Healthy Lifestyle Intervention: Application of Parenting Styles and Practices Among Latino Fathers and Early Adolescents

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Abstract

**Background:** The high prevalence of pediatric obesity is a public health crisis. Poor dietary intake, physical inactivity and excessive screen time are obesogenic energy balance-related behaviors (EBRBs). The obesity rate is disproportionately high among Latino adolescents who face unhealthy acculturation challenges. Therefore, prioritizing intervention efforts to provide effective and culturally appropriate strategies is necessary. Enhancing parental involvement in behavioral-based interventions may result in greater effectiveness for improving EBRBs and preventing pediatric obesity. Two promising strategies include addressing the overarching influence of parenting styles and practices on adolescents’ EBRBs and the underrepresentation of fathers.

**Overall Objective:** To provide theoretical support and empirical evidence for incorporating parenting skills education regarding parenting styles and practices in healthy lifestyle intervention programs to prevent unhealthy weight gain among Latino early adolescents (age 10-14).

**Methods:** The methods included secondary data analyses using population-level survey data, focus group interviews based on the grounded theory approach, psychometric testing of criterion validity for measures to evaluate program effectiveness, and a quasi-experimental design using pre- and post-intervention comparisons to determine program feasibility based on acceptability and preliminary effectiveness.

**Results:** Analysis of the population-level survey data showed that parenting styles moderated the associations of parenting practices with adolescents’ junk food/sugary drink intake and physical activity. Parenting styles were also associated with adolescents’ dietary intake and screen time after adjusting for the mediating effects of parenting practices. Focus group interviews generated themes related to Latino fathers’ beliefs and concerns about their early adolescents’ EBRBs, their food and activity parenting practices, and factors that may influence their involvement in promoting healthy EBRBs. Psychometric testing of evaluation measures showed good criterion validity for adolescent-reported parenting practices and poor validity for father-reported parenting practices around adolescents’ EBRBs. The pilot study of the Padres Preparados, Jóvenes Saludables program demonstrated feasibility based on acceptability and preliminary effectiveness regarding behavioral outcomes.
Conclusions: The influence of parenting styles on adolescents’ EBRBs and parenting practices needs to be further addressed in pediatric obesity prevention. Latino father involvement in the Padres Preparados, Jóvenes Saludables program may be effective in promoting healthy EBRBs and preventing unhealthy weight gain among early adolescents.
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List of Abbreviations

BMI: Body Mass Index
CDC: Centers for Disease Control and Prevention
CFQ: Child Feeding Questionnaire
CI: Confidence Interval
DGA: Dietary Guidelines for Americans
FV: Fruit and Vegetables
JF/SD: Junk Food and Sugary Drinks
kcal: kilocalorie(s)
MVPA: Moderate to Vigorous Physical Activity
NCI: National Cancer Institute
NHANES: National Health And Nutrition Examination Survey
PA: Physical Activity
RCTs: Randomized Controlled Trials
SSBs: Sugar Sweetened Beverages
ST: Screen Time
USDA: United States Department of Agriculture
U.S. DHHS: U.S. Department of Health and Human Services
YRBSS: Youth Risk Behavior Surveillance Survey
Introduction

Latino refers to individuals of Mexican, Puerto Rican, Cuban, and Central or South American origin or descent regardless of race (Raffaelli, Carlo, Carranza, & Gonzalez-Kruger, 2005). Latinos play an integral role in the economy, culture, and identity of the United States (U.S. House of Representatives, 2018). Latino children and adolescents comprise the fastest growing share of the U.S. pediatric population (Murphey, Guzman, & Torres, 2014). In 2016, 25% of U.S. children and adolescents were of Latino origin and this proportion is projected to increase to 32% by 2050 (U.S. Census Bureau, 2017). Latino children and adolescents may experience socioeconomic disadvantages which increases risk of obesity and related health issues (Murphey et al., 2014). Public health efforts need to prioritize childhood obesity prevention among this important and vulnerable population.

The overall goal of this dissertation is to effectively involve parents in promoting healthy energy balance-related behaviors (EBRBs) for obesity prevention among Latino early adolescents. It contains a literature review (Chapter 1), four manuscripts presenting results of research studies (Chapter 2, 3, 4, and 5), an overall discussion regarding current and future studies (Chapter 6), a complete bibliography and appendices with supporting materials. An overview of Chapters 1 - 6 is presented below. A diagram at the end of this section describes the overall layout and connections between the major components of this dissertation research.

Chapter 1 presents an up-to-date review of the prevalence, trends and disparities regarding pediatric obesity, the obesogenic status of EBRBs, lessons learned from behavior-based pediatric obesity intervention programs, and parental influence on behavioral risk factors for pediatric obesity. This review focuses on Latino adolescents from low socioeconomic immigrant families who are susceptible to unhealthy weight gain and obesogenic EBRBs. This chapter concludes with research objectives and hypotheses to address research gaps in the theoretical and empirical evidence for enhancing pediatric intervention programs with parental involvement.

Chapter 2 presents results from secondary data analysis using a population-based online survey of adolescents and their parents to examine the influence of parenting styles and practices in the context of adolescents’ EBRBs. This study generated
theoretical support for incorporating parenting styles and EBRB-related parenting practices in behavioral-based interventions for parents to promote healthy lifestyles among adolescents. This manuscript will be submitted to the Appetite Journal for publication.

Chapters 3, 4 and 5 present results from three studies related to the development and evaluation of Padres Preparados, Jóvenes Saludables, a community-based family-focused, pediatric obesity prevention program for Latino fathers to promote healthy eating and activity among adolescents aged 10 to 14 in the Minneapolis/St. Paul metropolitan area. Chapter 3 presents a focus group study that explored Latino fathers' perceptions and experiences regarding their early adolescents' dietary intake, physical activity and screen time. A community-based participatory research approach was used to inform the development of the Padres Preparados, Jóvenes Saludables program. A manuscript based on preliminary focus group interviews was published in the Journal of the Academy of Nutrition and Dietetics. Chapter 4 presents results based on the development and psychometric testing of survey measures regarding Latino fathers’ parenting practices related to their early adolescents’ EBRBs. These measures are being applied in the outcome evaluation of the Padres Preparados, Jóvenes Saludables program. A manuscript based on this study was submitted to the Health Education and Behavior Journal. Chapter 5 presents results for the development and pilot testing of the Padres Preparados, Jóvenes Saludables program. Pilot testing demonstrated program feasibility based on participants’ acceptability and preliminary program effectiveness for improving key behavior outcomes. This manuscript was submitted to the Journal of Human Sciences and Extension.

