Associations between Latino Fathers' Self-Efficacy, Parenting Practices and Youth Diet and Physical Activity

A THESIS SUBMITTED TO THE FACULTY OF THE UNIVERSITY OF MINNESOTA BY

Azzairia Jackson

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE

Dr. Marla M. Reicks

May 2021

©Azzairia Jackson 2021

Abstract

Background

Hispanic/Latino adolescents have a high prevalence of overweight/obesity and many are not meeting diet and physical activity (PA) recommendations. Latino father food and PA parenting practices can impact adolescent diet and PA behaviors. Paternal self-efficacy (PSE) for promoting healthy eating and PA may enhance frequency of positive food and PA parenting practices and healthy youth behaviors, yet little information is available about these relationships and change in PSE after intervention programs.

Objective

Evaluate relationships between PSE for promoting healthy behaviors, father food and PA parenting practices, and adolescent diet and PA, and intervention-based change in PSE.

Study Design, Settings, Participants

Baseline (n = 190 father/youth (10-14 years) dyads) and intervention data (n = 110 dyads) were used from the community-based, Padres Preparados, Jóvenes Saludables program, a randomized, controlled trial in Minneapolis/St. Paul (2017-2020). Eight-weekly education sessions focused on parenting skills and practices, nutrition and PA. Evaluation survey data were collected pre-post program.

Measurable Outcome/Analysis

PSE, parenting practices, and youth behaviors were measured with scales with acceptable psychometric properties and 24-hour dietary recalls. Regression analyses

examined associations between PSE, parenting practices and youth behaviors. T-tests evaluated intervention-based change in PSE.

Results

Mean youth age was 11.6 years, 49% were boys. Adolescent screen time was negatively associated with PSE for promoting PA. Increased PSE was positively associated with increased modeling of fruit and vegetable intake and PA and with making fruit and vegetables and PA opportunities available. PSE for promoting PA increased from pre to post program for intervention compared to control group fathers.

Conclusion

Confidence in the ability to promote healthy youth lifestyle behaviors was associated with increased frequency of positive paternal modeling and availability practices. PSE for promoting PA improved from pre to post program. Educators could include strategies to promote PSE in future educational programs.

Table of Contents

Abstract i
- **Background** i
- **Objective** i
- **Study Design, Settings, Participants** i
- **Measurable Outcome/Analysis** i
- **Results** ii
- **Conclusion** ii

List of Tables v

List of Figures vi

Appendices vii

Introduction 1

Literature Review 1

Prevalence of Obesity 1

Health Behaviors 2
- ***Fruits and Vegetables*** 2
- ***Sweet and Salty Snacks*** 3
- ***Sugary Drinks*** 5
- ***Fast Food*** 7
- ***Physical Activity*** 8
- ***Screen Time*** 10

Parenting Practices 11
- ***Modeling*** 14
- ***Availability*** 16
- ***Expectations/Limits*** 19

Self Efficacy 21
- ***Interventions to Improve Parental Self-Efficacy*** 24

Latino Father-focused Interventions to Prevent Childhood Obesity 28

Summary and Purpose 31

Methods 33
- **Study Design** 33
- **Participants** 34
- **Intervention** 35
- **Pre and Post Measurements** 42
- **Data Analysis** 47

Baseline Results 48

Intervention Results 56

Discussion 57
- **Limitations and Strengths** 60

Implications for Practice **60**
References 62

List of Tables

Table 1: Padres Preparados, Jóvenes Saludables Objectives, Primary Content and Structure

Table 2: Self-efficacy scales for fathers' food and physical activity behaviors and barriers

Table 3: Demographic characteristics of fathers and youth at baseline

Table 4: Descriptive statistics for self-efficacy scales

Table 5: Youth energy balance-related behaviors

Table 6: Paternal parenting practices

Table 7: Adjusted associations between adolescent dietary intake and PA and PSE for promoting healthy eating and PA and promoting healthy eating and PA in difficult situations

Table 8: Adjusted associations between father-reported setting expectations for food group intake and PA and PSE for promoting healthy eating and PA and promoting healthy eating and PA in difficult situations

Table 9: Adjusted associations between father-reported modeling healthy foods and PA available and PSE for promoting healthy eating and PA

Table 10: Adjusted associations between father-reported making food groups and PA available and PSE for promoting healthy eating and PA and promoting healthy eating and PA in difficult situations

Table 11: Change in father self-efficacy from pre to post program between groups

List of Figures

Figure 1: Diagram of intervention procedures and timeline

Appendices

Appendix 1: Measures to examine Latino fathers' parenting practices related to adolescents' EBRBs (father-reported)

Appendix 2. Measurement of paternal self-efficacy regarding youth energy balance-related behaviors

Appendix 3: Nutrition Data System for Research (NDSR) food groups and their components

Appendix 4: Measurement of adolescent physical activity

Appendix 5: Measurement of adolescent screen time

Introduction

According to the 2015-2016 National Health and Nutrition Examination Survey (NHANES), youth in the Hispanic community in the United States (2-19 years) have an obesity prevalence that is 50% greater than non-Hispanic/Latino White youth (Lecroy et al., 2019). Food parenting practices, such as modeling food behavior and expectations for eating can play a role in obesogenic dietary intake of children. In the Hispanic community, the mother is traditionally viewed as the main food caregiver for children (Arredondo et al., 2018). This thesis study instead focuses on the role of fathers, specifically their self-efficacy for food- and physical activity-related parenting practices, and how these practices influence children's dietary intake and physical activity. Few studies have examined the role Latino fathers play in improving child eating habits, therefore this study fills a gap in this research area.

Literature Review

Prevalence of Obesity

Childhood obesity is a critical public health issue in the United States that continues to worsen over time. National Health and Nutrition Examination Survey (NHANES) data from 2015-2016 showed that among children 2-19 years, 18.5% were affected by obesity, which included about 13.7 million children and adolescents. The prevalence of obesity was 13.9% among 2-5-year-olds, 18.4% among 6-11-year-olds, and 20.6% among 12-19-year-olds (Hales et al., 2017).

Among all race/ethnicity groups, Hispanics had a high prevalence of obesity, with 47% of adults in 2015-2016 with obesity compared to 12.7% of Asians, 37.9% of whites, and 46.8% of blacks (Hales et al., 2017). Recent data from 2015 focused specifically on

Hispanic adolescents compared to adolescents from other race/ethnic groups. The results showed that 23.6% (n=2269) of Hispanic participants had obesity. The results for other races/ethnic groups showed that 14.7% of whites, 20.4% of blacks and 9.8% of Asians had obesity (Ogden et al., 2018).

Health behaviors that may be related to the prevalence of childhood obesity include intake of fruit and vegetables, sweets and salty snacks, sugary drinks, fast food, and physical activity and screen time. Information about these health behaviors is available as it pertains to Hispanic youth based on studies of youth in general and studies that specifically address behaviors of Hispanic youth.

Health Behaviors

Fruits and Vegetables

The Dietary Guidelines for Americans 2015-2020 recommend consumption of whole fruit and a variety of vegetables (i.e., dark green, red, orange, legumes, and starchy). The Dietary Guidelines give specific quantities for fruit and vegetable consumption. Adolescents (9-18 years old) should consume approximately 1.5-2 cups of fruit per day and 2-3 cups of vegetables per day (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015).

The majority of Hispanic youth are not meeting fruit and vegetable intake recommendations. A study conducted by Kirkpatrick et al. (2012) used data from the NHANES (2001-2004) to examine fruit and vegetable intake of children age 2-18 across the United States with different family income levels and race/ethnicity. The results showed that 39.9% of Mexican-American children met the recommendations for total fruits, 35.4% for whole fruits and 9.3% for total vegetables. Among non-Hispanic whites,

26.8% met recommendations for total fruits and 6% for total vegetables. Among non-Hispanic blacks, 28.5% met recommendations for total fruits and 7.1% for total vegetables. Compared to non-Hispanic whites and non-Hispanic blacks, the percentage of Hispanic youth meeting recommendations was higher, but the overall percentages meeting recommendations in general, was low (9-39% for different fruit and vegetable types) (Kirkpatrick et al., 2012).

A review of studies that reported the correlation between fruit and vegetable intake and adiposity among adults and children showed a consistent relationship for adults, but not for children (Ledoux et al., 2010). Of the 11 studies involving adults, 8 showed an inverse relationship between fruit and vegetable intake and adiposity. However, confounding factors included a reduction in energy intake and increased physical activity. Of the 4 studies involving children, only one showed an inverse relationship between fruit intake and adiposity.

Sweet and Salty Snacks

Sweets refer to foods with added sugars, such as cakes, cookies, brownies or candy. Consuming a high amount of foods with added sugars makes it difficult to develop a healthy eating pattern. These foods contribute calories with limited nutrients (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015). Salty snacks refer to foods that have a high sodium content, such as chips, pretzels, and crackers. These foods tend to have high energy density, but low nutrient density (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015). Ultra processed foods typically include food additives, such as added sugars, preservatives, dyes or artificial flavors. Examples of these foods include cakes,

cookies, soft drinks, bread, and salty snacks. These foods contributed about 60% of the energy in the diet for Americans in 2009-2010 (Steele et al., 2016).

Bailey (2018) examined the intake of added sugars among adolescents. Added sugars were considered food with sugars added as an ingredient during preparation, processing, or at the table. The natural or inherent sugar in the food was not considered. Two 24-hour recalls were used, one in person and the other over the phone, to estimate the added sugar intake. About 16.2% of energy intake was attributed to added sugars for adolescents. For the group that ate the least added sugars (≤ 12.8% of daily kcal), the foods with the highest percent of total added sugars were cereal (12.5%), sweetened beverages (12.3%), and bread/rolls (10.4%). For the group that ate the most added sugars (≥ 20.4% of daily kcal), the foods with the highest percent of total added sugars were sweetened beverages (53.3%), sweet bakery products (11.4%), and candy (5.6%). Both of these groups exceeded the daily recommended amount of daily calories coming from added sugars (≤ 10%) (Bailey, 2018).

A study conducted by Shroff et al. (2013) highlighted a relationship between intake of sweets and salty snacks and obesity. The study was conducted in Bogotá, Columbia and included assessment of the frequency of weekly snacking by 961 school age children (5-12 years) over a 2.5-year follow-up. The snacks included were high-energy and low-nutrient-dense foods, such as ice cream, candy, packed fried snacks, such as chips, soda and sugar-sweetened, fruit-flavored drinks. Children who consumed snacks 2-6 times per week or ≥ 1 time per day had a 0.09 kg/m^2 higher BMI gain compared to students who never consumed snacks. Changes in BMI were positively related to the intake of ice cream/popsicles and candy, and eating sweets and salty snacks was

associated with the development of adiposity among the school-age children (Shroff et al., 2013).

Another study conducted by Borges et al. (2018) examined the eating habits of Brazilian adolescents (ages 10-18) and their association with overweight or obesity. The researchers analyzed food consumption data from 6,784 adolescents from a Household Budget Survey conducted from 2008 to 2009. Dietary patterns were categorized into a traditional Brazilian pattern, a snack pattern, a fast food pattern, and a milk, fruit and cereal breakfast pattern. The population included 17.7% with overweight and 4.6% with obesity. The two dietary patterns that had the highest correlation with becoming overweight were snacking and fast food. These two categories had the highest odds ratio of all food groups (1.50 for snacking and 1.55 for fast food compared to 1.02 for the Brazilian pattern and 1.06 for the breakfast pattern). Cookies and crackers contributed 20.4% of the calories consumed daily, and sweets, chocolates, desserts, cakes and pastries contributed 17.9% of the calories consumed daily (Borges et al., 2018).

Sugary Drinks

Sugary drinks or sugar-sweetened beverages (SSBs) are classified as drinks that contain added sugars or sweeteners. Examples of sugary drinks include soda, sports drinks, and fruit-flavored drinks (Alaska Department of Health and Social Services, 2019). The use of bright colors and celebrity endorsements make these drinks enticing to youth.

Malik et al. (2013) examined the link between intake of SSBs (carbonated soft drinks) and weight gain among children and adolescents (age 2-16) based on a review of 15 studies. A positive association was observed between SSB consumption and weight

gain. Randomized Controlled Trials involving children showed that a reduction in BMI gain was associated with reduced SSB consumption (Malik et al., 2013). One study specifically examined the prevalence of obesity associated with a reduction in SSB intake. James et al. (2004) found that a reduction of about two-thirds of a glass every three days (0.6 oz, a typical glass = 8 oz) was associated with a 0.2% reduction in the prevalence of obesity. On the contrary, the control group, who consumed about 1.7-1.8 glasses every three days showed a 7.5% increase in the prevalence of obesity (James et al., 2004). All of the studies in the review, except for one, showed a beneficial effect of reducing SSBs on weight.

Bleich et al. (2018) examined the trends of SSB consumption among adolescents of different races/ethnicities. SSB intake was estimated from 24-hour recalls collected as part of NHANES (2003-2014). SSB consumption (proportion of adolescents consuming SSBs on a given day) declined for adolescents from 2003-2014, except for females. Consumption declined across all races from 89.6% to 78.3% for Non-Hispanic whites and Non-Hispanic blacks and 86.3% to 71.6% for Mexican-American adolescents. Fruit juice consumption declined for all races from 26.2% to 18.6%, while water intake increased from 73.8% to 79.6%. The prevalence of soda and fruit drink consumption decreased, while low-calorie SSB consumption increased from 2.2% to 4.8%. Even though SSB consumption in general declined, there was an increase in calories from SSBs. For all races of adolescents, the calories shifted from 42.1 kcal to 49.0 kcal. These results showed that there was a decrease in the percentage of SSB drinkers, but adolescents still consumed more than the amount of SSBs recommended by the 2015-2020 Dietary Guidelines (U.S. Department of Health and Human Services and U.S.

Department of Agriculture, 2015). These amounts were persistently high for black, Mexican-American and non-Mexican Hispanic adolescents (Bleich et al., 2018).

Fast Food

Fast food is defined as food that is offered with quick service and is commonly consumed by adolescents. These foods tend to be high in fat because they are fried. Adolescents consume this food because as they get older, they tend to gain more independence. With this independence, a preference for eating out with friends develops (Taillie et al., 2016).

The NHANES Survey conducted from 2013-2014 collected data on the calorie intake of adolescents from quick service restaurants including intake among different races (U.S. Department of Agriculture, 2016). Hispanic adolescents consumed 15% of their calories from quick service restaurants, Non-Hispanic blacks consumed 19%, Asians consumed 12%, and Non-Hispanic whites consumed 17%. The survey also examined the intake of adolescents who were considered quick restaurant consumers defined as those who reported eating one food or beverage from a quick service restaurant on the day a 24-hour dietary recall was conducted. For all races, the percent of calories consumed from fast food was higher for quick restaurant consumers compared to all consumers. Among the quick restaurant consumers, Hispanic youth consumed 35% of calories from fast food, Non-Hispanic blacks consumed 39%, Asians consumed 38%, and Non-Hispanic whites consumed 38% (U.S. Department of Agriculture, 2016).

Because fast food tends to contain a high amount of fat due to the method of cooking, obesity is a concern if these foods are consumed in excess. Researchers analyzed this relationship by reviewing the diets of 4466 U.S. children (2 to 18 years)

who completed dietary recalls as part of NHANES from 2007-2010 (Poti et al., 2014). The results indicated that the main factor associated with obesity was the diet of the children exclusive of fast food consumption, but fast food still influenced their diet. The children were categorized as non-consumers of fast food, low consumers ($\leq$ 30% of energy from fast food), and high consumers ($\geq$ 30% of energy from fast food). High consumers of fast food tended to have a lower intake of milk, dairy, low-fat dishes, and fruits and vegetables, a higher intake of French fries and SSBs, a higher total energy, and a higher percentage of total energy from fat than non-consumers. In general, high consumers had higher odds of consuming a Western dietary pattern exclusive of fast food consumption, which was associated with a higher prevalence of obesity. Non-consumers of fast food had a higher intake of milk, low-fat dishes, fruits, and vegetables and a lower intake of SSBs and salty snacks. Because non-consumers followed this dietary pattern, there was lower energy intake and a lower prevalence of obesity (Poti et al., 2014).

