch break**, how often were you moving around, walking or playing? *(If you didn't have a break at school, choose "I didn't have lunch breaks")*

- **I didn't have lunch breaks**
- **Almost none of the time**
- **A little bit of the time**
- **A moderate amount of the time**
- **A lot of the time**
- **Almost all of the time**

5. Activity From School: How many days did you **walk or bike from school**? *(If you can't remember, try to estimate)*

- **0 days (never)**
- **1 day**
- **2 days**
- **3 days**
- **4-5 days (most every day)**

6. Activity before School: How many days **before school (6:00-8:00 am)** did you do some form of physical activity for at least 10 minutes?*(This includes activity at home NOT walking or biking to school)*

- **0 days**

- **1 day**
- **2 days**
- **3 days**
- **4-5 days**

7. Activity after School: How many days **after school (between 3:00 - 6:00 pm)** did you do some form of physical activity for at least 10 minutes? (This can include playing with your friends/family, team practices or classes involving physical activity but *NOT walking or biking home from school*)

- **0 days**
- **1 day**
- **2 days**
- **3 days**
- **4-5 days**

8. Activity on Weeknights: How many **school evenings (6:00 - 10:00 pm)** did you do some form of physical activity for at least 10 minutes? (This can include playing with your friends/family, team practices or classes involving physical activity but *NOT walking or biking home from school*)

- **0 days**
- **1 day**
- **2 days**
- **3 days**
- **4-5 days**

9. Activity on Saturday: How much physical activity did you do last **Saturday**? *(This could be for exercise, work/chores, family outings, sports, dance, or play. If you don't remember, try to estimate)*

- **No activity (0 minutes)**
- **Small amount of activity (1 to 30 minutes)**
- **Small to moderate amount of activity (31 to 60 minutes)**
- **Moderate to large amount of activity (1 to 2 hours)**
- **Large amount of activity (more than 2 hours)**

10. Activity on Sunday: How much physical activity did you do last **Sunday**? *(This could be for exercise, work/chores, family outings, sports, dance, or play. If you don't remember, try to estimate)*

- **No activity (0 minutes)**
- **Small amount of activity (1 to 30 minutes)**
- **Small to moderate amount of activity (31 to 60 minutes)**
- **Moderate to large amount of activity (1 to 2 hours)**
- **Large amount of activity (more than 2 hours)**

11. TV Time: How much time did you spend **watching TV** outside of school time *(This includes time spent watching movies or sports but NOT time spent playing video games).*

- **I didn't really watch TV at all**
- **I watched less than 1 hour per day**
- **I watched 1 to 2 hours per day**
- **I watched 2 to 3 hours per day**
- **I watched more than 3 hours per day**

12. Video Game Time: How much time did you spend **playing video games** outside of school

time? *(This includes games on Nintendo DS, wii, Xbox, PlayStation, iTouch, iPad, or games on your phone)*

- o **I didn't really play TV at all**
- o **I play less than 1 hour per day**
- o **I play 1 to 2 hours per day**
- o **I play 2 to 3 hours per day**
- o **I play more than 3 hours per day**

13. Computer Time: How much time did you spend using **computers** outside of school time? *(This doesn't include home work time but includes time on Facebook as well as time spent surfing the internet, instant messaging, playing online video games or computer games)*

- o **I didn't really use the computer at all**
- o **I used at computer less than 1 hour per day**
- o **I used at computer 1 to 2 hours per day**
- o **I used at computer 2 to 3 hours per day**
- o **I used at computer more than 3 hours per day**

14. Phone / Text Time: How much time did you spend using your **cell phone** after school? *(This includes time spent talking or texting).*

- o **I didn't really use a cell phone at all**
- o **I used a phone less than 1 hour per day**
- o **I used a phone 1 to 2 hours per day**
- o **I used a phone 2 to 3 hours per day**
- o **I used a phone more than 3 hours per day**

15. Overall Sedentary Habits: Which of the following best describes your **typical** sedentary habits at home? *(Try to think about a typical week and not just last week)*

- o **I spend almost none of my free time sitting**
- o **I spend little time sitting during my free time**
- o **I spend a moderate amount of time sitting during my free time**
- o **I spend a lot of time sitting during my free time**
- o **I spend almost all of my free time sitting**

16. Fruit: In the last week, estimate how many days you ate at least 2-3 servings of fruit? *(Include 100% fruit juice but do NOT include other flavored juice drinks).*

- o **0 days**
- o **1-2 days**
- o **3-4 days**
- o **5-6 days**
- o **7 days**

17. Veggies: In the last week, estimate how many days you ate at least 2-3 servings of vegetables? *(Do NOT include servings of french fries or potato chips)*

- o **0 days**
- o **1-2 days**
- o **3-4 days**
- o **5-6 days**
- o **7 days**

18. Breakfast: In the last week, how many days did you eat breakfast?*(Include foods consumed before school or breakfast served at school)*

- o **0 days**

o **1-2 days** o **3-4 days** o **5-6 days** o **7 days**
19. Sugar Drinks: In the last week, how many days did you drink a sugar sweetened beverages like regular or diet soda pop or Kool-Aid-like juices? o **7 days** o **5-6 days** o **3-4 days** o **1-2 days** o **0 days**
20. Fast Food: In the last week, how many days have you eaten fast food as a meal? o **7 days** o **5-6 days** o **3-4 days** o **1-2 days** o **0 days**