At the end of this dissertation, Chapter 6 provides an overall discussion related to major findings and implications of the dissertation studies as well as future research directions to effectively involve Latino fathers in promoting healthy EBRBs for obesity prevention among adolescents.
**Literature review (Chapter 1)**
- Summarized existing research
  - obesity disparity
  - energy balance-related behaviors
  - pediatric obesity prevention
  - parental influence of parenting style and practices
  - Latino father involvement
- Identified research gaps
  - effective intervention strategies
  - theoretical support for parenting styles and practices
  - empirical application of parenting styles and practices
  - paternal involvement
  - valid outcome assessment measures
- Defined research questions and hypotheses

**Focus group study (Chapter 3)**
- identified Latino fathers’ beliefs and concerns and parenting practices around adolescents’ energy balance-related behaviors, and relevant facilitators and barriers
- informed the design of the Padres Preparados, Jóvenes Saludables program

**Psychometric testing study (Chapter 4)**
- developed and assessed criterion validity of the measures of Latino fathers’ food- and activity-related parenting practices
- provided a valid tool for evaluating the Padres Preparados, Jóvenes Saludables program

**Program pilot testing (Chapter 5)**
- implemented the Padres Preparados, Jóvenes Saludables program
- demonstrated program feasibility
- demonstrated program potential effectiveness

**FLASHE data analyses (Chapter 2)**
- constructed a theoretical model
- examined the model with population-based data
- supported parenting skill education in the Padres Preparados, Jóvenes Saludables program

**Overall discussion (Chapter 6)**
- Summarized major research findings
- identified major strengths and limitations
- discussed future research directions
Chapter 1. Review of Literature

1. Childhood Obesity Prevalence, Trends and Disparities

Overweight and obesity are defined as excessive accumulation of fat that poses risks to health. For children and adolescents, body mass index (BMI) age- and sex-specific percentiles ≥ 85th and < 95th or ≥ 95th percentiles are considered overweight or obese categories, respectively (Krebs et al., 2007). Pediatric studies have shown that high BMI was associated with child body fat and cardiometabolic risk factors (Reilly, Kelly, & Wilson, 2010). Childhood obesity has been shown to significantly increase risk of premature mortality, cardiometabolic morbidity, disability, asthma, polycystic ovary syndrome symptoms, and potential cancer morbidity in adulthood (Reilly & Kelly, 2011). In addition, childhood obesity has been associated with adverse psychological, social and behavioral consequences such as depression, low self-esteem, and emotional distress from teasing and bullying (Pulgarón, 2013; Rankin et al., 2016).

The high prevalence of childhood obesity is a public health crisis in the United States. According to National Health and Nutrition Examination Surveys (NHANES), the first notable increase in the prevalence of childhood obesity was from about 6% to 11% between the survey cycles of 1976-1980 and 1988-1991 (Troiano, 1995). Since then, the positive linear trend in the prevalence of childhood obesity has continued to an alarming rate of nearly 19% in 2015-2016 (Skinner, Ravanbakht, Skelton, Perrin, & Armstrong, 2018).

Disparities in the prevalence of childhood obesity have been observed by race/ethnicity and age with Non-Hispanic Black and Hispanic youth consistently having significantly higher obesity rates than other race/ethnic groups (Ogden et al., 2016). The most recent NHANES 2015-2016 data showed that childhood (2 – 19 years) obesity rates were highest among Hispanic children (26%) followed by non-Hispanic African American (22%), non-Hispanic white (14%) and Asian children (11%) (Skinner et al., 2018). In addition, the increasing trend in childhood overweight and obesity between 1996 and 2016 was most prominent among adolescents ages 12 and above (Skinner et al., 2018). Adverse consequences and the disproportionately high and non-leveling
prevalence of pediatric obesity show heightened urgency in public health efforts to prevent unhealthy weight gain among Latino adolescents.

2. Energy Balance Related Behaviors

Weight gain results from long-term positive energy balance from excessive energy intake and/or inadequate energy expenditure. Energy intake comes from consumption of food and beverages. Energy expenditure consists of the basal metabolic rate which is the energy to sustain basic body functions and growth; the thermic effect of foods which is the energy involved in digesting, absorbing and metabolizing foods; and activity thermogenesis, which is the energy released for physical activity (Hill, Wyatt, & Peters, 2012). The net difference between energy intake and expenditure determines weight maintenance and change. Excluding some rare cases related to genetic and physiological alterations, poor dietary intake, inadequate physical activity and sedentary lifestyle lead to positive energy balance, which is a behavioral risk factor that primarily accounts for the epidemic of childhood obesity (Han, Lawlor, & Kimm, 2010).

2.1 Dietary Intake

Strong evidence from cross-sectional, longitudinal and randomized controlled trials supported the positive association between excessive dietary energy density and increased adiposity among children and adolescents (Pérez-Escamilla et al., 2012; Rouhani, Haghighatdoost, Surkan, & Azadbakht, 2016). In addition, observational studies showed that western dietary patterns high in energy and fat and low in fiber were positively associated with BMI and cardiometabolic risk factors including blood lipid profile, blood glucose and blood pressure among children and adolescents (Ambrosini, 2014; Cunha et al., 2018). The Dietary Guidelines for Americans (DGAs) 2015-2020 recommended healthy eating patterns with adequate intakes of fruit and vegetables, whole grains, primarily lean protein foods from a variety of sources and limited intakes of saturated fats, trans fats, added sugars and sodium (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015). However, an examination of dietary recall information from NHANES 2005-2010 showed that 2- to 18-year-old children had poor adherence to the DGAs, especially among older children, with an average dietary pattern including inadequate intakes of fruit, vegetables and whole grains and excessive intake of refined grains, fat and empty calories (Banfield, Liu, Davis,
Chang, & Frazier-Wood, 2016). These findings suggested that certain food groups are of special interest in improving children’s and adolescents’ dietary quality to prevent unhealthy weight gain and associated adverse health outcomes.

2.1.1 Intake of Fruit and Vegetables (FV)

Most fruits and vegetables (FV) are naturally low in fat and calories, and rich in dietary fiber, vitamins, minerals, and phytochemicals. Epidemiological and laboratory research has shown health benefits from FV for the prevention and/or management of cardiovascular disease, type 2 diabetes and certain types of cancer (Bechthold et al., 2017; Boeing et al., 2012; Schwingshackl et al., 2017). In addition, FV may potentially displace energy-dense foods and contribute to reducing dietary energy intake.