Physical Activity

The Dietary Guidelines 2015-2020 recommended that children and adolescents aged 6-17 should perform one hour or more of physical activity (PA) daily (U.S Department of Health and Human Services, 2015). The PA can consist of aerobic, muscle-strengthening or bone-strengthening exercises. Aerobic activity should be either moderate or vigorous intensity with vigorous intensity occurring at least 3 days a week. Adolescents should also engage in muscle-strengthening and bone-strengthening exercises at least 3 days a week (U.S. Department of Health and Humans services, 2015).

Trends in PA among adolescents were examined by researchers in the years 2001-2009 (Iannotti & Yang, 2013). The researchers recruited U.S. students in grades 6-10.

The average number of days adolescents exercised 60 or more minutes was less than five days per week. Boys exercised more than girls for each time period. In the years 2001 and 2005, older adolescents exercised less than younger adolescents. The number of days for exercise increased over time. More PA days were reported in 2009-2010 than 2001-2002 for both boys and girls.

Another study examined the relationship between PA and obesity among children by race/ethnicity (Singh et al., 2008). The researchers used the 2003-2004 NHANES survey to calculate obesity prevalence and estimate the odds ratio of developing obesity based on their income, screen time and level of physical activity. Adolescents were compared by race/ethnicity including non-Hispanic white, non-Hispanic black and Hispanic. The results indicated that the odds of obesity as it related to screen time, specifically television viewing, and a lack of physical activity were higher for non-Hispanic whites and blacks than Hispanics. Odds ratios were higher for Hispanic (OR = 2.0), non-Hispanic white (OR = 1.8) and black children (OR = 2.7) who engaged in no PA than non-Hispanic white children who exercised as least 5 days per week. In general, children who were physically inactive had 2-3 times higher odds of developing obesity than children who exercised 5 or more times per week.

Screen Time

Excessive sedentary time spent viewing screens such as televisions, phones and computers has been linked to obesity among adolescents leading to recommendations that limit screen time. Screen time is based on use of computers, television, or smartphone for work, school or entertainment. Excessive screen time has been linked to a higher likelihood of developing obesity (McDonald et al., 2018). The American Association of Pediatrics encourages parents to develop a Family Media Use Plan that takes into account their child's developmental stages to find a balance of media use (American Academy of Pediatrics, 2016.)

Huhman et al. (2012) examined data regarding screen time among adolescents (9-13 years) to determine if they were meeting the previous American Academy of Pediatrics recommendation of 1-2 hours of entertainment screen time/day (American Academy of Pediatrics, 2001). The researchers used national cross-sectional data from 2002-2006 to determine if progress was being made toward meeting the recommendation. Interviewers used a telephone survey and asked children how many hours they watched TV, played video games, or computer games the previous day. Children were classified into two groups by whether they had 2 hours or less or more than 2 hours of screen time. A majority of children (76.4%) reported screen time of 2 hours or less. Females had a higher odds ratio (1.2) than males (1.0) for meeting the screen time recommendation. For racial groups, African Americans were less likely to meet the recommendation compared to whites and Hispanics. Hispanic children showed an improvement in meeting the recommendations over time (72.2% in 2002 compared to 81% in 2006). Lastly, as age

increased, a lower likelihood of meeting the recommendation was observed (Huhman et al., 2012).

Because screen time is classified as a sedentary behavior, obesity is a concern if screen time exceeds recommendations. A study conducted by Singh et al. (2008) examined the correlation between excessive screen time and other factors such as low PA, low socioeconomic status, ethnic minority status and non-metropolitan residence. The researchers used the 2003 National Survey of Children's Health to calculate obesity prevalence among children aged 10-17 in the United States. To determine screen time, the interviewers conducted a telephone survey and asked children on average how many hours they spent watching TV or videos or playing video games. Children were classified into groups by the length of screen time. The groups were less than 1 hour, 1 hour, 2 hours or ≥ 3 hours. The odds of obesity associated with television viewing and lack of PA were greater for non-Hispanic whites and non-Hispanic blacks compared to Hispanics. For children who watched 3 hours or more of TV per day, the odds ratio for obesity was 1.8 times higher for Hispanics, 1.9 times higher for non-Hispanic whites, and 2.5 times higher for non-Hispanic blacks compared to non-Hispanic white children who watched TV less than 1 hour per day (Singh et al., 2008).

Parenting Practices

Food and activity parenting practices are defined as general parenting behaviors associated with children's dietary intake and physical activity (Walsh et al., 2019). Food parenting practices were organized into three constructs by an expert panel: coercive control, structure, and autonomy support or promotion (Vaughn et al., 2016). Coercive control refers to parents' control over what their children eat and their influence on the

thoughts and behaviors of their children's intake. Examples include restriction and pressure to eat. Structure refers to the environment the parent implements to facilitate their children's competence about food. Examples include food availability, modeling food behavior and setting expectations/limits for children. Autonomy support refers to promoting children's independence with food. Examples include child involvement and negotiation about foods consumed. In studies, these practices are usually assessed through questionnaires (O'Connor et al., 2018; Tschann et al., 2013). Questions ask parents about how often they perform behaviors, such as telling their child to eat fruit, buying fruit or eating fruit themselves. Questions ask children how often their parents perform certain behaviors, such as eating fruit. The behaviors of both the parent and child are then compared to examine the correlation between the parent's behavior and the child's perception of their parents' behavior.

Three main food and physical activity parenting practices include modeling, availability and expectations/limits (Vaughn et al., 2016). Modeling refers to the eating behavior and physical activity that the parent demonstrates for their children. Availability refers to food that is present or absent in the home. Parents often use availability to shape the food environment in the home. Expectations refers to the rules and limits regarding what, when and where their child eats.

Parenting styles have also been shown to influence children's dietary intake, screen time and physical activity. Parenting styles are defined as the emotional atmosphere present in a parent-child interaction in which parents' behaviors are exhibited (Maccoby & Martin, 1983). Parenting styles are classified as "authoritative (high warmth, high control), authoritarian (low warmth, high control), indulgent (high warmth, low

control), and uninvolved (low warmth, low control)" (Vaughn et al., 2016). Parenting practices regarding dietary intake and physical activity are implemented in different ways based on parenting styles (Darling & Steinberg, 1993).

Food and activity parenting practices are important influences on the health behavior of adolescents. Both mothers and fathers engage in these practices, but little research is available about the influence of fathers, specifically Latino fathers (Litchford et al., 2020; Rahill et al., 2020). Mothers tend to be regarded as the main caregivers for children. Latino mothers are often seen in the traditional role of providing food for children; therefore, the majority of studies related to childhood obesity consider the parenting practices of mothers (Davison et al., 2016). Research regarding the role of Latino fathers with respect to childhood obesity is emerging. Father involvement is important because fathers are able to promote healthy lifestyles for children (O'Connor et al., 2018).

The potential for emerging influence of Latino fathers was examined in a study conducted by Zhang et al. (2018). The study included 26 Mexican-American fathers who had children aged 10-14. Four focus group interviews were conducted to explore the perspectives of fathers and learn about their experiences with parenting practices regarding children's eating, physical activity and screen-time behaviors. Results indicated that eight main parenting practices were used to help children improve their diet, physical activity, and screen time. The practices were setting expectations and limits for food and exercise, making food and screen time available or limited, modeling, teaching and reasoning, monitoring, using incentives, and engaging in activities with children related to food and physical activity. The behavior that fathers suggested had the greatest

influence on their children's diet, exercise and screen time was role modeling. (Zhang et al., 2018).

Modeling

Modeling is viewed as a parenting practice that promotes the dietary intake and physical activity of children based on observational learning. Children observe the choices of their parents and adopt those same behaviors because they view them as appropriate (Bandura, 1977). These behaviors continue and ultimately influence the long-term dietary and activity choices of children (Herman & Polivy, 2005; Larsen et al., 2015).

The role of parents in the social context of their children's lives influences food consumption and physical activity level of children. A study conducted by Yee et al. (2017) examined the influence of parenting practices on their children's healthy and unhealthy food intake through a systematic review. The researchers reviewed 88 articles that included data from children aged 2-18 from the United States, Europe, Australia, Israel, Costa Rica and Hong Kong. One parenting practice was modeling. Modeling was assessed in two ways: parental intake of food and parental frequency of eating healthily and demonstrating the pleasures of eating healthily to children. Of the 33 studies that examined modeling of healthy food intake, 28 showed a positive correlation with child intake. Of the 16 studies that examined modeling of unhealthy food intake, 13 showed a positive correlation with child intake. In these studies, children were able to observe the eating behaviors of their parents and incorporate these same behaviors into their dietary patterns (Yee et al., 2017).

Along with modeling in general, the modeling behavior of fathers continues to be an emerging area of research. A review article by Rahill et al. (2020) highlighted the influence that fathers have on their children. Of 12 studies that examined modelling, 5 specifically addressed fathers. The results indicated that the children's intake was influenced by the father's intake, specifically the consumption of fruits, vegetables, sugar-sweetened beverages, and unhealthy snacks (cookies, potato chips) (Rahill et al., 2020).

Another study by Litchford et al. (2020) also examined the influence of fathers in a review that focused on different aspects of the father's diet and lifestyle and influences on children. Of 23 articles, 4 specifically examined modeling by fathers. A positive correlation was observed between fathers eating fruits and vegetables and their children eating fruits and vegetables. Children were more likely to have a diet high in sweets and fat if the father had a similar diet (Litchford et al., 2020).

For Latino fathers specifically, modeling is recognized as a positive and negative influence for children. In the study conducted by Zhang et al. (2018) participants noted that making healthy behavior changes, such as eating more fruits and vegetables, spending less time playing video games and being active with their children, positively influence the behavior of their children. On the contrary, fathers who had unhealthy habits had limited ability to promote healthy behavior in children (Zhang et al., 2018).

Parental modeling of physical activity has been viewed as a positive influence for children (Larson et al., 2011). A study conducted by Lindsay et al. (2017) examined how parents perceived role modeling for their preschool children. The study consisted of six focus group with 44 Latino parents who had at least three children aged 2-5. The study

explored beliefs about healthy eating and physical activity, barriers to maintaining a healthy lifestyle, perceptions of how parents influence their children's behavior in terms of lifestyle choices, and perceptions of how parents can serve as role models for their children. Parents acknowledged the benefits of healthy eating and physical activity, but also recognized the barriers preventing them from living a healthy lifestyle. Common barriers included working long hours, fatigue due to work, and little time to take care of oneself. Some parents concluded that engaging in healthy eating and consistent physical activity would make them better role models for their children (Lindsay et al., 2017).

Parent electronic media use was shown to influence children's screen time (Asplund et al., 2015). A cross-sectional study that surveyed 314 participants, 73% of which were Latino with children aged 0-5, about their children's screen-time use noted several factors that affected their children's screen-time behavior. The researchers examined how well this population adhered to the American Academy of Pediatrics (AAP) guidelines for screen time. Parents were asked to estimate the number of hours their children watched TV on a weekday and a weekend. Parents also answered similar questions about their own media use. The results indicated that 53% of children met the AAP guidelines for screen time allowance, 56% of children met the guidelines for no TV in the bedroom, and 29% met both. The two consistent factors that were associated with adherence to the AAP guidelines were parent electronic media use and the media environment (Asplund et al., 2015).

Availability

The ability to model intake of healthy foods is influenced by food availability. The type of food in the home, whether healthy or unhealthy, impacts behaviors of parents

and children. Food availability is used as a method to shape the home food environment and influence dietary intake of children (Vaughn et al. 2016).

A review by Pearson et al. (2008) found a positive association between home availability and the child's intake. A review of 60 articles showed that three samples had a positive association for home availability and adolescent and fruit/vegetable intake.

Another study examined the relationship between home food availability and diet quality among urban Hispanic children. Hispanic children ages 10 to 14 and their parents gave dietary information for calculation of the Healthy Eating Index (HEI) to determine diet quality (Santiago-Torres et al., 2014). The results indicated that having soda and fruit drink in the home led to a lower HEI score. The scores were 60.9 for children without soda and 57.7 for children with soda. For fruit drinks, HEI was 61.1 for children without fruit drink and 58.1 for children with fruit drink. Overall scores were negatively impacted when nutrient-poor foods were in the home and positively if nutrient-rich foods were in the home.

Food availability influences the home food environment as well as diet quality. Zhang et al. (2018) conducted focus group interviews with 26 Mexican American fathers of 10-14-year-old children. Fathers reported influencing the home food environment by food planning, buying and preparation. The main foods they reported purchasing were fruits and vegetables. Foods such as sugary drinks and fast food were only purchased every "once in a while" or only "at a party or restaurant." Fathers reported that limited purchasing of unhealthy food and purchasing healthy food encouraged their children to eat fruits and vegetables. Fathers also indicated that they prepared fruits and vegetables in

various ways, such as in a smoothie or cut up, to influence their children to eat healthy foods (Zhang et al., 2018).

Environmental factors, including availability, can influence physical activity among children and families (Villegas et al., 2020). A study conducted in both Mexico and the U.S. examined environment factors that affected physical activity of Latino families (Villegas et al., 2020). The researchers placed 33 participants (primarily Latino mothers) into focus groups and asked them about factors that affected their family's physical activity. Mothers that lived in Mexico expressed safety as their main concern. An increase in kidnappings contributed to mothers' fears about letting their children play outside. Mothers in the U.S., specifically Illinois, expressed weather as their main concern. During the winter months, safe, comfortable places for physical activity were reported to be lacking. The most common form of physical activity reported among both groups was walking and playing with their children (Villegas et al., 2020).

Previous studies also compared environmental factors affecting youth physical activity in both Mexico and the U.S. (Yamamoto-Kimura et al., 2015; Carroll-Scott et al, 2013). Environmental factors in Mexico included lack of nearby resources such as parks, cost of recreational facilities, lack of sidewalks, and the presence of gangs (Yamamoto-Kimura et al., 2015). Environmental factors in the U.S included proximity to parks, gyms and grocery stores, access to parks and gyms, and crime incidents at parks (Carroll-Scott et al, 2013).

Among rural Mexican-American children, the availability of electronic devices has been linked to obesity (McDonald et al., 2018). In a study by McDonald et al. (2018), 202 parents of Mexican children aged 6-10 in 2 rural communities on the U.S.-Mexico

border were interviewed to determine children's screen time. The results indicated that 14.9% of children had heavy screen use on weekdays and 25.2% had heavy use on weekends. About two thirds of children (62.4%) used smartphones and 60.9% used desktops or laptops. The availability of these devices was associated with an increased odds of obesity (McDonald et al., 2018).

Expectations/Limits

Expectations and limits are considered guidelines that parents set for their children regarding dietary intake and physical activity. Parents set rules regarding when, where, what and how much the child can eat (Vaughn et al., 2016). This parenting practice can be measured through questionnaires with subscales such as "how often should a parent allow their child to eat whatever they want?" or "how often do you limit the number of snacks your child eats?" (Tschann et al, 2013).

Although parents attempt to influence their children to eat healthier by implementing these practices, expectations and limits tend to have reverse effects. Children who have rules about eating certain foods, such as fruit and vegetables tend to have a decreased preference for those foods later in life (Ventura & Worobey, 2013). Also, children who have limits for certain foods, such as salty snacks or sugar sweetened beverages, have an increased preference for those foods (Ventura & Worobey, 2013). However, a study by Wang and Fielding-Singh (2018) produced conflicting results. These researchers administered a survey to high school students in the San Francisco Bay area to measure the effect of having health-oriented food rules at home on choosing a healthy snack. The results showed that a student who had at least one health-oriented food rule at home was 2 times more likely to choose a healthy snack compared to a

student without health food rules at home (Wang & Fielding-Singh, 2018). In addition, a systematic review presented results which challenged the notion of healthy food rules leading to a lower preference for healthy food. A review conducted by Litchford et al. (2020) examined the influence of fathers' food rules on adolescent intake. Of 23 studies, 5 addressed food rules. The results contradicted Ventura and Worobey (2013) by indicating that the expectations of fathers for their children's diet produced lower BMI scores for children and was associated with higher youth fruit and vegetable intake.