Schwingshackl and colleagues (2015) conducted a meta-analysis of 17 prospective observational studies with measurements of FV intake and anthropometric characteristics in adult populations. FV intake was associated with 9-17% reduced risk of adiposity. Mytton and colleagues (2014) examined the effect of an increased FV intake on body weight based on the collective findings from eight randomized controlled trials (RCTs) that exclusively focused on increasing FV intake in both child and adult participants. They found a mean difference of 133 grams higher FV intake and 0.68 kg less body weight change between intervention and control groups. Based on the healthy dietary patterns recommended by the DGAs, children and adolescents would meet their nutrient needs without exceeding dietary energy intake by consuming 1-2.5 cups of fruits and 1-3 cups of vegetables daily depending on their age, sex, and activity levels (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015).

2.1.2 Intake of Sugar Sweetened Beverages (SSBs)

Sugar sweetened beverages (SSBs) refer to drinks with added sugar or other caloric sweeteners, and include non-diet sodas, fruit-flavored drinks, sport and energy drinks, sweetened tea and coffee drinks, and powdered or reconstituted drinks. SSBs have high sugar content and poor satiating effects that contribute to excessive energy intake and adiposity risk. A meta-analysis of five prospective cohort studies found that children who drank one or more servings of SSBs per day were 50% more likely to be overweight than children who drank little or no SSBs (Te Morenga, Mallard, & Mann, 2013). Another meta-analysis of seven cohort studies of children and adolescents showed a 0.06
(95% CI 0.02, 0.10) unit increase of BMI over a year period for each additional daily consumption of 12-oz of SSBs (Malik, Pan, Willett, & Hu, 2013). Two RCTs reported that children and adolescents from intervention groups who exclusively reduced SSB consumption had a significantly lower increase in BMI and weight than those from control groups (De Ruyter, Olthof, Seidell, & Katan, 2014; Ebbeling et al., 2014). In addition to the adverse effect on adiposity, consumption of SSBs has been found to have adverse impacts related to cardiovascular disease, type 2 diabetes and dental caries (Bleich & Vercammen, 2018; Imamura et al., 2015; Vos et al., 2017).

### 2.1.3 Intake of Sweets and Salty Snacks

Sweets refer to foods that are high in added sugars and low in other nutrients. Common sweets include candies, chocolate confections, dairy desserts, and grain-based desserts. Salty snacks are mostly grain- or starchy vegetable-based foods seasoned with salt and/or spices. Salty snacks are often high in energy density and low in other nutrients. Sweets and salty snacks constitute major sources of added sugars and solid fats in children’s and adolescents’ diets (Reedy & Krebs-Smith, 2010; Slining & Popkin, 2013). Results from a cross-sectional study of 400 overweight or obese adolescents aged 11-13 showed that those having more than 15% of total daily energy intake from energy-dense snacks had greater body weight (Bo et al., 2014). A similar association between high energy-dense snack consumption and increased BMI was found in a 2.5-year follow-up among a cohort of 5- to 12-year-olds (Shroff et al., 2013).

### 2.1.4 Intake of Fast Food

Fast food refers to foods purchased from self-service or carry-out eating places (Jaworowska, Blackham, Davies, & Stevenson, 2013; Pereira et al., 2005). Fast food is characterized by high energy density, excessive amounts of calories, sodium, solid fats and added sugars (Harris, Schwartz, Gross, Munsell, & Tsutsumi-Acuna, 2013) and poor nutritional value (Kirkpatrick et al., 2013). An analysis of children’s menus from fast food restaurants in 2010 found that less than 1% of meal combinations met the nutrition standards set for preschoolers and school-age children and only 17% of regular menu items qualified as healthy choices for adolescents (Harris et al., 2013). Another menu evaluation of 16 top fast food chain restaurants found no significant change in nutrient content of children’s menus between 2010 and 2014 with the majority of main dishes
exceeding the recommended amount of calories from solid fat and sodium (Deierlein, Peat, & Claudio, 2015). Fast food contributes to excessive dietary energy intake. Children and adolescents who consumed fast food had significantly higher total energy intake than those who did not consume fast food (Powell & Nguyen, 2013). A number of studies have found significant positive associations between the consumption of fast food and increased intakes of calories, total fats and saturated fats, and higher adiposity (Bezerra, Curioni, & Sichieri, 2012; Jaworowska et al., 2013; Nago, Lachat, Dossa, & Kolsteren, 2014). Therefore, frequent consumption of fast food challenges the ability to achieve a healthy dietary pattern and may ultimately increase the risk of excessive adiposity.

2.2 Physical Activity

Adequate physical activity has many health benefits for children and adolescents, including improved cardiorespiratory and muscular fitness, bone density, cardiometabolic biomarkers, body composition and reduced symptoms of depression (U.S. DHHS, 2008). Physical activity contributes to considerable variation in energy expenditure depending on duration, frequency and intensity (van Baak, 1999). Several longitudinal cohort studies reported inverse associations between physical activity and excessive adiposity among the pediatric population (Pate et al., 2013; Ramires, Dumith, & Gonçalves, 2015). This association has been shown to be independent of dietary quality and sedentary behaviors based on a 2-year follow up with a cohort of fifth graders from diverse racial/ethnic backgrounds (Dowda, Taverno Ross, McIver, Dishman, & Pate, 2016). In addition, interventions with structured physical activity components have been reported to improve weight status, body composition and cardiometabolic biomarkers among overweight or obese adolescents (Stoner et al., 2016).

2.3 Sedentary behaviors

Sedentary behaviors are commonly referred to as any waking behaviors in a sitting or reclining posture at rest (Sedentary Behaviour Research Network, 2012). The causal association between sedentary behaviors and pediatric adiposity has not been well-established (Biddle, García Bengoechea, & Wiesner, 2017), however sedentary behaviors require low energy expenditure and compete for time spent on physical activities. In addition, some sedentary behaviors such as watching TV, video or movies can co-occur with intakes of energy dense foods (Larson, Miller, Watts, Story, & Neumark-Sztainer,
The synergistic effect of excessive screen time, inadequate physical activity, and excessive dietary energy intake are likely to cause unhealthy weight gain.

In summary, dietary intake of fruit and vegetables, SSBs, sweets and salty snacks, and fast foods; and physical activity and screen time are behavioral risk factors that contribute to energy balance and subsequently weight maintenance and change. Therefore, these EBRBs are of high priority in behavioral interventions to prevent unhealthy weight gain among the pediatric population.