Limited research has addressed the relationship between parent food rules and limitations and dietary intake among Latino youth. One study conducted by Lecroy et al. (2019) examined the relationship between food parenting practices (rules and limitations, monitoring, and pressure to eat) and an obesogenic dietary intake among 1214 Latino adolescents aged 8-16 and their parents (88.8% mothers). Obesogenic foods included snack foods, sweets, and high-sugar beverages. Parents who had high controlling food parenting practices had a 1.75 times higher odds of having children with high obesogenic dietary intake compared to parents with low controlling food parent practices (Lecroy et al., 2019)

Limited studies have addressed expectations for screen time among Latino families. One cross-sectional study included a phone interview and screen media diary among 312 female primary caregivers of Mexican descent with children aged 3-5 years. The phone interview asked about screen-related parenting practices including time restriction, if there was a TV in the child's bedroom, and how often parents allowed their children to watch TV during meals and when eating between meals. The results indicated that parental time restriction was associated with fewer minutes of TV viewing by

children. Also, allowing viewing while eating was associated with more eating while watching TV, but it was not significantly associated with the minutes of daily TV watching (Thompson et al., 2018).

Self Efficacy

Self-efficacy is the confidence one has in oneself to engage in a behavior (Bandura, 1977). This confidence is developed through four sources: mastery experiences, social modeling, social persuasion, and psychological and mood states (Bandura, 2010). Mastery experiences allow for the individual to reach a level of expertise for an area of concern. Success builds confidence and increases self-efficacy. Social modeling refers to seeing other people succeed in performing a behavior, serving as a form of motivation, which raises belief in one's abilities. Social persuasion refers to encouragement from those around the individual. Motivation from others leads to a greater effort, increasing the individual's chance of success. Psychological and mood states refer to physical changes in the body and mind, which allow the individual to be at their optimal state providing a greater chance to succeed. Self-efficacy beliefs regulate human function through four avenues: cognitive, motivational, emotional, and selection process. Cognitive processes refer to the goals the individual sets for him or herself. The higher the individual perceives his or her self-efficacy; he or she will set goals that are more challenging and have a higher sense of accountability to meet these goals. Motivational processes refer to the discipline an individual inflicts on him or herself to be motivated to achieve the goals. Beliefs about abilities are used to predict outcomes. Affective processes refer to the way in which one's self-efficacy beliefs affect the nature and intensity of emotional experiences. These beliefs create a bias for how an individual

perceives obstacles in life, affect the control of discouraging thought patterns, and influence the process that mitigates obstacles to benign happenings. The last process is the selection process, which refers to selecting different activities and environments. Beliefs about one's self-efficacy influences this selection. People tend to avoid activities and environments they perceived as threatening to their abilities and choose activities and environments they feel they can easily cope with (Bandura, 2010).

Parent self-efficacy is apparent in parent-child relationships based on parenting practices employed to improve child eating and physical activity behaviors. Food and physical activity parenting practices or behaviors may be based on interactions between the parent's self-efficacy, beliefs about the behavior, and the social and physical environment surrounding the family (Bandura, 2004).

Self-efficacy is usually measured by having participants respond to a series of statements that form a scale regarding confidence in the ability to engage in a behavior. The statements may have options ranging from "not at all confident" to extremely confident". For example, for food parenting practices, a statement could ask parents how confident they are in their ability to get their child to eat fruits and vegetables (Walsh et al., 2019). Self-efficacy for parenting practices was measured in a study conducted by Cullen et al. (2000). The study developed and tested a questionnaire to measure parent self-efficacy for influencing the fruit, juice, and vegetable (FJV) intake of their children. The questionnaire included 20 items, which asked parents how sure they could accomplish several tasks such as "regularly tell [their] child [they] like fruit for snack" and "regularly have fruit at dinner" (Cullen et al, 2010). These items were measured on a scale with the following response options: 1=very sure I cannot, 2= I think I cannot,

3=not sure, 4= I think I can, and 5= very sure I can. Factor analysis resulted in 3 factors: FJV parent modelling / socialization, FJV parent planning / encouraging, and FJV availability and accessibility with acceptable internal consistency and test-retest reliability. The 3 factors explained 42% of the variance, with planning self-efficacy positively associated with fruit consumption (Cullen et al., 2000). Another study by Wright et al. (2014) used similar scales based on four parent behaviors: influencing the child to engage in least 60 minutes of moderate physical activity every day, and helping the child consume 5 servings of fruits and vegetables every day, limit sugary drinks to once per week, and limit fruit juice consumption to 6 ounces daily. Parents who reported having more positive dietary behaviors and meeting the recommendations for fruit and vegetable consumption and physical activity had higher self-efficacy than parents who reported less positive behaviors or did not meet recommendations (Wright et al., 2014).

Limited studies have examined self-efficacy of fathers regarding food and physical activity parenting behaviors or practices to manage child dietary intake and activity. Mothers have usually been the target population because they are viewed as the primary caregiver. One study conducted by Walsh et al. (2019) examined how paternal self-efficacy was related to dietary intakes that were protective against child obesity. The researchers collected data from 195 fathers and their children ages 4 to 36 months in the Extended Infant Feeding Activity and Nutrition Trial program. Self efficacy was measured as the father's confidence level in their children's eating fruits and vegetables and their ability to convince their children to eat fruits and vegetables. Fathers' self-efficacy was tracked over time (one measure when the child was 4 months old and another at 36 months). Linear regression analysis examined associations between fathers'

self-efficacy and the child's dietary intake. Fathers with persistently high self-efficacy (very confident to extremely confident) had children who had a higher water intake and lower non-core (fruit juice, soft drink, etc.) drink intake than fathers with low self-efficacy. An increase in self-efficacy was associated with a higher fruit and vegetable intake and lower non-core drink intake. Decreasing self-efficacy was associated with a lower fruit, vegetable and water intake and higher non-core drink intake (Walsh et al., 2019).

Self-efficacy was also considered a positive intrapersonal factor that can influence dietary patterns. In a focus group study conducted by Zhang et al. (2018), Latino fathers reported self-efficacy for engaging in parenting practice as a positive influence on the dietary intake of their children. Fathers showed self-efficacy by expressing confidence in their ability to prepare healthy food and engage in physical activity. Fathers reported that this confidence led to healthy behavior changes that had a positive influence on their children's behaviors (Zhang et al., 2018).

Interventions to Improve Parental Self-Efficacy

Several interventions have been conducted to increase parental self-efficacy or confidence in the ability to perform parenting practices. A study conducted by De Lepeleere et al. (2017) tested an online video intervention "Movie Models" to improve parental self-efficacy regarding food and physical activity parenting practices for parents of primary school children in Belgium. The video was a health promotion video that aimed to educate parents about their children's physical activity, screen-time, healthy dieting, parenting practices, and parental self-efficacy to address childhood obesity. The study included two groups of parents, an intervention and control group. The control

group did not have access to the videos during the intervention period, but instead received all videos at the end of the study. The intervention group parents were instructed to watch a video online each week for 4 weeks with more videos added to the website each week. One to four months after the intervention was completed, parents were asked to fill out a questionnaire that assessed parental self-efficacy as it pertained to implementing parenting practices. Responses were compared from pre to post intervention. An increase in self-efficacy was observed for the intervention group compared to no change for the control group for behaviors regarding engaging in physical activity themselves, motivating their children to eat vegetables, and giving their children as much freedom as possible to drink water. A decrease in self-efficacy for having vegetables available was also observed in the intervention group compared to the control group (De Lepeleere et al., 2017).

Another study integrated some of the videos used in the "Movie Models" intervention with parents of primary school-aged children in Belgium with families at risk of type 2 diabetes (Stappen et al., 2019). Both the parents and children who were assigned to the intervention group together were required to participate in six Feel4Diabetes counseling sessions from September 2016 to March 2017, two of which included the video intervention. The video consisted of education about children's physical activity, screen-time, and eating behaviors. The control group received recommendations on healthy lifestyles and feedback on anthropometric and laboratory measures only. The parents in the intervention group had a significant increase from pre to post-test in self-efficacy for eating behaviors compared to no change or a decrease in self-efficacy for the control group. The intervention group showed an increase in self-

efficacy for the involvement of their child in buying fruit and vegetables compared to a decrease in the control group and an increase in self-efficacy for motivating their children to eat fruit and vegetables compared to no change in the control group (Stappen et al., 2019).

Another intervention method used to improve parental self-efficacy for promoting fruit and vegetable intake among families with young children involved a text message application called Txt4HappyKids (Power & Bersamin, 2018). The study was conducted in Alaska with parents who were predominantly low-income, white females within 25-34 years of age. Parents received two text messages per week over the course of 11 weeks promoting fruit and vegetable intake for their children. Example text messages reported sales for fruits and vegetables at the grocery store, provided recipes for healthy dishes, and explained the benefits of eating fruits and vegetables. The results indicated that these text messages did not create a significant change based on pre- and post-intervention responses to scales measuring frequency of serving fruits and vegetables, confidence in shopping for and serving fruits and vegetables, and perceived benefits of serving fruits and vegetables and role modeling intake. However, the majority of participants reported they served more fruit and vegetables to their children because of the benefits (92%), tried to follow a healthier diet (86%), tried alternative ways to prepare fruit and vegetables (85%), and became more aware of the food their children were eating (81%) (Power & Bersamin, 2018).

A study by Heerman et al. (2019) implemented an intervention using the COACH (Community-Based Approaches to Community Health) method with Latino parent-child pairs, specifically mothers of children 3-5 years of age. The participants were categorized

into two groups, an intervention and control group. The intervention group experienced two phases of COACH. The first phase included in-person education sessions that consisted of one 90-minute session per week for 15 weeks. The sessions included information about developing skills to engage in a healthy diet, physical activity, sleep, engaged parenting and media use. While the parents attended their sessions, the children had a concurrent session similar to the adult intervention. After the individual sessions for parents and children, they came together to discuss what they learned and shared a meal. The second phase included twice-monthly coaching calls over 3 months. Health coaches engaged in motivational interviewing with the parents to set family goals, gauge progress, and find solutions to previous health problems. The control group only engaged in the twice-monthly phone calls for 3 months. Self-efficacy for parents was measured using a 16-item scale, with four sub-scales for child health behaviors (Wright et al., 2014). The intervention group showed improvements in self-efficacy for four behaviors, including avoiding sugary drinks, avoiding fruit juice, encouraging physical activity, and encouraging fruit and vegetables compared to the control group (Heerman et al, 2019).

The pilot VALÉ (Vidas Activas y Familias Saludables) Program focused on Latino children 4-9 years-old who were overweight/obese (Gallo et al., 2019). At least one parent participated in 10 weekly group sessions that lasted 90-120 minutes. Parents included 57 mothers and 39 fathers. The sessions addressed diet, exercise, and behavior modification. For the first half of each session, the parents received health counseling and nutrition education, with an emphasis on helping children develop and maintain a healthy lifestyle, while children participated in structured physical activity. For the second half of each session, families ate a healthy culturally appropriate family dinner together. During

the dinner, families completed weekly goal setting and generated solutions to achieving these goals. The results from this intervention indicated that 72% of parents were much more confident and 28% were a little more confident in their ability to make healthy food and activity choices for their children (Gallo et al., 2019).

Latino Father-focused Interventions to Prevent Childhood Obesity

Limited research has been conducted regarding the involvement of Latino fathers in obesity prevention for their children. A review led by Morgan et al. (2020) examined the involvement of all fathers in obesity prevention. Of 8,765 abstracts and 803 full-text articles, only 6% focused only on fathers compared to 93% on mothers. Several reasons may explain the discrepancy between involvement of mothers vs. fathers. Bayley et al. (2009) indicated that work commitments, reduced awareness of programs, and discomfort in mother-dominated groups limits father involvement. Latino fathers have generally been considered to have a passive role in their children's weight and to be less likely than mothers to perceive their children's weight as a problem (Morgan et al., 2020. Focus group interviews were conducted by Lowenstein et al. (2013) to explore experiences of fathers with healthcare providers. The study consisted of 24 fathers, 50% of which were Latinos. These fathers were heavily involved in their children's healthcare and often were in attendance for clinical visits. Generally, fathers indicated they were not addressed during clinic visits, especially when both parents were in attendance, which resulted in fathers not feeling respected. Because of this perceived lack of respect, fathers were less receptive to receiving information about their child regarding their diet, physical activity, and weight. Fathers suggested health care providers point out inadequacies and provide solutions to address them, and personalize the discussion (Lowenstein et al, 2017).

O'Connor et al. (2020) culturally adapted the Healthy Dads, Healthy Kids lifestyle obesity intervention developed for fathers and their children in Australia (Morgan et al., 2011) to target Hispanic fathers and children in Texas. The original Healthy Dads, Healthy Kids (HDHK) study was designed to help overweight fathers lose weight and positively influence the dietary habits of their children. The participants were fathers and their children age 5-12. The intervention plan consisted of 7 face-to-face group sessions (4 for fathers only and 3 for fathers and children), 90 minutes each over 3 months. The sessions focused on healthy eating and how parents could influence physical activity and diet to facilitate better choices for children (Morgan et al., 2011).

O'Connor et al. (2020) conducted interviews with panels of Hispanic fathers, mothers and youth in Texas to adapt the HDHK program for Hispanic fathers to facilitate weight loss and for children to prevent obesity. Researchers indicated that core principles from the original HDHK initiative should be retained during this adaptation. They included targeting fathers, encouraging fathers to change their lifestyles to be good role models for children, teaching fathers authoritative parenting practices, and emphasizing education about physical activity and healthy eating behavior. Adaptations included changing diet content to reflect common Hispanic foods, placing a greater focus on decreasing daily sugar intake, and engaging mothers in a different way. Participants indicated that they wanted a larger emphasis on parenting and limiting child screen time, greater promotion of the family dynamic rather than a focus on fathers, and consideration of how fathers interact with male and female children compared to mothers (O'Conner et al., 2020).

The adapted program was tested for feasibility by O'Connor et al. (2020) in a follow up study. The participants included the fathers, their partners (mother), and one to three children. To test feasibility, the researchers established five criteria: recruit 40 Hispanic fathers and their families in 4 months or less, retain 80% of the participants from pre to post assessments, ensure 70% of attendance for each of the 10 sessions, obtain 80% "excellent" or "good" ratings for the program from the participants, and collect anthropometric and behavioral data on at least 75% of the participants. Almost all feasibility criteria were met in this study. Instead of recruiting 40 families in 4 months or less, the researchers were able to recruit 36 families. All families were present for the pre-assessment, but only 75% were present for the post assessment. The program had greater than a 70% attendance rate. The program was rated as "excellent" or "good" by 80% of participants. For anthropometric and behavior data, 100% of participants had data at baseline and 72% had data at the follow-up (O'Connor et al., 2020).

Results of a feasibility study of the Padres Preparados Jóvenes Saludables program were reported by Zhang et al. (2019). This pilot study targeted Latino fathers and early adolescent children in the Minneapolis/St. Paul metropolitan area. Fathers attended interactive sessions with other fathers to learn parenting skills and joint sessions with children about healthy eating and lifestyle behaviors. The program included eight 2.5-hour weekly sessions. Each session included parenting skills for fathers, diet and physical activity education for fathers and youth, a food preparation activity, physical activity, and a family meal. Most fathers (90%) indicated that the sessions were helpful and 94% felt that the instructors addressed their needs (Zhang et al., 2019). The program was revised based on the findings of the feasibility study and is currently being

implemented as a randomized, controlled trial with Latino families in the Minneapolis/St. Paul metropolitan area (2018-2020).

Summary and Purpose

Childhood obesity is a critical public health issue based on a continued increase in prevalence over time. Obesity disproportionately affects Hispanic youth and adults compared to Asian and non-Hispanic white youth and adults (Hales et al., 2017; Cockrell Skinner et al., 2018). The primary factors related to health that contribute to obesity are diet, physical activity and screen time. Hispanic/Latino youth are not meeting the Dietary Guideline recommendations for fruits and vegetables (Kirkpatrick et al., 2012) and have high intakes of sweet and salty snacks, sugary drinks and fast food (Shroff et al., 2013; Borges et al., 2018; Bleich et al, 2018, U.S. Department of Agriculture, 2016). Hispanic youth are also not meeting recommendations for screen time and physical activity, thereby increasing the risk of developing obesity (Laurson et al., 2008).

Parenting practices influence how a child will engage in healthy diet and physical activity behaviors. Three main parenting practices that influence children's behaviors are modeling, availability, and setting expectations/limits. Modeling of healthy food intake and healthy lifestyles choices has been shown to positively influence the health behaviors of children (Yee et al., 2017). Having healthy food available in the home has also shown a positive association with children's dietary intakes (Pearson et al., 2008). Parent-implemented rules about dietary intakes seem to either cause children to have a decreased preference for healthy food later in life (Ventura & Worobey, 2013) or influence them to make healthy food choices (Wang & Fielding-Singh, 2018). Modeling of physical activity and limited screen time has had a positive impact on children's behaviors (Larsen

et al., 2011; Lindsay et al., 2017; Apslund et al., 2015). Engaging in behaviors, such as being active with their children and spending less time playing video games was reported by Latino fathers as having positive influences on children's behaviors (Zhang et al., 2018).

Parent self-efficacy can facilitate the implementation of food and physical activity parenting practices. Several interventions involving videos (De Lepeleere et al., 2017; Stappen et al., 2019) or counseling sessions (Heerman et al., 2019; Gallo et al., 2019) aimed to educate parents and their children about health behaviors and resulted in increased parental self-efficacy.

Limited interventions to improve parenting practices and self-efficacy have focused on Latinos, specifically Latino fathers. Common reasons for the lack of research with fathers include conflicts with work schedules, reduced awareness of intervention programs, and discomfort in mother-dominated groups. However, fathers play an important role in influencing food and physical activity behaviors of children through parenting practices. Interventions targeting parenting practices of fathers should also examine relationships between parenting practices, self-efficacy and youth diet and physical activity outcomes at baseline, in addition to assessing whether the intervention was effective in improving self-efficacy that could facilitate an increased frequency of parenting practices. Therefore, the purpose of this thesis project was to:

1. Examine the relationship between father-reported food parenting practices, father self-efficacy for food behaviors and youth dietary intakes at baseline;

Hypothesis: Father reported self-efficacy for positive food related parenting practices will be associated with healthy youth dietary intake.

2. Examine relationships between father-reported physical activity and screen time parenting practices, father physical activity and screen time self-efficacy and youth physical activity and screen time at baseline; and

Hypothesis: Father reported self-efficacy for positive PA and screen time parenting practices will be associated with greater youth PA and less screen time.

3. Determine whether father self-efficacy for food behaviors, physical activity and screen time improved from pre to post intervention between treatment and control groups.

Hypothesis: Self efficacy scores will be increased from pre to post intervention in the treatment vs. control group.

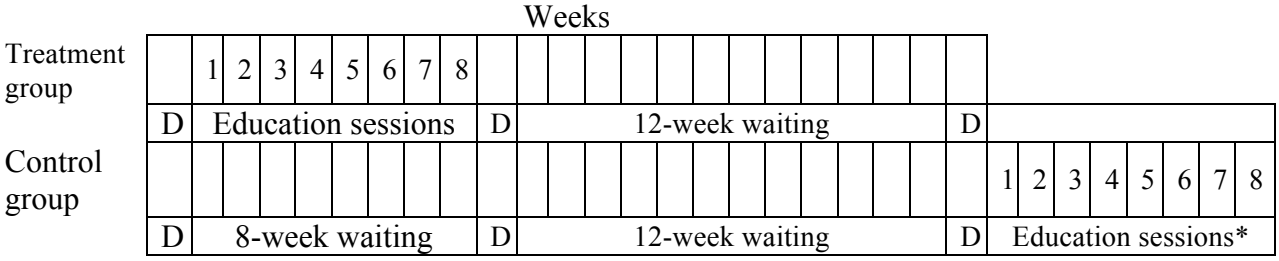
Methods

Study Design

The Padres Preparados, Jóvenes Saludables program was a randomized, controlled trial that focused on promoting healthy lifestyles for Latino fathers and children (10-14 years) in Minneapolis and St. Paul from 2017 to 2020. The program included 8 2.5 hour educational sessions for parents and their children (10-14 years) regarding parenting skills and practices, nutrition and physical activity. One of the goals of the intervention for parents was to improve paternal self-efficacy for parenting practices to improve youth health behaviors. The treatment group attended educational sessions one week after baseline evaluation data were collected, the wait-list control group attended educational sessions after all evaluation data were collected (Figure 1). Evaluation data collection sessions were conducted at baseline (one week prior to the first educational session for the treatment group), post-intervention (one week after the 8th

educational session for the treatment group), and at 3 months follow up (3 months after the 8th educational session for the treatment group).

Figure 1. Diagram of intervention procedures and timeline



D = data collection session
*5 education sessions in person plus 3 via a mobile app for last 3 sites

Participants

Latino fathers and their early adolescent children were recruited at community centers and churches through flyers, social media posts, and announcements. Inclusion criteria for fathers included identifying as Latino, being the parent of a child 10-14 years, speaking Spanish and eating meals with the child 3 days in a week. Youth were 10-14 years of age. Mothers were welcome to participate in the educational sessions, but the focus of the intervention and desired outcomes was on the fathers and youth. A total of 369 fathers and youth dyads expressed interest in the study after recruitment with 277 dyads remaining after screen for eligibility. After excluding those that did not attend the baseline data collection session and withdrawals, 190 dyads were randomly assigned into treatment and control groups. There were six intervention cohorts ranging in size from 28 to 37 father youth dyads. Fathers signed a consent form giving permission to the researchers to implement the intervention and for their children to engage in the intervention. Youth signed an assent form prior to participating. Fathers and youth received $35 and $25 in cash as compensation for participation each time they attended a

data collection session. The study was approved by the University of Minnesota Institutional Review Board.

Intervention

Table 1 describes the weekly intervention sessions for participants. Each session consisted of food preparation, two interactive segments, physical activity, and a review. The food preparation and physical activity included both the parent and the child, while the interactive segments were conducted with parents and youth together or separated into two groups. The food preparation activity included making a healthy side dish or topping to complement entrées provided for the family meal. Examples include making guacamole for quesadillas and mango salsa for tacos. After the food was prepared, families would sit together and enjoy the meal. The physical activity components included different ways to move, such as Zumba and chair yoga. Each weekly topic focused on different aspects of a healthy lifestyle, such as developing healthy habits for the adolescents and family rules regarding healthy eating.

A bilingual male and female co-facilitator led the sessions for adults. Research team members conducted training for co-facilitators to introduce session content and allow practice in leading the session components. Youth facilitators were graduate or undergraduate nutrition students or agency staff with experience working with youth.

The intervention program was expected to increase self-efficacy for fathers to promote healthy youth dietary and physical activity behaviors. The program fostered mastery of parenting skills to improve father self-efficacy in two ways. First, fathers were provided information about the health behaviors so they had the necessary background and motivation to promote these behaviors. Second, role playing and discussion exercises

were used to allow fathers to practice promotion of these behaviors. The program also used various activities to promote social modeling of parenting skills to improve father self-efficacy. The families prepared side dishes and participated in physical activities together, so fathers were able to see other fathers model behaviors for youth. In addition, the program used social persuasion to improve father self-efficacy to promote healthy behaviors for youth through encouragement from program facilitators and other fathers. Facilitators not only taught fathers about the importance of living a healthy lifestyle, but they also participated along with fathers in the food preparation and physical activities. This participation implicitly encouraged fathers to continue to promote healthy behaviors for their child. The program was delivered by facilitators with constant positive reinforcement and acceptance, in a relaxed and encouraging manner, intended to uplift and inspire fathers. The positive atmosphere could also have contributed to improved self-efficacy to promote healthy youth behaviors through food and physical activity parenting practices.

Table 1. Padres Preparados, Jóvenes Saludables Objectives, Primary Content and Structure

	Topics and objectives	**Primary content and structure**
Session 1	**Topic**: Positive parenting and healthy habits **Objectives:** At the end of this session, participants will be able to: 1. Articulate why maintaining a healthy lifestyle and healthy self-image is important. 2. Reflect on their current eating and physical activity behaviors. 3. Recognize the influence of eating and physical activity behaviors on energy balance. 4. Value their role and their parents' role in living a healthy lifestyle as a family.	**Food prep and family meal (30 min)** *P+C: fruit yogurt parfait* **Intro (10 min)** *P+C: intro to the program* **Interactive segment part I (45 min)** *P: hopes and dreams for child, lifestyle assessment, energy balance* *C: goals and dreams, lifestyle assessment* **Physical activity (15 min)** *P+C: group dance* **Interactive segment part II (45 min)** *P: parenting styles, PP* *C: energy balance, healthy recommendations* **Review (10 min)** *P: key messages, post-session evaluation, setting weekly goals* *C: key messages, feedback*
Session 2	**Topic:** Multiple cultures and active lifestyles **Objectives:** At the end of the session, participants will be able to: 1. Recognize the benefits of navigating multiple worlds and having a strong family connection. 2. Explain how physical activity contributes to energy balance and the importance of meeting recommendations. 3. Identify strategies with parents' involvement to be physically active. 4. Set and monitor goals for meeting physical activity recommendations with parents.	**Food prep and family meal (30 min)** *P+C: veggie mix* **Intro (10 min)** *P+C: **r**eview last session* **Interactive segment part I (45 min)** *P: cultural values, acculturation, culture, and health* *C: cultural values* **Physical activity (15 min)** *P+C: indoor cardio* **Interactive segment part II (45 min)** *P+C: physical activity recommendations, barriers* *P: PP* **Review (10 min)** *P: key messages, post-session evaluation, setting weekly goals* *C: key messages, feedback*

Session 3	**Topic:** Adolescent development and healthy eating **Objectives:** At the end of the session, participants will be able to: 1. Reflect on their own decision-making process and make healthy eating and physical activity decisions. 2. Explain how fruits and vegetables contribute to energy balance and the importance of increasing fruit and vegetable intake. 3. Identify strategies with parents' involvement to increase fruit and vegetable consumption. 4. Set and monitor goals to meet recommendations for fruit and vegetable consumption with parents.	**Food prep and family meal (30 min)** *P+C: mango salsa* **Intro (10 min)** *P+C: review last session* **Interactive segment part I (45 min)** *P: adolescent development, parent's role* *C: decision making* **Physical activity (15 min)** *P+C: chair yoga* **Interactive segment part II (45 min)** *P+C: nutrition for growth, portion size, MyPlate FV messages* *P: PP* **Review (10 min)** *P: key messages, post-session evaluation, setting weekly goals* *C: key messages, feedback*
Session 4	**Topic:** Communication and limiting screen time **Objectives:** At the end of the session, participants will be able to 1. Apply positive communication skills. 2. Explain how screen time influences energy balance and the importance of reducing screen time. 3. Apply strategies with parents' involvement to manage screen time. 4. Set and monitor goals of screen time activities with parent.	**Food prep and family meal (30 min)** *P+C: guacamole* **Intro (10 min)** *P+C: **r**eview last session* **Interactive segment part I (45 min)** *P, C: communication basics, active listening, "I" messages* *P: PP* **Physical activity (15 min)** *P+C: house chore relay* **Interactive segment part II (45 min)** *P+C: screen time assessment and consequences, family media plan,* *P: PP* **Review (10 min)** *P: key messages, post-session evaluation, setting weekly goals* *C: key messages, feedback*

Session 5	**Topic:** Family rules and healthy beverages **Objectives:** At the end of this session, participants will be able to 1. Explain how sugary drinks influence energy balance and the importance of reducing sugary drinks. 2. Select healthy beverages in different settings. 3. Identify and apply strategies with parental involvement to overcome barriers to reducing sugary drink consumption. 4. Set and monitor goals of limiting sugary drink consumption with their parents.	**Food prep and family meal (30 min)** *P+C: fruit-infused water* **Intro (10 min)** *P+C: review last session* **Interactive segment part I (45 min)** *P: discipline strategies, negotiable vs. non-negotiable rules* *C: family rules, natural vs. logical consequences* **Physical activity (15 min)** *P+C: agility ladder* **Interactive segment part II (45 min)** *P+C: label reading, sugar, and calories in SSBs* *C: traffic light drinks, label reading, sugar and calories in SSBs* *P: PP* **Review (10 min)** *P: key messages, post-session evaluation, setting weekly goals* *C: key messages, feedback*
Session 6	**Topic:** Managing conflicts and healthy snacks **Objectives**: At the end of this session, participants will be able to 1. Recognize the importance of setting and following rules in families. 2. Explain how sweets and savory snacks influence energy balance and the importance of eating healthy alternatives. 3. Identify and apply strategies with parental involvement to select healthy snack options in different settings. 4. Set and monitor the goals of limiting sugary snacks.	**Food prep and family meal (30 min)** *P+C: fruit kababs* **Intro (10 min)** *P+C: **r**eview last session* **Interactive segment part I (45 min)** *P: problem-solving, managing conflict* *C: 5 steps of conflict resolution* **Physical activity (15 min)** *P+C: Zumba* **Interactive segment part II (45 min)** *P+C: label reading, portion sizes for sweets and salty snacks, healthy alternatives* *C: label reading, healthy alternatives, emotional vs. mindful eating* *P: PP* **Review (10 min)** *P: key messages, post-session evaluation, setting weekly goals* *C: key messages, feedback*

Session 7	**Topic:** Supervision and fast food **Objectives:** At the end of this session, participants will be able to: 1. Manage peer influence to support healthy behaviors. 2. Explain how fast foods influence energy balance and the importance of reducing fast food intake. 3. Identify and apply strategies with parental involvement to overcome barriers to reducing fast food consumption. 4. Set goals and monitor the consumption of fast foods with parents.	**Food prep and family meal (30 min)** *P+C: yogurt dip* **Intro (10 min)** *P+C: review last session* **Interactive segment part I (45 min)** *P: supervision and monitoring, parents as coaches* *C: types of friends, peer influence* **Physical activity (15 min)** *P+C: indoor cardio* **Interactive segment part II (45 min)** *P+C: fast food culture, peer pressure, calories in fast food choices* *C: calorie balance and fast food, fast food marketing, making healthier decisions* **Review (10 min)** *P: key messages, post-session evaluation, setting weekly goals* *C: key messages, feedback*
Session 8	**Topic:** Family connection and family meals **Objectives:** At the end of this session, participants will be able to: 1. Explain how family meals contribute to energy balance and the importance of family meals. 2. Appreciate the importance of achieving energy balance via healthy lifestyle behaviors with parental involvement. 3. Recognize the youth's role in leading healthy lifestyles in the family.	**Food prep and family meal (30 min)** *P+C: veggie mix* **Intro (10 min)** *P+C: review last session* **Interactive segment part I (45 min)** *P: family connection and priorities, time management* *C: family connection and support* **Physical activity (15 min)** *P+C: agility ladder* **Interactive segment part II (45 min)** *P+C: benefits and barriers to family meals, meal planning, MyPlate* *P: PP* *P+C: program completion celebration* **Review (10 min)** *P: key messages, post-session evaluation, setting weekly goals* *C: key messages, feedback*

C: child only; P: parent only; P+C: parent and child together; P, C: parent and child separate; Food prep: food preparation activity; PP: three key parenting practices including setting expectations, role modeling, and creating a supportive environment; this content was for parent only; SSBs: sugar-sweetened beverages

Pre and Post Measurements

The baseline measurements examined in this study (and used in the analyses for the first two thesis purposes) included paternal parenting practices and self-efficacy and father-reported physical activity, and youth energy balance-related behaviors (i.e., youth dietary intake, physical activity and screen time). The pre and post measurements (used to examine change resulting from the intervention--the third thesis purpose) included paternal self-efficacy for food behaviors, physical activity and screen time.