3. Energy Balance Related Behaviors Among Latino Children and Adolescents in the United States

Data from NHANES 2007-2010 showed that 82% of Mexican American children aged 4-13 did not meet the recommended intake of 2 servings of total fruit per day which was higher than the proportion of non-Hispanic white children who met the recommendation (Drewnowski & Rehm, 2015). Hispanic children also had higher fruit juice intake than non-Hispanic white children (Drewnowski & Rehm, 2015; Herrick, Rossen, Nielsen, Branum, & Ogden, 2015). On average, Mexican American children aged 2-18 consumed 0.72 cup equivalents of fruit per 1000 calories during the 2009-2010 NHANES cycle, which was lower than the Healthy People 2020 target of 0.9 cup equivalents of fruit per 1000 calories (Kim, Moore, Galuska, Wright, & Harris, 2014). A more recent estimation based on 2013 YRBSS data showed that Hispanic adolescents aged 14-18 only had 0.7 cup equivalents of total fruit intake per day, which was less than half of the recommended cup equivalents of daily fruit intake (Moore, Thompson, & Demissie, 2017).

Mexican American children aged 2-18 decreased their daily cup equivalents of vegetables per 1000 calories from 0.61 to 0.51 with an annual change of -0.008 (p = 0.04) between NHANES 2003-2004 and 2009-2010 cycles (Kim et al., 2014). The decrease was mainly from dark green, orange and red vegetables and legumes. A recent estimate based on the 2013 YRBSS indicated that Hispanic children aged 14-18 consumed 0.8 cup equivalents of vegetables per day which only accounted for less than one third of the recommended vegetable intake (Moore et al., 2017).
The proportion of children and adolescents consuming SSBs on a given day declined significantly between NHANES 2003-2004 and 2013-2014 from 80% to 61% across all age groups and racial and ethnic groups (Bleich, Vercammen, Koma, & Li, 2018). However, the proportion of SSB consumers remained significantly higher among Mexican American children than the overall pediatric population (Bleich et al., 2018). Hispanic children aged 6-19 consumed about 7% of their daily total calories from SSBs in 2011-2014 (Rosiner, Herrick, Gahche, & Park, 2017).

Snacking has become a significant component of children’s diets (Dunford & Popkin, 2018). According to NHANES 2011-2014, Mexican American children aged 2-18 had an average of 2.4 snacks daily which contributed to a mean 453 calories per capita (Dunford & Popkin, 2018). Mexican American children are likely to choose energy-dense and nutrient poor foods similar to the top snack choices identified among Mexican children, including salty snacks, candy, sweetened breads, and cookies (Taillie, Afeiche, Eldridge, & Popkin, 2015). According to the NHANES 2013-2014, 41% of Hispanic children aged 2-19 consumed fast food on a given day. These children and adolescents consumed an average of 703 kcal from fast food and 208 more total daily calories compared to those who did not consume fast food (USDA, 2016).

According to the NHANES 2011-2012, 38% of Hispanic adolescents aged 12-19 reported meeting the physical activity guidelines (Haughton, Wang, & Lemon, 2015). In comparison, the 2017 YBRSS showed that only 26% of high school students of Hispanic ethnicity reported being physically active for at least 60 minutes daily during the 7-day period before taking the survey (Kann et al., 2018). Hispanic adolescents were less likely to meet physical activity recommendations than non-Hispanic white adolescents (OR 0.67, 95% CI 0.43-0.96) (Haughton et al., 2015). According to the 2017 YBRSS, 45% of high school students of Hispanic ethnicity reported playing video or computer games or using a computer not for school work for 3 or more hours on an average school day and 21% reported watching TV 3 or more hours per day on an average school day (Kann et al., 2018). An analysis of NHANES 2011-2012 data indicated that only 23% of Hispanic adolescents aged 12-19 met the screen-time recommendation of 2 hours or less per day (Haughton et al., 2015).
In addition, acculturation has been associated with multiple obesogenic behavioral outcomes among Latino immigrants. Acculturation as indicated by country of birth, self-identified U.S. culture orientation and speaking English, was associated with a greater percentage of energy consumed from sodas, desserts and salty snacks, pizza and French fries; lower fiber intake, less attention to eating healthy foods, and lower behavioral control for eating unhealthy foods among Latino adults and young people in the U.S. (Batis, Hernandez-Barrera, Barquera, Rivera, & Popkin, 2011; Diaz, Marshak, Montgomery, Rea, & Backman, 2009; Fred Wen et al., 2016). In addition, similarities of diets to those consumed by U.S.-born Americans also predicted poorer dietary quality among Hispanics as indicated by the Healthy Eating Index-2010, especially among those foreign-born Hispanic children and adults who lived in the U.S. ≥ 5 years (Diaz et al., 2009; Van Hook, Quiros, & Frisco, 2015).

Acculturation also showed adverse influences on PA and screen time-related sedentary behaviors among Latinos in the U.S. Acculturation, indicated by language spoken, length of stay or immigrant generation, was associated with decreased transportation and occupational physical activity among Latino adult immigrants and young people (Arredondo et al., 2016; Echeverría, Ohri-Vachaspati, & Yedidia, 2015; Marquez & McAuley, 2006).

In terms of leisure-time PA and sports participation, foreign-born Latino youth or offspring of first-generation Latino immigrants were especially lacking compared to those of later-generation immigrants (Gordon-Larsen, Harris, Ward, & Popkin, 2003; Liu, Probst, Harun, Bennett, & Torres, 2009; Singh, Yu, Siahpush, & Kogan, 2008). Irrespective of immigrant generation, Hispanic children in general were less likely to meet the physical activity recommendations than non-Hispanic White children (Haughton et al., 2015). In addition, multiple acculturation indicators, such as being born outside of the U.S., language spoken, length of stay, and immigrant generation, have been associated with increased recreational media use among Latino children and adolescents (Gordon-Larsen et al., 2003; Shi, Van Meijgaard, & Simon, 2012).

In summary, Latino young people generally have inadequate fruit and vegetable intake and excessive intake of SSBs, sweets and salty snacks, and fast food as well as inadequate physical activity and excessive screen time based on recommendations. Gaps
between actual intake and activity and recommendations were greater among Latino older children and adolescents. In addition, Latino children face acculturation challenges of adverse dietary changes, inadequate physical activity and increased screen time. Any of these behavioral outcomes may contribute to the obesity disparity among Latino children compared to other race/ethnic groups. Effective interventions on these modifiable behavioral risk factors are needed to address the high prevalence of obesity among Latino children.

4. Parental Involvement in Pediatric Obesity Preventions

Existing behavior-based pediatric obesity intervention programs generally showed promising but small effects on weight-related outcomes among children and adolescents (Biddle, Petrolini, & Pearson, 2014; Brown et al., 2014; Diep, Chen, Davies, Baranowski, & Baranowski, 2014; Hung et al., 2015; Metcalf, Henley, & Wilkin, 2012; Owen, Curry, Kerner, Newson, & Fairclough, 2017; Wang et al., 2015). Hung and colleagues (2015) conducted a meta-analysis of 54 effect sizes from 26,114 children aged 6-18 participating in controlled trials of school-based obesity prevention. They found that only RCTs showed a significant but small effect size (d = 0.050, P < .001) for weight-related outcomes, while the overall intervention studies had a small and non-significant overall effect size (d = 0.039, P = .145). A more recent quantitative synthesis of meta-analyses of intervention effects on preventing and reducing overweight/obesity among children and adolescents also showed that overall, pediatric obesity intervention programs had statistically significant effects with relatively little clinical relevance (standard mean difference: -0.08, 95% CI: -0.11, -0.06) (Kobes, Kretschmer, Timmerman, & Schreuder, 2018). This study further identified that high parental involvement resulted in greater program effectiveness (standard mean difference: -0.21) for weight-related outcomes among children and adolescents than no or low parental involvement (standard mean difference ranged from -0.13 to -0.08). Therefore, parental involvement can be an important element to enhance the effectiveness of pediatric obesity prevention programs.

Existing lifestyle interventions also showed modest effects on improving dietary intake, physical activity and sedentary behaviors among children and adolescents. Diep and colleagues (2014) conducted meta-analyses of intervention effects on fruit and vegetable intake of 2-18-year-old children and found overall small effects on fruit intake
(k = 13, Hedges’ g = 0.32, 95% CI: 0.19, 0.46) and moderate effects on vegetable intake (k = 14, Hedges’ g = 0.17, 95% CI: 0.07, 0.28). Several meta-analyses of physical activity interventions also showed small effects (effect sizes ranged from 0.07 to 0.29) on children’s and adolescents’ physical activity levels (Brown et al., 2014; Metcalf et al., 2012; Owen et al., 2017). Similarly, meta-analyses of sedentary behavior interventions generally showed small effect sizes (−0.29; 95% CI: -0.35, -0.22) in favor of sedentary behavior reduction for the intervention groups (Biddle et al., 2014).

Parental involvement may result in better program effects on children’s and adolescents’ EBRBs. For example, qualitative content analysis of multiple systematic reviews indicated that nutrition education programs with active parental involvement were more likely to have favorable outcomes than those without or with passive and/or limited parental involvement (Golley, Hendrie, Slater, & Corsini, 2011; Kader, Sundblom, & Elinder, 2015; Meiklejohn, Ryan, & Palermo, 2016; Murimi et al., 2018; Schlechter, Rosenkranz, Guagliano, & Dzewaltowski, 2016). Physical activity interventions have usually been conducted in institutional settings such as school and recreation centers. Researchers believed that parents play an important role in not only supporting program participation but also sustaining positive effects outside a program (Gråstén, 2017). In addition, other researchers suggested that active participation of parents with their children may lead to more acceptable strategies and achievable goals and thereby more effective interventions (Altenburg, Kist-van Holthe, & Chinapaw, 2016).

Various strategies have been applied to involve parents in pediatric obesity interventions. Parent involvement can include individual face-to-face or telephone counseling, group education or training, sent-home information (e.g. homework, newsletter, text message), and online virtual training (Kader et al., 2015). A series of behavioral change techniques have also been applied to parents’ participation, which include providing knowledge and information, awareness raising, identification of motivations and barriers, goal-setting, and parenting skills and/or practices such as encouragement, role modeling, monitoring, and management of the home food and activity environment (Altenburg et al., 2016; Brown et al., 2014; Kader et al., 2015). A repeated theme from the literature is that the greater level of parental involvement with
active parent participation (multiple individual sessions or group sessions vs. newsletters or one-time event) is more likely to produce significant and/or greater program outcomes (Altenburg et al., 2016; Dudley, Cotton, & Peralta, 2015; Marsh, Foley, Wilks, & Maddison, 2014; Meiklejohn et al., 2016; Murimi et al., 2018; Schlechter et al., 2016). However, the parenting skills and/or behavioral change techniques that best engage parents and optimize program effects remain unknown. Thus, further research is needed on parental involvement in pediatric obesity prevention interventions in order to augment program effect sizes for weight and behavioral outcomes.

Similarly, pediatric obesity intervention programs showed promising but limited effects among Latino children and adolescents with programs having family components more likely to be effective (Holub et al., 2013; Kiraly, Turk, Kalarchian, & Shaffer, 2017; Mena, Gorman, Dickin, Greene, & Tovar, 2015). However, programs that included parenting training on healthy lifestyle knowledge and parenting skills were designed for either young children or exclusively overweight/obese Latino youth (Barkin, Gesell, Po’e, Escarfuller, & Tempesti, 2012; Beck, Fernandez, Rojina, & Cabana, 2017; Crespo et al., 2012; Falbe, Cadiz, Tantoco, Thompson, & Madsen, 2015; Fitzgibbon et al., 2006; Hull et al., 2016; Mendoza et al., 2016; Slusser et al., 2012). School-based programs for upper elementary school-aged children and children at early adolescent ages generally had weak parental involvement or did not specify whether parents were involved (Arauz Boudreau, Kurowski, Gonzalez, Dimond, & Oreskovic, 2013; Elder et al., 2014; Safdie et al., 2013). This may lead to lack of program strength to prevent pediatric obesity among Latino adolescents. Future studies need to focus on providing effective intervention strategies related to parental involvement for Latino adolescents who face high risk of overweight/obesity and may have adverse changes in EBRBs as they grow older.

5. Parental Influence on Behavioral Risk Factors for Pediatric Obesity

Parents (broadly defined as primary caregivers in the household where a child resides) are responsible for the physical and psychosocial environment for the socialization of young people. In terms of EBRBs, parents provide food and activities at home and outside the home, make family rules or policies, role model behaviors and teach skills. Twin and adoptive studies supported the unique role of environmental influences on adiposity in addition to genetic predispositions (Silventoinen, Rokholm,
According to the socio-ecological model, environmental influences are determined by factors from intrapersonal, interpersonal, institutional, community, and policy levels (McLeroy, Bibeau, Steckler, & Glanz, 1988). Parents are identified as influential interpersonal determinants of children’s EBRBs (Faith et al., 2012; Gruber & Haldeman, 2009). The role of parents in determining children’s EBRBs is indicated by significant and consistent associations observed between parents’ and children’s dietary intakes (e.g., intakes of total energy, fat, FV, and SSBs, and overall dietary quality), time in MVPA and sedentary behaviors as well as media use (Fuemmeler, Anderson, & Mâsse, 2011; Jago, Sebire, et al., 2013; Robinson, Rollo, Watson, Burrows, & Collins, 2014; Wang, Beydoun, Li, Liu, & Moreno, 2011).