Paternal parenting practices

Paternal parenting practices refer to general parenting behaviors, specifically regarding health, that are associated with their children's dietary intake and physical activity. These practices are categorized according to three constructs: coercive control, structure, and autonomy support or promotion (Vaughn et al., 2016). In this study, as part of the structure construct, setting expectations, role modeling and managing availability were measured through a survey for fathers. Appendix 1 provides the survey questions and response options for each food or physical activity parenting practice specific to each energy balance-related behavior (Zhang et al., 2020). One question was used to assess setting expectations, two questions assessed modeling, and three questions assessed availability practices. Where two or three questions were used, coded responses were summed and averaged to obtain parenting practice scores.

Paternal self-efficacy (PSE)

Self-efficacy was measured in the baseline and post survey with 22 questions related to two primary concepts, promoting healthy eating (9 questions) or PA (13 questions) behaviors in children (Bohman et al., 2016). Questions were intended to

measure PSE regarding paternal behaviors that would promote healthy eating or PA by asking fathers how sure they were about performing behaviors that promoted healthy eating or PA among youth (Appendix 2). Questions were also intended to measure PSE regarding barriers to promoting healthy eating or PA by asking fathers how sure they were about their ability to promote healthy youth behaviors in difficult situations based on situational demands or psychological states (Appendix 2). Response options were coded as 1 = not sure at all, 3 = moderately sure, and 5 = completely sure.

Two principal component analyses were conducted with 32 Latino fathers recruited from the Minneapolis/St. Paul metropolitan area and greater Minnesota and enrolled in a preliminary validation study. The validation sample had similar demographic characteristics as the baseline sample (mean age 41 years and 23 years in the U.S., 41% below a high school education, 77% employed full-time, 91% married, 67% with an annual income < $35,000, and 52% primarily speaking only Spanish at home).

The first principal components analyses included 9 items to assess PSE regarding promoting healthy eating and yielded 2 self-efficacy scales: 1) confidence in the ability to promote healthy eating (5 items), 2) confidence in the ability to promote healthy eating in difficult situations (4 items) (Table 2). The second PCA analysis included 13 items regarding promoting PA and yielded 2 PSE scales: 1) confidence in the ability to promote PA (5 items), and 2) confidence in the ability to promote PA in difficult situations (7 items). One original item (How sure are you that you can create a positive atmosphere when being physically active with your child?) was deleted from the second PCA analysis because it was highly correlated with 5 other items (all $r > 0.512$, all $p < 0.003$).

Internal consistency for all scales based on Cronbach α coefficients was acceptable (> 0.7) (Nunnally & Bernstein, 1994). A higher PSE score indicates greater confidence in the ability to promote healthy eating or PA among youth.

Table 2. Self-efficacy scales for fathers' food and physical activity behaviors and barriers (validation sample)

n = 28 with complete data	Eigenvalue	Variance explained	Cronbach α
Confidence in the ability to promote healthy eating	4.4	3.15	0.87
How sure are you that you can…		Factor loading	
create a positive atmosphere when having meals with healthy choices?		0.90	
be a role model for your child about healthy eating and drinking?		0.82	
prepare and serve healthy foods and beverages that your child likes?		0.80	
find healthy foods and beverages when these products are not immediately available?		0.67	
buy healthy foods and beverages instead of junk food and sugary drinks?		0.61	
n = 28 with complete data	Eigenvalue	Variance explained	Cronbach α
Confidence in the ability to promote healthy eating in difficult situations	1.3	2.57	0.80
How sure are you that you can get your child to eat healthy foods and drink healthy beverages when…			
when your child is acting defiant?		0.85	
when child is having a friend over?		0.77	
when your child wants to consume foods and beverages that are not healthy?		0.74	
when you are tired, stressed, emotionally upset, or affected by daily hassles?		0.64	
n = 27 with complete data	Eigenvalue	Variance explained	Cronbach α
Confidence in the ability to promote PA	1.7	3.02	0.79
How sure are you that you can…			
be a role model for your child to have an active lifestyle, by playing, taking walks, or doing sports?		0.76	
pay for sports training or a recreation center membership?		0.74	
buy equipment for physical activity, like a football or skates?		0.72	
arrange opportunities for your child to engage in different kinds of physical play or activities that he or she likes?		0.66	
take your child outdoors for physical activity, like to a playground or for cycling?		0.57	

n = 27 with complete data	Eigenvalue	Variance explained	Cronbach α
Confidence in the ability to promote PA in difficult situations	5.7	4.37	0.89
How sure are you that you can get your child to be physically active …			
outdoors, when the weather is bad, like when it is rainy or cold?		0.85	
when your child doesn't want to be active? For example, when playing computer games or watch TV?		0.78	
when you are tired, stressed, emotionally upset, or affected by daily hassles?		0.78	
when your child is acting defiant?		0.76	
when your child is having a friend over?		0.70	
during holidays, on vacation, or in similar situations?		0.68	
when you don't want to be active?		0.68	

Youth energy balance-related behaviors

Youth energy balance-related behaviors refer to consuming fruits, vegetables, sugary drinks, sweet/salty snacks, and engaging in physical activity and screen time. Youth completed three 24-hour recall interviews conducted by trained researchers using the Nutrition Data System for Research (NDSR) software (Nutrition Coordinating Center, University of Minnesota, Minneapolis, MN), the first in person and the remaining recalls by phone. Youth were asked to report all the food, beverages, and water they consumed in the last 24 hours. Youth were given a food amounts booklet to assist with reporting the quantity of the food consumed by phone. The NDSR software was used to combine foods into categories (Appendix 3). Physical activity was reported by youth according to hours they engaged in vigorous, moderate, and mild exercise per week (Appendix 4) (Evenson et al., 2019). The response options ranged from none to 6+ hours. Responses were summed according to hours per 5 weekdays and 2 weekend days and

then converted to hours/day. Physical activity of fathers was assessed using the Godin-Shephard Leisure-Time Physical Activity Questionnaire (Godin & Shephard, 1985; Godin, 2011). Fathers were asked to report the number of times they do strenuous exercise, moderate exercise, and mild exercise for more than 15 minutes during their free time in a week. Responses were summed to calculate total number of times they engaged in exercise per week.

Father and youth screen time was assessed by survey questions asking how often they engaged in watching TV/DVD/Videos, using a computer outside of homework, playing electronic games, and using a smartphone/tablet on weekdays and weekend days (Appendix 5) (Utter et al., 2003). Screen time was summed according to hours per 5 weekdays and 2 weekend days and then converted to hours/day.

Data Analysis

Data were analyzed using the Statistical Analysis System (Version 9.4, SAS Institute, Cary, NC, copyright 2002-2012). Descriptive statistics including means and frequencies were used to report demographic characteristics, parenting practices, self-efficacy, and youth behaviors. Chi-square tests were used to determine differences in level of self-efficacy by demographic characteristics.

Linear regression analysis was used to examine associations between PSE and adolescent behaviors. Models were adjusted for father and household characteristics that accounted for differences in food group/PA in preliminary analysis. All models were also adjusted for child age and sex and corresponding father food intake and PA.

Logistic regression analyses with odds ratios were used to examine associations between PSE and high and low levels of expectations based on median cutoffs. Models

were adjusted for child age and sex and corresponding father food intake/PA. In addition, models were adjusted for father and household characteristics that accounted for differences in food group intake and PA in preliminary analysis. Linear regression analyses were used to examine associations between PSE and modeling and availability practices with adjustment for child age and sex and corresponding father dietary intake and PA, as well as other father and household characteristics that accounted for differences in food group intake and PA in preliminary analysis.

Adolescent and father dietary intake variables were not normally distributed; therefore, these values were square root transformed and used in the analyses. For ease of interpretation of the results, non-transformed values were presented in tables with p-values based on the analyses with transformed values.

Paired t-tests were used to examine differences in changes in father self-efficacy from pre to post intervention sessions between the treatment and control group.

A p-value <0.05 was considered statistically significant.

Baseline Results

1. Participants

The average age of youth was 11.6 years (Table 3). About half were boys (48.9%). The education level for most fathers was mainly less than high school or high school. The majority of fathers were employed full-time (74.5%) and married/living with a partner (92.0%). Annual household income levels varied, with about one-third reporting an income of $15,000-$24,999. The mean number of children and adults in the household was 2.6 and 2.5, respectively. Differences were not observed in level of self-efficacy by any demographic characteristics.

Table 3. Demographic characteristics of fathers and youth at baseline		
Characteristic	Mean	SD
Youth age (n = 190)	11.6	1.5
Youth sex (n = 188)	n	%
Male	92	48.9
Female	96	51.0
	Mean	SD
Father age (n = 190)	41.8	7.40
Father years in the US (n = 190)	19.4	6.6
Father education (n = 188)	n	%
Less than high school	71	37.8
High school	80	42.6
Some college or more	37	19.7
Father employment (n = 184)		
Self-employed	27	14.7
Unemployed	8	4.3
Employed part time	12	6.5
Employed full time	137	74.5
Father marital status (n = 187)		
Single/separated	15	8.0
Married/living with a partner	172	92.0
Annual household income (n = 183)		
Under $15,000	21	11.5
$15,000 to $24,999	52	28.4
$25,000 to $34,999	37	20.2
$35,000 to $49,999	43	23.5
$50,000 to $99,999	30	16.4
	Mean	SD
Number of children <18 in HH (n = 183)	2.6	1.2
Number of adults >18 in HH (n = 187)	2.5	1.0

2. Self-efficacy

Mean self-efficacy scores for promoting healthy eating and PA were high (3.8 and 4.0, respectively on a scale of 1 to 5. (Table 4). Mean self-efficacy scores for promoting healthy eating and PA in difficult situations were mid-range (3.1 and 2.9, respectively on a scale of 1 to 5).

Table 4. Descriptive statistics for self-efficacy scales (baseline sample)

Confidence in the ability to:	n	Mean (SD)	Range	Median
Promote healthy eating	187	3.8 (0.9)	1.8-5	3.8
Promote healthy eating in difficult situations	187	3.1 (1.0)	0.3-5	3.0
Promote PA	190	4.0 (0.9)	1-5	4.2
Promote PA in difficult situations	190	2.9 (0.9)	1.1-5	3.0

3. Youth energy balance-related behaviors

Youth ate < 2 servings of fruits and vegetables per day (Table 5). Fast food and sugary drinks were consumed in lower numbers of servings than fruit, vegetables and sweet/salty snacks. Youth spent 0.64 hours per day on a combination of mild, moderate and vigorous physical activity. Screen time accounted for about 5 hours a day.

Table 5. Youth energy balance-related behaviors			
Food group intake	n	Mean servings/day[c]	SD
Fruit	187	1.75	1.70
Vegetable	187	1.63	1.30
Sugary drink	187	0.51	0.91
Sweets and salty snacks	187	1.76	1.64
Fast food	187	0.48	0.95
Physical activity (hours/day)[a]	190	0.64 hours/day	0.59
Screen time (hours/day)[b]	185	4.92 hours/day	3.06

[a]Physical activity (mild, moderate, vigorous) topcoded at 2 hours per day.
[b]Screen time was topcoded at 10 hours per day.
[c]Based on 24-hr recall data

4. Paternal Parenting Practices

Fathers expected their children to eat fruits and vegetables less than 2 times a day and allowed their children to consume sugary drinks, sweets/salty foods and fast food less than 1-3 times a week (Table 6). Fathers expected their child to engage in 30 minutes to 1 hour of physical activity per day and to limit screen time to between 30 minutes to 2

hours per day. Fathers indicated they modeled fruit and vegetable intake for their child about 1-3 times per week, and sugary drink, sweets/salty snacks and fast food less than once per week. Fathers indicated that fruits and vegetables were often made available, whereas sugary drinks, sweets/salty foods and fast food were not often made available. Also, screen time opportunities were made available sometimes and opportunities for physical activity were made available often.

Table 6. Paternal parenting practices			
Score	n	Mean (SD)	Median
Expectations			
Fruit	187	1.49 (1.01)	2.0
Vegetable	180	1.54 (1.11)	2.0
Sugary drinks	167	1.59 (1.00)	2.0
Sweets/salty snacks	170	1.59 (0.91)	2.0
Fast food	182	1.27 (0.85)	1.0
Physical activity	162	1.55 (1.14)	2.0
Screen time	148	2.40 (0.89)	2.0
Modeling			
Fruit	174	3.14 (1.00)	3.0
Vegetable	181	3.10 (1.02)	3.0
Sugary drink	188	2.37 (1.00)	2.5
Sweets/salty snacks	188	1.94 (0.86)	2.0
Fast food	183	1.93 (0.75)	2.0
Physical activity	181	2.60 (1.09)	2.5
Screen time	185	2.85 (1.12)	3.0
Availability			
Fruit	177	3.94 (0.82)	4.0
Vegetable	180	3.82 (0.99)	4.0
Sugary drink	181	1.85 (0.66)	2.0
Sweets/salty snacks	181	1.78 (0.65)	1.7
Fast food	184	1.99 (0.69)	2.0
Physical activity	185	3.61 (0.97)	3.7
Screen time	186	3.16 (1.06)	3.0

5. Adolescent dietary intake/PA and PSE for promoting healthy eating and PA

No associations were observed between adolescent fruit, vegetable, sugary drink, sweets/salty snack and fast food intakes and PSE for promoting healthy eating (Table 7).

Adolescent intakes were also not associated with PSE for promoting healthy eating in difficult situations.

Adolescent screen time was negatively associated with PSE for promoting PA among youth (β: -0.520 [95% CI: -1.038, 0.003] p = 0.049), but not with PSE to promote PA in difficult situations (Table 7). Mean screen time was expected to decrease 0.52 hours per day for each one unit increase in PSE for promoting PA. PSE to promote PA and to promote PA in difficult situations were not associated with adolescent PA.

Table 7. Adjusted[a] associations between adolescent dietary intake and PA and PSE for promoting healthy eating and PA and promoting healthy eating and PA in difficult situations

Adolescent dietary intake (servings per day) (n = 187)	Self-efficacy for promoting healthy eating			
	B[b]	Standard Error	95% CI	P value
Fruit (n = 156)	-0.031	0.173	-0.373, 0.311	0.799
Vegetable (n = 158)	-0.141	0.128	-0.392, 0.111	0.391
Sugary drinks (n = 177)	-0.124	0.084	-0.179, 0.151	0.442
Sweets & salty snacks (n = 174)	-0.034	0.148	-0.346, 0.259	0.561
Fast food (n = 174)	-0.036	0.184	-0.201, 0.129	0.443
Adolescent dietary intake (servings per day) (n = 187)	Self-efficacy for promoting healthy eating in difficult situations			P value
Fruit	-0.245	0.155	-0.552, 0.062	0.211
Vegetable	-0.145	0.123	-0.388, 0.098	0.516
Sugary drinks	-0.095	0.078	-0.249, 0.058	0.082
Sweets/salty snacks	-0.171	0.138	-0.443, 0.100	0.067
Fast food	-0.109	0.075	-0.258, 0.040	0.241
Adolescent physical activity and screen time (hours per day)	Self-efficacy for promoting PA			P value
PA (n = 172)	-0.044	0.049	-0.140, 0.052	0.448
Screen time (n = 151)	-0.520	0.262	-1.038, 0.003	0.049
Adolescent physical activity and screen time (hours per day)	Self-efficacy for promoting PA in difficult situations			P value
PA (n = 172)	0.026	0.053	-0.079, 0.132	0.343
Screen time (n = 151)	-0.125	0.299	-0.717, 0.466	0.913

[a]All models were adjusted for child age and sex and corresponding father behaviors. Additional adjustments for food group intake/PA included (fruit – household income, father years in US, vegetable – number adults in home, father years in US, sugary drinks – father age, sweets/salty snacks and fast food – father marital status, number adults in home, screen time – father employment, number children in home).