Darling and Sternberg’s (1993) conceptual model of parenting styles provides a theoretical framework to understand the potential causal mechanisms of parental influence on children’s and adolescents’ weight status and EBRBs (Figure 1). In the context of pediatric overweight and obesity, children’s specific EBRBs are behavioral risk factors for excessive weight gain (pathway d), which are under the influence of general parenting (pathway c) and parenting practices around these specific EBRBs (pathway b). This contextual model also emphasizes relationships between general parenting and EBRB-specific parenting practices (pathway a) as well as the moderating effects of parenting styles on the relationships between parenting practices and child behavioral outcomes related to EBRBs (pathway m). Existing studies showed broad interests in investigating parental influences on children’s EBRBs based on this conceptual framework. Gicevic and colleagues (2016) identified 667 non-experimental studies published between 2009 and 2015 focused on parenting behaviors, styles and practices and their relationship to pediatric obesity-related behaviors and outcomes. Findings from these and more recent studies could inform the development of effective strategies to promote positive parental influence through public health interventions to address the epidemic of pediatric obesity.
5.1 Parenting Practices and Dietary Intake among Children and Adolescents

The identification of food parenting practices that have shown either positive or negative effects on child dietary behaviors is essential for evidence-based pediatric obesity intervention programs. Collective findings have been summarized and discussed in several recent reviews (Blaine, Kachurak, Davison, Klabunde, & Fisher, 2017; Larsen et al., 2015; Loth, 2016; Yee, Lwin, & Ho, 2017). These reviews showed that restriction, pressure-to-eat, monitoring, instrumental/emotional feeding, modeling, and availability were the most frequently investigated food parenting practices. Summaries of current perceptions regarding these six types of food parenting practices are provided in the following sections. Other less studied food parenting practices are combined with the six commonly-studied food parenting practices based on relevancy. Study findings pertaining to general populations of young people are included, with attention to potential correlates of parenting practices such as child’s age, parents’ SES, race and ethnicity and study country.

5.1.1 Food Restriction, Overt Control and Limit

Both food restriction and limits aim to reduce child consumption of undesirable foods, however they belong to different food parenting dimensions (Vaughn et al., 2016). Food restriction is commonly characterized as excessive and coercive control, while food limits are often defined as providing neutral, structural guidance (Vaughn et al., 2016).
Variations in the definition and operationalization of these two restrictive food parenting practices presented challenges to synthesizing collective findings of food restriction and limit. For example, Yee and colleagues (2017) defined restrictive guidance as “the frequency with which parents set limits, rules, or restrictions regarding food consumption”. Their meta-analysis of findings from 15 studies showed that higher parental restrictive guidance was correlated with less unhealthy food intake among children and adolescents ($r = -0.11, p < 0.01$). In contrast, the systematic review conducted by Blaine and colleagues (2017) found that more studies showed undesirable positive associations than negative associations between parental restriction and snack intake among children and adolescents (13 vs. 4 out of 23). This finding indicated that parental restriction was likely associated with higher snack intake among children and adolescents, which contradicted the results of the meta-analysis by Yee et al. (2017). A detailed look at the current body of studies on parental food restriction and limit helps clarify mixed findings.

Several researchers have investigated the potential mechanism responsible for how restriction would enhance children’s desire and intake of palatable foods (Larsen et al., 2015; Loth, 2016). Findings from experimental studies conducted in laboratory settings showed that restricting desired food from young children resulted in undesirable outcomes (Farrow, Haycraft, & Blissett, 2015; Fisher & Birch, 1999; Jansen, Mulkens, & Jansen, 2007; Jansen, Mulkens, Emond, & Jansen, 2008; Rollins, Loken, Savage, & Birch, 2014). However, these food restriction studies only showed a temporary effect on child responses in experimental settings. Fisher and colleagues (1999) reported that the restriction effect on increasing intake became insignificant three weeks after the experimental trial where children had delayed access to a palatable snack. The effect of food restriction in laboratory settings may be different from parental restriction in day-to-day situations as well. Several studies found no significant associations between parent-reported food restriction at home and children’s snack intake in laboratory-based eating tests (Farrow et al., 2015; Jansen et al., 2007; Moens & Braet, 2007; Rollins et al., 2014; Sud, Tamayo, Faith, & Keller, 2010). Three experimental studies with children aged 1-7 also showed that parent-reported food restriction resulted in lower intake of unhealthy foods (Farrow et al., 2015; Ogden, Cordey, Cutler, & Thomas, 2013; Sud et al., 2010).
One experimental study found that food restriction did not increase snack intake among older children aged 7 to 13 (Moens & Braet, 2007). Therefore, findings from food restriction experiments are inconsistent and cannot be generalized to an overall effect of parental food restriction on long-term dietary intake among children and adolescents.

Observational studies most commonly applied the Child Feeding Questionnaire (CFQ) to assess parental food restriction. However, the eight items in the CFQ food restriction scale belong to four different food parenting concepts. They are restricting intake (3 items; “I have to be sure that my child does not eat too many sweets”, “I have to be sure that my child does not eat too many high-fat foods” and “I have to be sure that my child does not eat too much of her favorite foods”), restricting access (1 item; “I intentionally keep some foods out of my child’s reach”), using food as rewards (2 items; “I offer sweets to my child as a reward for good behavior” and “I offer my child her favorite foods in exchange for good behavior”), and preventing excessive consumption of unhealthy food (2 items; “If I did not guide or regulate my child’s eating, she would eat too many junk foods” and “If I did not guide or regulate my child’s eating, she would eat too much of her favorite foods”).