[b]Unstandardized regression coefficients for adolescent dietary intake/PA/screen time and PSE for promoting healthy eating and PA and addressing barriers to promoting healthy eating and PA

6. Paternal parenting practices for dietary intake/PA and PSE for promoting healthy eating/PA

6.1. Setting expectations for dietary intake and PA and PSE for promoting healthy eating and PA

Significant associations were not observed between level of father expectations for adolescent intake from any food groups or for PA or screen time and PSE for promoting healthy eating and PA or PSE for promoting healthy eating and PA in difficult situations (Table 8). The odds of having a high expectation for sugary drink intake frequency were decreased by 0.29 for each 1 unit increase in PSE for promoting healthy eating [OR = 0.71 [0.48, 1.06]), p = 0.094, but this association was not statistically significant. The odds of having a high expectation for sugary drink intake frequency were also decreased by 0.28 for each 1 unit increase in PSE for promoting healthy eating in difficult situations [OR = 0.72 [0.50, 1.03]), p = 0.073, but this association was not statistically significant.

Table 8. Adjusted[a] associations between father-reported setting expectations for food group intake and PA and PSE for promoting healthy eating and PA and promoting healthy eating and PA in difficult situations

	Odds ratio for high expectations for food intake frequency [95% Wald Confidence Limits] p value				
PSE	Fruit (n = 159)	Vegetable (n = 165)	Sugary drinks (n = 171)	Sweets/salty snacks (n= 183)	Fast Food (n = 176)
Promoting healthy eating	1.186 [0.799, 1.759] 0.398	1.078 [0.746, 1.558] 0.691	0.709 [0.475, 1.060] 0.094	0.843 [0.588, 1.208] 0.353	0.676 [0.390, 1.170] 0.161
Promoting healthy eating in difficult situations	1.142 [0.809, 1.611] 0.451	1.261 [0.891, 1.785] 0.191	0.721 [0.504, 1.031] 0.073	0.837 [0.602, 1.164] 0.290	0.714 [0.445, 1.145] 0.162

	Odds ratio for high expectations for PA frequency [95% Wald Confidence Limits] p value	
PSE	PA (n = 161)	Screen time (n = 162)
Promoting PA	0.957 [0.664, 1.379] 0.813	0.792 [0.541, 1.159] 0.229
Promoting PA in difficult situations	1.118 [0.752, 1.662] 0.583	0.917 [0.613, 1.373] 0.675

[a]All models were adjusted for child age and sex and corresponding father intake/PA. In addition, the following variables were also included for food group intake and PA expectations: fruit - household income, sugary drinks – father education and household income, fast food –father employment, PA – household income, father employment and marital status, number of adults in home, screen time – father education.

6.2 Modeling healthy eating/PA and PSE for promoting healthy eating and PA

Increased father self-efficacy for promoting healthy eating was positively associated with increased modeling of fruit and vegetable intake; specifically, the mean scale score for modeling of fruit intake increased 0.39 units for a 1 unit increase in PSE and the mean scale for modeling vegetable intake increased 0.48 units for a 1 unit increase in PSE for promoting healthy eating (Table 9). Similar results were observed for PSE for promoting healthy eating in difficult situations and modeling vegetable intake. The mean scale score for modeling vegetable intake increased 0.35 units for every 1 unit increase in PSE for promoting healthy eating in difficult situations. Increased father self-efficacy for promoting healthy eating was negatively associated with increased modeling of sugary drinks with a mean scale score for modeling sugary drink intake decrease of 0.47 units for every 1 unit increase in PSE.

Increased father self-efficacy for promoting PA was positively associated with increased modeling of PA with a mean scale score for modeling PA increase of 0.56 units for every 1 unit increase in PSE.

Table 9. Adjusted associations between father-reported modeling healthy foods and PA and PSE for promoting healthy eating and PA	
	Modeling food intake

	β (SE) p value				
PSE	Fruit (n = 158)	Vegetable (n = 156)	Sugary drinks (n = 173)	Sweets/salty snacks (n= 180)	Fast food (n = 180)
Promoting healthy eating	0.392 (0.198) 0.0497	0.482 (0.191) 0.013	-0.466 (0.162) 0.005	-0.213 (0.142) 0.136	-0.079 (0.128) 0.538
Promoting healthy eating in difficult situations	0.042 (0.179) 0.814	0.348 (0.176) 0.0495	-0.170 (0.151) 0.260	-0.062 (0.129) 0.630	-0.054 (0.115) 0.639
	Modeling PA β (SE) p value				
PSE	PA (n = 157)			Screen time (n = 159)	
Promoting PA	0.561 (0.178) 0.002			0.006 (0.186) 0.976	
Promoting PA in difficult situations	0.203 (0.202) 0.317			0.018 (0.207) 0.933	

[a]All models were adjusted for child age and sex and corresponding father intake/PA. In addition, the following variables were also included for food group intake and PA modeling: fruit – father marital status and employment, sweets/salty snacks – number adults in home, fast food –father age, PA – father education.

6.3 Making healthy foods and PA available and PSE for promoting healthy eating and PA

Increased father self-efficacy for promoting healthy eating was positively associated with making fruits and vegetables available with mean scale scores for making these foods available increased by 1.08 units for making fruit available and 1.15 units for making vegetables available for a 1 unit increase in PSE. Increased father self-efficacy for promoting healthy eating was negatively associated with making sugary drinks available with a decrease of 0.45 units for a 1 unit increase in PSE.

Increased father self-efficacy for promoting healthy eating during difficult situations was positively associated with making vegetables available, but not with making fruits available ($p = 0.06$). Increased father self-efficacy for promoting PA was

positively associated with making PA available with the mean scale score for making PA available increased by 0.98 units for a 1 unit increase in PSE.

Table 10. Adjusted associations between father-reported making food groups and PA available and PSE for promoting healthy eating and PA and promoting healthy eating and PA in difficult situations

	Making foods/drinks available β (SE) p value				
PSE	Fruit (n = 159)	Vegetable (n = 156)	Sugary drinks (n = 173)	Sweets/salty snacks (n= 181)	Fast Food (n = 180)
Promoting healthy eating	1.079 (0.239) <0.0001	1.150 (0.260) <0.0001	-0.447 (0.167) 0.008	-0.083 (0.173) 0.630	0.028 (0.182) 0.879
Promoting healthy eating in difficult situations	0.419 (0.225) 0.064	0.682 (0.246) 0.006	-0.124 (0.155) 0.425	0.183 (0.155) 0.241	-0.008 (0.163) 0.963

	Making PA available β (SE) p value	
PSE	PA (n = 159)	Screen time (n = 159)
Promoting PA	-0.981 (0.221) <0.0001	-0.052 (0.088) 0.557
Promoting PA in difficult situations	0.333 (0.256) 0.197	0.116 (0.100) 0.229

[a]All models were adjusted for child age and sex and corresponding father intake/PA. In addition, the following variables were also included for food group intake and PA availability: fruit – household income, sugary drinks – father education, household income, fast food –father employment, PA – household income, number adults in home, father employment and marital status, screen time – father education.

Intervention Results

PSE for promoting PA was increased in the intervention group compared to the control group from pre- to post-program (Table 11). However, PSE for promoting healthy eating and promoting PA in difficult situations were not changed from pre- to post-program in either group or between groups.

Paternal self-efficacy	Group	Pre-program Mean (SD[a])	Post program	Difference	p value[bc]

			Mean (SD[a])		
Promoting healthy eating	Intervention	3.83 (0.86) n = 82	4.00 (0.75) n = 51	0.06 (0.86) n = 50	0.325
	Control	3.94 (0.88) n = 74	3.90 (0.86) n = 52	-0.10 (0.77) n = 52	
Promoting healthy eating in difficult situations	Intervention	3.04 (0.97) n = 82	3.16 (0.95) n = 51	0.09 (0.97) n = 50	0.400
	Control	3.11 (1.00) n = 74	3.18 (1.02) n = 52	-0.07 (0.97) n = 52	
Promoting PA	Intervention	3.84 (0.92) n = 85	4.11 (0.68) n = 51	0.20 (0.91) n = 51	0.010
	Control	4.07 (0.87) n = 74	3.91 (0.91) n = 52	-0.22 (0.68) n = 52	
Promoting PA in difficult situations	Intervention	2.88 (0.89) n = 85	3.04 (1.04) n = 51	0.10 (0.90) n = 51	0.595
	Control	2.88 (0.83) n = 74	2.94 (0.89) n = 52	0.00 (1.01) n = 52	

[a]SD = standard deviation
[b]p-value based on t-tests comparing differences between groups.
[c]The analysis of change was limited to those for whom both pre and post data were available

Discussion

This study examined relationships between Latino father self-efficacy for promoting healthy eating and PA and parenting practices including setting expectations for food group intake, modeling intake of healthy foods and PA, making healthy foods and PA available using baseline data. No associations were observed with PSE and setting expectations, whereas positive associations were observed with modeling and making healthy food and PA available. Increased PSE for promoting PA was observed among intervention compared to control group fathers from pre to post program.

The results showed that fathers were more likely to model healthy food intake and/or make these foods available if they were confident in their ability to promote healthy food intake among adolescents. These results align with expectations that modeling healthy food intake and making these foods available would be more likely if

fathers were confident in promoting healthy eating. In support of this conclusion, focus group interviews with Latino fathers indicated that fathers felt confident in their ability to prepare healthy foods or engage in physical activity in difficult situations, such as in the winter or when they were tired after work, which could result in promoting healthy lifestyle behaviors for children based on modeling or availability practices (Zhang et al., 2018).

Results from this study also indicated that Latino fathers perceived that mothers had the primary responsibility for food parenting practices and fathers lacked interest in nutrition or food preparation (Zhang et al. 2018). Therefore, fathers may not have the same opportunities to apply food parenting practices for adolescents, and therefore have a lower likelihood that self-efficacy would be strengthened through mastery experience than mothers. Taillie (2018) examined the trend for home cooking by gender from 2003-1016 and found that the percentage of Hispanic men who cooked increased from 31% in 2003 to 42% in 2016, whereas the percentage of Hispanic women who cooked only increased from 73% in 2003 to 75% in 2016. Although the percentage of men who cooked increase, women still did the majority of the cooking. This study showed that Hispanic men spend less time cooking, therefore they do not have as many opportunities to implement food parenting practices, which can lead to lower self-efficacy.

Fathers in the current study were also more likely to model PA and make PA opportunities available with higher levels of confidence in their ability to promote PA. Consistent with these findings, a qualitative study by Lindsay et al. (2017) indicated that low self-efficacy limited Latino child care home providers' ability to model healthy eating and PA (Lindsay et al., 2017). Another study by Fuemmeler et al. (2011) examined

the relationship between moderate to vigorous physical activity (MVPA) of mothers and fathers and their children. In general, having active parents, potentially through role modeling, was positively associated with children's MVPA (mean age 9.9 years) with no significant difference in relationships among mothers vs. fathers. Mothers' MVPA tended to more strongly influence daughters' MVPA, while fathers' MVPA tended to have a greater influence on sons' MVPA (Fuemmeler et al., 2011). Analyses in the current study adjusted for adolescent sex, however, future studies adequately powered to detect differences in relationships by adolescent sex could be completed.

Paternal self-efficacy for promoting physical activity was negatively associated with screen time among adolescents in the current study. These results were likely based on youth spending more time on PA and less time on screens because higher PSE allowed for greater promotion of PA. Results from a study by McDonald et al. (2018) supported these findings. Patterns of screen time for rural Mexican-American children showed that families who were physically active together 2 or 3 times per week had less weekend screen time compared to families that were physically active together 1 time per week.

Results from the intervention group indicated that PSE was increased for promoting PA, but did not change for promoting healthy eating and PA during difficult situations. This is an interesting finding given that the self-efficacy value for promoting PA was already at 4 on a 1-5 point scale. The intervention components used to address barriers to promoting healthy eating and PA during difficult times included interactive segments to practice ways to promote exercise indoors with little space and food preparation practices to make healthy food appealing to youth. The interactive segments

also allowed fathers to generate problem-solving solutions to address barriers. Even though these components were implemented, they may not have provided adequate exposure to make a difference in PSE for promoting healthy eating and PA during difficult situations.

Limitations and Strengths

This study fills a gap in the literature regarding the impact of Latino fathers' self-efficacy for food and physical activity parenting practices on the food and PA behaviors of their children. A limited number of studies focused on Latino fathers and self-efficacy to engage in these practices because mothers are traditionally the main food caregivers with responsibility for diet and lifestyle factors of children.

Food intake data were collected using self-report via 24-hour dietary recalls, therefore validity may have been affected by participant's ability and willingness to accurately share information about foods and beverages consumed (Burrows et al., 2010). While 100% of youth participated in one recall, only about 80% participated in two recalls and about 56% participated in three recalls. Those with fewer than three recalls may not have intake data representative of usual intake. In addition, while the self-efficacy instrument showed good internal consistency, it was not tested for test-retest reliability. This study was conducted in the Twin Cities, so the results may not be generalizable to Latinos in other communities.

Implications for Practice

To improve PSE, dietitians and other health professionals should implement intervention programs that provide opportunities for fathers to practice promoting PA. To develop mastery of these practices, programs could be facilitated by other fathers who

have high levels of PSE for promoting healthy youth behaviors. Motivation from other fathers could also contribute to improved self-efficacy, especially regarding youth behaviors for which fathers are most concerned.

Implications for Future Research

Limited research has addressed parental self-efficacy for engaging in food and physical activity parenting practices and relationships to diet and lifestyle behaviors of children, in particular among fathers versus mothers and among Latino fathers versus fathers of other races/ethnicities. Additional studies could compare these relationships among Latino fathers versus mothers, and among parents with youth of different ages. Because generalizability was a limitation for this study, future research also needs to include Latino populations from other states or regions.

Self-reported methods to collect dietary intake information, such as 24-hour dietary recalls, have the potential for measurement error (Foster et al., 2019). Therefore, use of biomarkers, such as skin carotenoid scores measured with the Veggie Meter as a proxy for fruit and vegetable intake, may be used to objectively confirm self-reported food intake information (Pitts & May, 2020). Dietitians and other health professionals could implement the use of these biomarker instruments to improve accuracy of food intake results.

References

Alaska Department of Health and Social Services (2019). What is a sugary drink? Retrieved from http://dhss.alaska.gov/dph/PlayEveryDay/Pages/What-is-a-Sugary-Drink.aspx

American Academy of Pediatrics, Committee on Public Education. American Academy of Pediatrics: children, adolescents, and television. (2001). *Pediatrics*, 107, 423–426.

American Academy of Pediatrics. Media Use in School-Aged Children and Adolescents. (2016). *Pediatrics*, 138(5), 1-8.

Arredondo, E. M., Ayala, G. X., Soto, S., Slymen, D. J., Horton, L. A., Parada, H., … Elder, J. P. (2018). Latina mothers as agents of change in children's eating habits : findings from the randomized controlled trial Entre Familia : Reflejos de Salud. *International Journal of Behavioral Nutrition and Physical Activity*, *15*(95), 1–11.

Asplund, K. M., Kair, L. R., Arain, Y. H., Cervantes, M., Oreskovic, N. M., & Zuckerman, K. E. (2015). Early childhood screen time and parental attitudes toward child television viewing in a low-income Latino population attending the special supplemental nutrition program for women, infants, and children. *Childhood Obesity*, *11*(5), 590–599. https://doi.org/10.1089/chi.2015.0001

Bailey, R. L. (2018). Sources of added sugars in young children, adolescents, and adults with low and high intakes of added sugars. *Nutrients*, *10*(102), 1–11. https://doi.org/10.3390/nu10010102

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191–215. https://doi.org/10.1037/0033-295X.84.2.191.