Food restriction measured using the CFQ showed inconsistent relationships with children’s and adolescents’ dietary intake in observational studies. For example, when food restriction was assessed using the full CFQ restriction scale, it was positively associated with unhealthy dietary intake among children and adolescents (Boots, Tiggemann, & Corsini, 2018; Boots, Tiggemann, Corsini, & Mattiske, 2015; Burrows et al., 2012; Entin, Kaufman-Shriqui, Naggan, Vard, & Shahar, 2014; Kiefner-Burmeister, Hoffmann, Meers, Koball, & Mushet-Eizenman, 2014; Lee, Mitchell, Smiciklas-Wright, & Birch, 2001; Loth, MacLehose, Larson, Berge, & Neumark-Sztainer, 2016; Park, Li, & Birch, 2015; Rhee et al., 2015). In contrast, when food restriction was assessed using the first three items of restricting intake, it was negatively associated with unhealthy dietary intake (Park et al., 2015; Sleddens et al., 2014). On the other hand, food restriction measured using the CFQ showed positive association with greater healthy intake in two longitudinal studies of young children (McPhie et al., 2012; Ystrom, Barker, & Vollrath, 2012), but similar positive associations were not significant in other longitudinal studies.
of children and adolescents from wider age groups (Boots et al., 2018; Entin et al., 2014; Gregory, Paxton, & Brozovic, 2011; Sleddens et al., 2014).

The inconsistent findings regarding food restriction measured by the CFQ may be largely due to the problematic psychometric properties of the instrument. Anderson and colleagues (2005) conducted a confirmatory factor analysis of the CFQ based on responses from 231 low-income parents of black and Hispanic preschoolers. They found that four items related to the food parenting concept of restricting access, using food as reward and preventing excessive intake from the original scale failed to load as one factor. In addition, the 2 items of preventing excessive unhealthy food intake indicate a pre-existing condition of unhealthy dietary habits, which can cause bias in drawing causal relationships between food restriction and children’s dietary intake. Overall, findings generated from the CFQ food restriction scale did not provide useful guidance about the potential influence of parental food restriction on children’s dietary intake.

Another commonly applied measure of parental restriction is called overt control, which has been used to assess how often the parent is firm about or sets limit on what, when, where and how much the child should eat (Brown & Ogden, 2004; Ogden, Reynolds, & Smith, 2006). Longitudinal studies found that parent-reported overt control predicted lower intake of energy-dense snacks and SSBs among 9-year-olds ($\beta = -0.07$, $p< 0.05$), but not consumption of unhealthy snacks among older adolescents aged 17-18 ($\beta = -0.05$, $p = 0.5$) (Dickens & Ogden, 2014; Rodenburg, Kremers, Oenema, & Van De Mheen, 2014). Adolescents have greater autonomy over their food selection and intake than children, thus their perception of parental control or limit may be more reliable in predicting their dietary intake than parent-reported overt control. For example, one longitudinal study showed that adolescent-reported parental overt control predicted lower SSB intake ($\beta = -0.24$, $p < 0.001$) among 208 Dutch adolescents aged 12-18 (De Bruijn, Kremers, De Vries, Van Mechelen, & Brug, 2007). Several cross-sectional studies also showed negative correlations between adolescent-perceived parental control and consumption of fast food ($r = -0.3$, $P < 0.01$), snacks ($r = -0.25$, $p < 0.01$), and SSBs ($r = -0.27$, $p < 0.01$) among adolescents from different countries (Gevers, van Assema, Sleddens, de Vries, & Kremers, 2015; Melbye et al., 2016; Monge-Rojas et al., 2010). In addition, a greater degree of adolescent-reported parental limits on SSB intake a ($\leq 1$ per
day) was associated with less SSB intake (OR: 0.77, 95% CI: 0.66-0.91) than no limits (Nickelson, Roseman, & Forthofer, 2010). Parental permissiveness (e.g., “I let my child decide what he/she wants to eat.”) was associated with greater intakes of SSBs (OR: 2.84, 95% CI: 2.21 to 3.64) and sweets (OR: 1.59, 95% CI: 1.22 to 2.07) among adolescents (Vereecken, Legiest, De Bourdeaudhuij, & Maes, 2009).

Parental control and limits may not be directly associated with children’s and adolescents’ healthy food intake because cross-sectional studies have shown inconsistent relationships between parental food restriction, control or limits and healthy dietary intake among children and adolescents (Boots et al., 2015; Couch, Glanz, Zhou, Sallis, & Saelens, 2014; Durão et al., 2015; Gubbels et al., 2009; Loth et al., 2016; Melbye, Øgaard, & Øverby, 2013; Monge-Rojas et al., 2010; Papaioannou et al., 2013; Peters, Dollman, Petkov, & Parletta, 2013; Ray, Roos, et al., 2013; Van Strien, van Niekerk, & Ouwens, 2009; Liang Wang et al., 2013). These inconsistent associations may be confounded by other parenting practices concurrently applied by parents.

In summary, existing experimental studies were not able to prove the hypothesis that parental food restriction would produce counterproductive effects on limiting palatable foods. Different operationalizations of food restriction need to be considered when interpreting findings from observational studies. The psychometric properties of the CFQ food restriction scale may lead to conflicting findings between food restriction and dietary intake among children and adolescents. Observational studies on adolescent-perceived parental food control and limits provide relatively strong evidence that parental food restriction and limit may contribute to a lower intake of unhealthy foods by adolescents. The direct relationship between parental food control and limit and children’s and adolescents’ healthy food intake remains unclear. Overall, parental food restriction and limits may be effective food parenting practices to prevent excessive unhealthy food intake among adolescents.

5.1.2 Pressure-to-eat, Demand and Encouragement

Pressure-to-eat refers to parents’ demanding behaviors that children eat more than they want. Pressure-to-eat is commonly measured by parents’ agreement with statements such as “my child should always eat all of the food on her plate”, “I have to be especially careful to make sure my child eats enough”, “If my child says ‘I’m not hungry’, I try to
get her to eat anyway”, “If I did not guide or regulate my child’s eating, she would eat much less than she should” (Birch et al., 2001). Several experimental and longitudinal studies showed that pressure-to-eat negatively affected young children’s food preference and intake (Galloway, Fiorito, Francis, & Birch, 2006; Gregory et al., 2011; Ystrom et al., 2012). However, other observational studies showed conflicting associations between pressure-to-eat and healthy and/or unhealthy food intake among children across different age groups (Brown, Ogden, Vogele, & Gibson, 2008; Campbell, Crawford, & Ball, 2006; Fisher, Mitchell, Smiciklas-Wright, & Birch, 2002; Hennessy, Hughes, Goldberg, Hyatt, & Economos, 2012; Lee & Keller, 2012; Vereecken, Rovner, & Maes, 2010; Wardle, Carnell, & Cooke, 2005).