Bandura A. (2004). Health promotion by social cognitive means. *Health Education Behavior*, 31(2):143–64. https://doi.org/10.1177/1090198104263660. PubMed PMID: 15090118.

Bandura, A. (2010). Self efficacy. In *The Corsini Encylopedia of Psychology*, (4th Ed. pp. 1534–1536) Hoboken, New Jersey: John Wiley & Sons.

Bayley, J., Wallace, L. M., & Choudhry, K. (2009). Fathers and parenting programmes: barriers and best practice. *Community Practice,* 82(4), 28–31.

Berkey, C. S., Rockett, H. R., Field, A. E., Gillman, M. W., & Colditz, G. A. (2004). Sugar- added beverages and adolescent weight change. *Obesity Research,* 12, 778 – 88.

Bleich, S. N., Vercammen, K. A., Koma, J. W., & Li, Z. (2018). Trends in beverage consumption among children and adults, 2003-2014. *Obesity*, *26*(2), 432–441. https://doi.org/10.1002/oby.22056

Bohman, B., Rasmussen, F., & Ghaderi, A. (2016). Development and psychometric evaluation of a context-based parental self-efficacy instrument for healthy dietary and physical activity behaviors in preschool children. *International Journal of Behavioral Nutrition and Physical Activity*, *13*(110), 1–9. https://doi.org/10.1186/s12966-016-0438-y

Borges, C. A., Marchioni, D. M. L., Levy, R. B., & Slater B. (2018). Dietary patterns associated with overweight among Brazilian adolescents. *Appetite*, 123, 402-409.

Burrows, T. L., Martin, R. J., & Collins, C. E. (2010). A systematic review of the validity of dietary assessment methods in children when compared with the method of doubly labeled water. *Journal of the American Dietetic Association, 110(110),* 1501-1510.

Carroll-Scott A, Gilstad-Hayden K., Rosenthal L., Peters S.M., McCaslin C., Joyce R., et al. (2013). Disentangling neighborhood contextual associations with child body mass index, diet, and physical activity: the role of built, socioeconomic, and social environments. *Social Science & Medicine*, 95,106–14. https://doi.org/10.1016/j.socscimed.2013. 04.003.

Cockrell Skinner, A., Ravanbakht, S. N., Skelton, J. A., Perrin, E. M., & Armstrong, S. C. (2018). Prevalence of obesity and severe obesity in US children, 1999-2016. *Pediatrics,* 141, e20173459. doi: 10.1542/peds.2017-3459.

Cullen, K. W., Baranowski, T., Rittenberry, L., Cosart, C., Owens, E., Hebert, D., & Moor, C. De. (2000). Socioenvironmental influences on children's fruit juice and vegetable consumption as reported by parents: Reliability and validity of measures. P*ublic Health Nutrition*, 3(3), 345–355.

Darling, N., & Steinberg, L. Parenting style as context: an integrative model. (1993). *Child Development,* 113, 487–496.

Davison, K. K., Gicevic, S., Aftosmes-tobio, A., Ganter, C., Simon, C. L., Newlan, S., & Manganello, J. A. (2016). Fathers' representation in observational studies on parenting and childhood obesity: a systematic review and content analysis. *American Journal of Public Health*, *106*(11), 14–21. https://doi.org/10.2105/AJPH.2016.303391

De Lepeleere, S. De Bourdeaudhuij, I., Cardon, G., & Verloigne, M. (2017). The effect of an online video intervention ' Movie Models ' on specific parenting practices and parental self-efficacy related to children's physical activity, screen-time and healthy diet: a quasi experimental study. *BMC Public Health*, *17*(366), 1–15. https://doi.org/10.1186/s12889-017-4264-1

Evenson, K. R., Arredondo, E. M., Carnethon, M. R., & Delamater, A. M. (2019). Physical Activity and Sedentary Behavior among US Hispanic/ Latino Youth: The SOL Youth Study, *Medicine & Science in Sports & Exercise, 51*(5), 891–899. https://doi.org/10.1249/MSS.0000000000001871

Foster, E., Lee, C., Imamura, F., Hollidge, S. E., Westgate, K. L., Venables, M. C., … Brage, S. (2019). Validity and reliability of an online self-report 24-h dietary recall

method (Intake24): a doubly labelled water study and repeated-measures analysis. *Journal of Nutritional Science*, *8*(e29), 1–9. https://doi.org/10.1017/jns.2019.20

Fuemmeler, B. F., Anderson, C. B., & Mâsse, L. C. (2011). Parent-child relationship of directly measured physical activity. *International Journal of Behavioral Nutrition and Physical Activity, 8*, 17.

Gallo, S., Jones, M. T., Doig, A. C., Kogan, K., Fields, J., Wonderlich, J. A., … Mehlenbeck, R. (2020). Feasibility of a multidisciplinary and culturally adapted pediatric weight management program for Latino families: results from the Vidas Activas y Familias Saludables Pilot Study. *Journal of Nutrition Education and Behavior*, *52*(1), 55–63. https://doi.org/10.1016/j.jneb.2019.10.002

Godin, G., & Shephard, R. J. (1985). A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sport Sciences. Journal Canadien Des Sciences Appliquees Au Sport*, *10*(3), 141–146.

Godin, G. (2011). The Godin-Shephard leisure-time physical activity questionnaire. *Health & Fitness Journal of Canada*, *4*(1), 18–22.

Hales, C. M., Carroll, M. D., Fryar, C. D., Ogden, C. L. (2017). *Prevalence of Obesity Among Adults and Youth:* United States, 2015–2016. NCHS Data Brief. October (288):1-8.

Herman, C., & Polivy, J. (2005). Normative influences on food intake. *Physiology & Behavior, 86*(5), 762–772. https://doi.org/10.1016/j.physbeh.2005.08.064.

Heermann, W. J., Teeters, L., Sommer, E. C., Burgess, L. E., Escarfuller, J., Van Wyk, C., … Singer-Gabella, M. (2019). Competency-based approaches to community health: a randomized controlled trial to reduce childhood obesity among Latino preschool-aged children. *Childhood Obesity*, *15*(8), 519–531.

Huhman, M., Lowry, R., Lee, S. M., Fulton, J. E., Carlson, S. A., & Patnode, C. D. (2012). Physical activity and screen time: Trends in U.S. children aged 9 to 13 years , 2002 – 2006. *Journal of Physical Activity and Health*, *9*, 508–515. https://doi.org/10.1123/jpah.9.4.508

Iannotti, R. J., & Wang, J. (2013). Trends in physical activity, sedentary behavior, diet, and BMI among US adolescents, 2001-2009. *Pediatrics*, *132*(4), 606–614. https://doi.org/10.1542/peds.2013-1488

James, J., Thomas, P., Cavan, D., & Kerr, D. (2004). Preventing childhood obesity by reducing consumption of carbonated drinks: cluster randomised controlled trial. *British Medical Journal*, 328, 1237.

Kirkpatrick, S. I., Dodd, K. W., Reedy, J., & Krebs-Smith, S. M. (2012). Income and race/ethnicity are associated with adherence to food-based dietary guidance among U.S.

adults and children. *Journal of the Academy of Nutrition and Dietetics*, *112*(5), 624–635. https://doi.org/10.1097/MCA.0000000000000178.

Larsen, J. K., Hermans, R. C. J., Sleddens E. F.C., Engles, R. C. M. E., Fisher J.O., Kremers, S. P. J. (2015). How parental dietary behavior and food parenting practices affect children's dietary behavior. Interacting sources of influence? *Appetite, 89*, 246–257. https://doi.org/10.1016/j.appet.2015.02.012.

Larson N, Ward D.S., Neelon S.B., Story, M. (2011) What role can child-care settings play in obesity prevention? A review of the evidence and call for research efforts. *Journal of American Dietetic Association, 111*:1343–1362.

Laurson K.R., Eisenmann J.C., Welk G.J., Wickel E.E., Gentile D.A., Walsh D.A. (2008). Combined influence of physical activity and screen time recommendations on childhood over- weight. *Journal of Pediatrics*, *153(2)*: 209–214.

Lecroy, M. N., Siega-Riz, A. M., Albrecht, S. S., Ward, D. S., Cai, J., Perreira, K. M., … Stevens, J. (2019). Association of food parenting practice patterns with obesogenic dietary intake in Hispanic/Latino youth : Results from the Hispanic Community Children's Health Study/Study of Latino Youth (SOL Youth). *Appetite*, *140*(May), 277–287. https://doi.org/10.1016/j.appet.2019.05.006

Ledoux, T. A., Hingle, M. D., Baranowski, T. (2010), Relationship of fruit and vegetable intake with adiposity: A systematic review. *Obesity Reviews*, *2011*(12), e145-e150.

Litchford, A., Roskos, M. R. S., & Wengreen, H. (2020). Influence of fathers on the feeding practices and behaviors of children : A systematic review. *Appetite*, *147*(December 2019), 104558. https://doi.org/10.1016/j.appet.2019.104558

Lindsay, A. C., Greaney, M. L., Wallington, S. F., & Wright, J. A. (2017). Easier said than done : a qualitative study conducted in the USA exploring Latino family child care home providers as role models for healthy eating and physical activity behaviours. *BMJ Open*, *7*, e018219. https://doi.org/10.1136/bmjopen-2017-018219

Lowenstein, L. M., Perrin, E. M., Berry, D., Vu, M. B., Davis, L. P., Cai, J., … Ammerman, A. S. (2013). Childhood Obesity Prevention : *Childhood Obesity*, *9*(2), 137–143. https://doi.org/10.1089/chi.2012.0111

Maccoby, E., & Martin, J. A. Socialization in the context of the family: parent-child interaction. In: E Hetherington, ed. Socialization, Personality, and Social Development. Vol 4. New York: John Wiley; 1983:1–101.

Malik, V. S., Pan, A., Willett, W. C., & Hu, F. B. (2013). Sugar-sweetened beverages and weight gain in children and adults: A systematic review and meta-analysis 1 – 3. *American Journal of Clinical Nutrition*, *98*, 1084–1102. https://doi.org/10.3945/ajcn.113.058362.1

McDonald, J. A., Sroka, C., Olivares, E., Marin, M., Gurrola, M., & Sharkey, J. R. (2018). Patterns of screen time among rural Mexican-American children on the New Mexico-Mexico border. *Preventing Chronic Disease*, *15*(113), 1–12.

Morgan, P. J., Lubans, D. R., Plotnikoff, R. C., Callister, R., Burrows, T., Fletcher, R., … Collins, C. E. (2011). The 'Healthy Dads, Healthy Kids' community effectiveness trial : study protocol of a community-based healthy lifestyle program for fathers and their children. *BMC Public Health*, *11*(1), 876. https://doi.org/10.1186/1471-2458-11-876

Morgan, P. J., Young, M. D., Lloyd, A. B., Wang, M. L., & Eather, N. (2020). Involvement of fathers in pediatric obesity treatment and prevention trials: a systematic review. *Pediatrics*, *139*(2), e21062635.

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory* (3rd Ed). New York: McGraw-Hill.

O'Connor, T. M., Beltran, A., Musaad, S., Perez, O., Flores, A., Galdamez-Calderon, E., Isbell, T., Arredondo, E.M., Parra Cardona, R., Cabrera, N., Marton, S. A., Baranowski, T., & Morgan, P. J. (2020). Feasibility of targeting Hispanic fathers and children in an obesity intervention: "Papa´s Saludables Ninos Saludables". *Childhood Obesity*, *17*(52). 379-372.

O'Connor, T. M., Perez, O., Beltran, A., García, I. C., Arredondo, E., Cardona, R. P., … Morgan, P. J. (2020). Cultural adaptation of 'Healthy Dads, Healthy Kids' for Hispanic families: applying the ecological validity model. *International Journal of Behavioral Nutrition and Physical Activity*, *17,* 52.

O'Connor, T., Perez, O., Garcia, I. C., & Gallagher, M. (2018). Engaging Latino fathers in children's eating and other obesity-related behaviors: a review. *Current Nutrition Reports*, *7*, 29–38.

Ogden, C. L., Fryar, C. D., Hales, C. M., Carroll, M. D., Aoki, Y., & Freedman, D. S. (2018). Differences in obesity prevalence by demographics and urbanization in US children and adolescents, 2013-2016. *Journal of the American Medical Association*. *319*(23), 2410–2418. https://doi.org/10.1001/jama.2018.5158

Pearson, N., Biddle, S. J. H., & Gorely, T. (2008). Family correlates of fruit and vegetable consumption in children and adolescents : a systematic review. *Public Health Nutrition*, *12*(2), 267–283. https://doi.org/10.1017/S1368980008002589

Pitts, S. J., & May, K. (2020). Use of the Veggie Meter as a tool to objectively approximate fruit and vegetable intake among youth for evaluation of preschool and school-based interventions. *Journal of Human Nutrition and Dietetics*, *33*(1), 869–875. https://doi.org/10.1111/jhn.12755

Poti, J. M., Duffey, K. J., & Popkin, B. M. (2014). The association of fast food consumption with poor dietary outcomes and obesity among children: Is it the fast food

or the remainder of the. *The American Journal of Clinical Nutrition*, *99*, 162–171. https://doi.org/10.3945/ajcn.113.071928.162

Power, J. M., & Bersamin, A. (2018). A text messaging intervention (Txt4HappyKids) to promote fruit and vegetable intake among families with young children: pilot study. *JMIR Formative Research*, *2*(2), e13. https://doi.org/10.2196/formative.8544

Pulley, C., Galloway, A. T., Webb, R. M., & Payne, L. O. (2014). Parental child feeding practices: how do perceptions of mother, father, sibling, and self vary? *Appetite*, *80*, 96–102. https://doi.org/10.1016/j.appet.2014.05.001

Rahill, S., Kennedy, A., & Kearney, J. (2020). A review of the influence of fathers on children's eating behaviours and dietary intake. *Appetite*, *147*, 104540. https://doi.org/10.1016/j.appet.2019.104540

Santiago-Torres, M., Adams, A. K., Carrel, A. L., LaRowe, T. L., & Schoeller, D. A. (2014). Home food availability, parental dietary intake, and familial eating habits influence the diet quality of urban Hispanic children. *Childhood Obesity*. 10(5), 408-415. doi:10.1089/chi.2014.0051

Shroff, M. R., Perng, W., Baylin, A., Mora-Plazas, M., Marin, C., & Villamor, E. (2013). Adherence to a snacking dietary pattern and soda intake are related to the development of adiposity: a prospective study in school-age children. *Public Health Nutrition*, (18), 1507-1513. http://doi.org/10.1017/S136898001300133X

Singh, G. K., Kogan, M. D., Van Dyck, P. C., & Siahpush, M. (2008). Racial/ethnic, socioeconomic, and behavioral determinants of childhood and adolescent obesity in the United States: Analyzing independent and joint associations. *Annals of Epidemiology*, *18*(9), 682–695. https://doi.org/https://doi.org/10.1016/j.annepidem.2008.05.001

Stappen, V. Van, De Lepeleere, S., Huys, N., Latomme, J., Verloigne, M., Cardon, G., … Craemer, M. De. (2019). Effect of integrating a video intervention on parenting practices and related parental self- efficacy regarding health behaviours within the Feel4Diabetes-study in Belgian primary schoolchildren from vulnerable families : A cluster randomized trial. *Plos One*, *14*(12), e0226131. https://doi.org/10.1371/journal.pone.0226131

Steele, E. M., Baraldi, L. G., Laura, M., Moubarac, J., Mozaffarian, D., & Monteiro, C. A. (2016). Ultra-processed foods and added sugars in the US diet : evidence from a nationally representative cross-sectional study. *BMJ Open*, *6*, e009892. https://doi.org/10.1136/bmjopen-2015-009892

Taillie, L. S., Afeiche, M. C., Eldridge, A. L., & Popkin, B. M. (2016). The contribution of at-home and away-from-home food to dietary intake among 2 – 13-year-old Mexican children. *Public Health Nutrition*, *20*(14), 2559–2568. https://doi.org/10.1017/S1368980016002196

Taillie, L. S. (2018). Who's Cooking? Trends in US home food preparation by gender, education, and race/ethnicity from 2003 to 2016. *Nutrition Journal*, *17* (41). https://doi.org/10.1186/s12937-018-0347-9.

Thompson, D. A., Schmiege, S. J., Johnson, S. L., Vandewater, E. A., Boles, R. E., Zambrana, R. E., … Tschann, J. M. (2018). Screen-related parenting practices in low-income Mexican American families. *Academy of Pediatrics*, *18*(7), 820–827.

Tschann, J. M., Gregorich, S. E., Penilla, C., Pasch, L. A., Groat, C. L. De, Flores, E., … Butte, N. F. (2013). Parental feeding practices in Mexican American families: initial test of an expanded measure. *International Journal of Behavioral Nutrition and Physical Activity*, *10*(1), 6. https://doi.org/10.1186/1479-5868-10-6

U.S. Department of Agriculture. (2015). Choose my Plate. Retrieved from https://www.choosemyplate.gov/eathealthy/fruits & https://www.choosemyplate.gov/eathealthy/vegetables

U.S. Department of Agriculture, A. R. S. (2016). *Quick service restaurants: Percent reporting, mean amounts, and percent of selected nutrients from foods obtained from quick service restaurants, by race/ethnicity and age, What We Eat in America, NHANES 2013-2014*. Retrieved from https://www.ars.usda.gov/ARSUserFiles/80400530/pdf/1516/Table_49_QSR_GEN_15.pdf

U.S. Department of Health and Human Services and U.S. Department of Agriculture. (2015). 2015-2020 Dietary Guidelines for Americans. Retrieved from http://health.gov/dietaryguidelines/2015/guidelines/

U.S. Department of Health and Human Services. (2015). Physical Activity Guidelines for Americans. Retrieved from https://health.gov/dietaryguidelines/2015/guidelines/appendix-1/

Utter, J., Neumark-Sztainer, D., Jeffery, R., & Story, M. (2003). Couch potatoes or French fries: Are sedentary behaviors associated with body mass index, physical activity, and dietary behaviors among adolescents? *Journal of the American Dietetic Association, 103,* 1298-1305. https://doi.org/10.1016/S0002-8223(03)01079-4

Vaughn, A. E., Ward, D. S., Fisher, J. O., Faith, M. S., Hughes, S. O., Kremers, S. P. J., … Power, T. G. (2016). Fundamental constructs in food parenting practices: a content map to guide future research. *Nutrition Reviews*, *74*(2), 98–117. https://doi.org/10.1093/nutrit/nuv061

Ventura, A. K., & Worobey, J. (2013). Early influences on the development of food preferences. *Current Biology*, *23*(9), R401–R408.

Villegas, E., Galvez-Ortega, K., Wiley, A., Teran-Garcia, M., Fiese, B. H., & Teran-Garcia, M. (2020). Environmental factors influencing physical Activity among Latino

families : A Cross-country Comparison. *Journal of Racial and Ethnic Health Disparities*, *7*, 528–538.

Walsh, A. D., Hesketh, K. D., Hnatiuk, J. A., & Campbell, K. J. (2019). Paternal self-efficacy for promoting children's obesity protective diets and associations with children' s dietary intakes. *International Journal of Behavioral Nutrition and Physical Activity*, *16*, 53.

Wang, J., & Fielding-Singh, P. (2018). How food rules at home influence independent adolescent food choices. *Journal of Adolescent Health*, *63*(2), 219–226. https://doi.org/10.1016/j.jadohealth.2018.02.010

Wright, J. A., Adams, W. G., Laforge, R. G., Berry, D., & Friedman, R. H. (2014). Assessing parental self-efficacy for obesity prevention related behaviors. *International Journal of Behavioral Nutrition and Physical Activity*, *11,* 53.

Yamamoto-Kimura, L.T., Alvear-Galindo, M.G., Morán-Álvarez, C. Acuna-Sanchez M. E., Torres Duran, P. V. Juarez Oropeza, M. A., Ferreira Hermosilla, A., & Solis Diaz, M. G. (2013). Actividad extraescolar y obesidad en los niños. Influencia del ámbito familiar y del vecindario. *Revista Médica del Instituto Mexicano del Seguro Social,* 51(4), 378-383.

Yee, A. Z. H., Lwin, M. O., & Ho, S. S. (2017). The influence of parental practices on child promotive and preventive food consumption behaviors : a systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity*, *14,* 47. https://doi.org/10.1186/s12966-017-0501-3

Zhang, Y., Hurtado, G. A., Flores, R., Alba-Meraz, A., & Reicks, M. (2018). Latino fathers' perspectives and parenting practices regarding eating, physical activity, and screen time behaviors of early adolescent children: focus group findings. *Journal of the Academy of Nutrition and Dietetics*, *118*(11), 2070–2080. https://doi.org/10.1016/j.jand.2018.03.025

Zhang, Y., Reyes Peralta, A., Arellano Brazys, P., Hurtado, A., Larson, N., Reicks, M. (2020). Development of a survey to assess Latino fathers' parenting practices regarding energy balance-related behaviors of early adolescents. *Health Education and Behavior, 47*(1), 123-133. doi: 10.1177/1090198119878769.

Zhang, Y., Hurtado, G. A., Peralta Reyes, A., Arellano Brazys, P., Perdue, L., Alvarez de Davila, S., Flores, R., Monardez Popelka, J., & Reicks, M. Feasibility and effectiveness of Padres Preparados, Jóvenes Saludables, a family-based program to prevent obesity among Latino early adolescents: preliminary findings. J Human Sci Ext. 2019;7(3):68-91.

Appendix 1: Measures to examine Latino fathers' parenting practices related to adolescents' EBRBs (father-reported)

	Questions	Coded response options for each question
Paternal expectations/limits	1. *How many times in a day do you want your child to eat [**fruits, vegetables**]?*	0 times or I don't know= **(0),** 1 time= **(1),** 2 times= **(2),** 3 times or more= **(3)**
	1. *How often do you allow your child to drink/eat [**sugary drinks, sweets/salty snacks**]?*	Not allowed= **(0),** Less than 1 time in a week= **(1),** 1-3 times in a week= **(2),** 4-6 times in a week= **(3),** 1 or more times in a day, as often as I want, or I don't know = **(4)**
	1. *How often do you allow your child to eat **fast food**?*	Not allowed= **(0),** Less than 1 time in a week= **(1),** 1-3 times in a week= **(2),** 4-6 times in a week= **(3),** 1 or more times in a day, as often as I want, or I don't know = **(4)**
	1. *How many hours in a day do you want your child to be **physically active**?*	0 minutes or I don't know = **(0)**, 30 minutes or less = **(1),** 30 minutes to 1 hour = **(2),** 1 to 2 hours = **(3),** 2 hours or more = **(4)**
	1. *How much **screen time** do you allow your child to have in a day?*	Not allowed= **(0),** 30 minutes or less= **(1),** 30 minutes to 1 hour= **(2),** 1 to 2 hours= **(3),** 2 hours or more, as much as I want, or I don't know= **(4)**
Paternal behavioral modeling	1. *How many times in a week does your child see you eating/drinking **[fruit, vegetables, sugary drinks, sweets/salty snacks, fast food]**?* 2. *How many times in a week do you eat/drink **[fruit, vegetables, sugary drinks, sweets/salty snacks, fast food]** with your child?*	Almost never or never **(1),** Less than 1 time in a week **(2),** 1-3 times in a week **(3),** 4-6 times in a week **(4),** Once a day or more **(5)** **Coded responses to the two questions were summed and averaged.**
	1. *How **active** are you?* 2. *How many times in a week are you **physically active** with your children?*	Not active at all **(1),** Not very active **(2),** Neither **(3),** Active **(4),** Very active **(5)** Almost never or never **(1)** Once a day or more **(5)** Almost never or never **(1)**, not often **(2)**, sometimes **(3)**, often **(4)**, almost always or always **(5)** **Coded responses to the two questions were summed and averaged.**
	1. *How many times in a week does your child see you having **screen time**?* 2. *How many times in a week do you have **screen time together with your child**?*	Almost never or never **(1)**, less than 1 time in a week **(2)**, 1-3 times in a week **(3)**, 4-6 times in a week **(4)**, once a day or more **(5)** Almost never or never **(1),** not often **(2)**, sometimes **(3)**, often **(4)**, to once a day or more **(5)** **Coded responses to the two questions were summed and averaged.**

Availability/ accessibility	1. How often do you *buy* ***[fruits, vegetables, sugary drinks, sweets / salty snacks, fast food]*** *for your child to eat/(drink?* 2. How often do you *prepare* ***[fruits, vegetables, sugary drinks, sweets / salty snacks, fast food]*** *for your child to eat/drink?* 3. How often do you *make sure you have different kinds of* ***[fruits, vegetables]*** *for your child to choose from?*	Almost never or never **(1),** Not often **(2),** Sometimes **(3)** Often **(4),** Almost always or always **(5)** **Coded responses to the three questions were summed and averaged.**
	1. *How often do you take your child to a place where he/she can be* ***physically active****?* 2. *How often do you send your child outside to be* ***physically active*** *when the weather is nice?* 3. *How often do you make opportunities available for your child to be* ***physically active****?*	Almost never or never **(1),** not often **(2),** sometimes **(3),** often **(4),** almost always or always **(5)** **Coded responses to the three questions were summed and averaged.**
	1. *How often do you give* ***screen time*** *opportunities to your child?*	Almost never or never **(1),** not often **(2),** sometimes **(3),** often **(4),** almost always or always **(5)**

Appendix 2. Measurement of paternal self-efficacy regarding youth energy balance-related behaviors

Section 10. Confidence

We want to know how sure you are that you can get your child to eat healthy foods and drink healthy drinks, and be physically active. Think about the child participating in this program while answering the following questions. On a scale of 1 to 5 that ranges from "not sure at all" to "completely sure", please circle the number that best represents how sure you are.

How sure are you that you can…	**Not sure at all**		**Moderately sure**		**Completely sure**
1. **buy healthy foods and beverages instead of junk food and sugary drinks?**	1	2	3	4	5
2. **find healthy foods and beverages when these products are not immediately available?**	1	2	3	4	5
3. **prepare and serve healthy foods and beverages that your child likes?**	1	2	3	4	5
4. **create a positive atmosphere when having meals with healthy choices?**	1	2	3	4	5
5. **be a role model for your child about healthy eating and drinking?**	1	2	3	4	5
How sure are you that you can get your child to eat healthy foods and drink healthy beverages…	**Not sure at all**		**Moderately sure**		**Completely sure**
6. **when your child wants to consume foods and beverages that are not healthy?**	1	2	3	4	5
7. **when you are tired, stressed, emotionally upset, or affected by daily hassles?**	1	2	3	4	5
8. **when your child is acting defiant?**	1	2	3	4	5
9. **when your child is having a friend over?**	1	2	3	4	5

How sure are you that you can…	**Not sure at all**		**Moderately sure**		**Completely sure**
1. **buy equipment for physical activity, like a football or skates?**	1	2	3	4	5
2. **pay for sports training or a recreation center membership?**	1	2	3	4	5
3. **take your child outdoors for physical activity, like to a playground or for cycling?**	1	2	3	4	5
4. **arrange opportunities for your child to engage in different kinds of**	1	2	3	4	5

physical play or activities that he or she likes?					
5. **create a positive atmosphere when being physically active with your child?**	1	2	3	4	5
6. **be a role model for your child to have an active lifestyle, by playing, taking walks, or doing sports?**	1	2	3	4	5
How sure are you that you can get your child to be physically active…	**Not sure at all**		**Moderately sure**		**Completely sure**
7. **when you don't want to be active?**	1	2	3	4	5
8. **when your child doesn't want to be active? For example, when playing computer games or watch TV?**	1	2	3	4	5
9. **when you are tired, stressed, emotionally upset, or affected by daily hassles?**	1	2	3	4	5
10. **when your child is acting defiant?**	1	2	3	4	5
11. **outdoors, when the weather is bad, like when it is rainy or cold?**	1	2	3	4	5
12. **when your child is having a friend over?**	1	2	3	4	5
13. **during holidays, on vacation, or in similar situations?**	1	2	3	4	5

Appendix 3: Nutrition Data System for Research (NDSR) food groups and their components

Food groups	**Food categories**
Fruit intake	Citrus juice Fruit juice excluding citrus juice Citrus fruit Fruit excluding citrus fruit Avocado and similar fruit Fruit-based savory snacks
Vegetable intake	Dark-green vegetables Deep yellow vegetables Tomato White potatoes Other starchy vegetables Legumes (cooked dry beans) Other vegetables Vegetable juice
Sugary drink intake	Sweetened soft drinks Sweetened fruit drinks Sweetened tea Sweetened coffee Sweetened coffee substitute Sweetened water
Sweets/salty snacks	Meat-based savory snack Frozen dairy desert Frozen non-dairy desert Pudding and other dairy desserts Sugar Syrup, honey, jam, jelly, preserves Sauces, sweet-regular Sauces sweet-reduced fat/reduced calorie/fat-free Chocolate candy Non-chocolate candy Frosting or glaze Vegetable-based savory snack Crackers- whole grain Crackers- some whole grain Crackers- refine grains Ready-to-eat cereal (presweetened)- whole grain Ready-to-eat cereal (presweetened)- some whole grain Ready-to-eat cereal (presweetened)- refined grain Cakes, cookies, pies, pastries, Danish, doughnuts, cobblers – whole grain Cakes, cookies, pies, pastries, Danish, doughnuts, cobblers – some whole grain Cakes, cookies, pies, pastries, Danish, doughnuts, cobblers – refined grain Snack bars- whole grain Snack bars- some whole grain Snack bars- refined grain Snack chips- whole grain

	Snack chips- some whole grain Snack chips- refined grain Popcorn Flavored popcorn
Fast food	Fried vegetables Fried potatoes Fried chicken – commercial entrée and fast food Fried fish - commercial entrée and fast food Fried shellfish- commercial entrée and fast food

Appendix 4: Measurement of adolescent physical activity

In a usual week, how many hours do you spend doing the following activities?

1. Vigorous exercise (heart beats rapidly) each week	
O None O Less than 30 minutes O 30 minutes-2 hours O 2 1/2-4 hours O 4 1/2-6 hours O 6+ hours	Examples: soccer, aerobic dancing, running, swimming laps, basketball, biking fast, tennis, skating, cross-country skiing
2. Moderate exercise (not difficult) each week	
O None O Less than 30 minutes O 30 minutes-2 hours O 2 1/2-4 hours O 4 1/2-6 hours O 6+ hours	Examples: walking quickly, baseball, gymnastics, easy bicycling, volleyball, skiing, snowboarding…
3. Mild exercise (little effort) each week	
O None O Less than 30 minutes O 30 minutes-2 hours O 2 1/2-4 hours O 4 1/2-6 hours O 6+ hours	Examples: walking slowly (to school, to friend's house, etc.), light house chores

Appendix 5: Measurement of adolescent screen time

In your free time <u>on an average WEEKDAY</u> (ONE day from Monday to Friday),

how many hours do you spend doing the following activities?	**0 hr**	**0.5 hr**	**1 hr**	**2 hr**	**3hr**	**4 hr**	**5+ hr**
1. Watching TV/DVDs/Videos							
2. Using a computer (not for homework)							
3. Playing electronic games while sitting							
4. Using smartphones or tablets							

In your free time <u>on an average WEEKEND day</u> (Saturday or Sunday),

how many hours do you spend doing the following activities?	**0 hr**	**0.5 hr**	**1 hr**	**2 hr**	**3 hr**	**4 hr**	**5+ hr**
1. Watching TV/DVDs/Videos							
2. Using a computer (not for homework)							
3. Playing electronic games while sitting							
4. Using smartphones or tablets							