Parents are more likely to demand that children eat foods with higher nutritional value (e.g., vegetables) than palatable foods high in sugar and fat (e.g., sweets and chips). Parents of older children and adolescents may be less likely to pressure their child to “clean plates” and eat more. Therefore, the previously mentioned instruments to assess pressure-to-eat may not be appropriate measures of parental demand on children’s healthy food intake, especially among older children. This may explain null and inconsistent findings in existing studies among older children and adolescents (Campbell et al., 2007; Dickens & Ogden, 2014; Johnson, Van Jaarsveld, & Wardle, 2011; Liang et al., 2016; Moens & Braet, 2007; Rhee, Boutelle, et al., 2015; Taylor, Wilson, Slater, & Mohr, 2011; Vereecken et al., 2009).

A few studies examined parental demand and encouragement specifically on healthy food intake. For example, child-perceived parental demand for fruit and vegetable intake (“Do your parents demand that you eat fruit/vegetable every day?”) was positively correlated with intakes of fruits ($r = 0.22, p < 0.01$) and vegetables ($r = 0.15, p < 0.05$) among children aged 10-11 (De Bourdeaudhuij et al., 2005). Parent-reported encouragement for children to eat new foods, healthy foods and a variety of foods was associated with greater vegetable intake ($\beta = 0.13, p < 0.01$) among Norwegian 10-12-year-olds (Melbye & Hansen, 2015). However, another study applied a similar measure of parental encouragement of healthy eating and did not find positive associations with fruit and vegetable intake among 14 – to 18-year-old Costa Rican adolescents (Monge-Rojas et al., 2010).
In summary, the common instrument used to assess pressure-to-eat measures coercive parenting practices to push children to eat more regardless of children’s hunger, satiety or preference. This type of measure generated inconsistent findings in relation to children’s healthy/unhealthy dietary intake. In addition, this instrument may not reflect age-appropriate food parenting practices among older children and adolescents. A few studies showed promising but inconclusive effects of parental demand and encouragement on healthy food intake among older children and adolescents. Intervention studies may consider parental demand and encouragement on healthy food intake as a potential parenting strategy to improve healthy food intake among older children and adolescents.

5.1.3 Monitoring

According to the definition provided by Vaughn et al. (2016), monitoring refers to parenting practices where parents track what and how much their children eat to make sure they eat a sufficient amount of healthy foods and avoid excessive amounts of unhealthy foods. Parental monitoring practices accompany parents’ expectations and rules related to children’s dietary intake.

Observational studies showed inconsistent findings regarding the relationship between parental monitoring and dietary intake among children and adolescents. Some of these studies showed associations between parental monitoring and more healthy food intake (Arredondo et al., 2006; McGowan, Croker, Wardle, & Cooke, 2012; Melbye & Hansen, 2015) and lower intakes of unhealthy foods (Arredondo et al., 2006; McGowan et al., 2012; Melbye et al., 2016; Melbye & Hansen, 2015; Ng et al., 2014). Whereas other studies did not show significant associations between parental monitoring and either healthy or unhealthy intake among children and adolescents (Campbell et al., 2006; Harris, Mallan, Nambari, & Daniels, 2014; Kröller & Warschburger, 2009; Lee et al., 2001; Moens & Braet, 2007; Reina et al., 2013; Rhee, Boutelle, et al., 2015; Sleddens, Kremers, et al., 2014). These inconsistencies may be due to the curvilinear relationship and bi-directional influence between parental monitoring and children’s dietary intake (Gubbels et al., 2011; Mellin, Neumark-Sztainer, Story, Ireland, & Resnick, 2002). Therefore, observational studies may not be able to show potential relationships between the frequency of parental monitoring and children’s dietary quality. However,
encouraging parental monitoring with non-coercive food parenting practices may be an effective strategy to support parental expectations and limits for promoting healthy dietary intake among children and adolescents.

5.1.4 Instrumental Feeding, Praise and Emotional Feeding

Instrumental feeding includes food parenting practices based on providing/withholding non-food incentives (e.g., toys, play time) to encourage children to eat (e.g., “my child gets a reward if he/she eats fruit or vegetables”) as well as using food as a reward (e.g., “I reward my child with something to eat when she is well-behaved”) (Wardle, Sanderson, Guthrie, Rapoport, & Plomin, 2002). Experimental studies conducted among young children showed that using non-food tangible rewards (stickers or games) increased young children’s preference for and intake of new and/or less-liked vegetables (Cooke et al., 2011; Corsini, Slater, Harrison, Cooke, & Cox, 2011; Remington, Añez, Croker, Wardle, & Cooke, 2012). Experimental studies showed that using food as rewards to eat another food increased preference toward the rewarding food among children aged 7 or younger (Mikula, 1989). Parents tend to use palatable less healthy foods to reward and/or discipline the intake of less preferred fruits and vegetables. Several longitudinal studies found that parents’ frequency of using foods that children liked as a reward or as a way to discipline children for dietary or non-dietary-related behaviors predicted lower fruit intake and higher intakes of SSBs, snacks, and junk foods among children aged 10 or younger (Entin et al., 2014; Rodenburg et al., 2014).

Praise in the form of positive verbal feedback regarding children’s eating behaviors is believed to be a convenient strategy to convey social support and enhance children’s intrinsic motivation for eating (Cooke, Chambers, Añez, & Wardle, 2011; Remington et al., 2012). However, experimental studies conducted among preschoolers showed inconsistent findings (Birch, Marlin, & Rotter, 1984; Cooke et al., 2011; Remington et al., 2012). Researchers argued that verbal praise would be less likely to undermine children’s motivation and be more convenient to apply than tangible rewards (Cooke et al., 2011; Gibson et al., 2012). The frequency of parental praise and its relationship with child dietary intake has been examined in a few observational studies.
(Yee et al., 2017). Positive associations between parental verbal praise and children’s dietary intake were only found among young children.

Emotional feeding refers to parents using foods to cope with children’s emotional distress (Wardle et al., 2002). Sweet palatable foods are commonly used as short-term remedies for emotional distress. Whether emotional eating is intrinsic or learned, emotional feeding has been shown to enhance this coping response among children. Several experimental and longitudinal studies found that emotional feeding predicted emotional eating and unhealthy food intake among children aged 9 or younger (Blissett, Haycraft, & Farrow, 2010; Rodenburg et al., 2014; Sleddens et al., 2014; Steinsbekk, Barker, Llewellyn, Fildes, & Wichstrøm, 2018). Cross-sectional studies also showed that emotional feeding was associated with lower fruit and vegetable intake and higher intake of unhealthy foods including SSBs, snacks, sweets, and energy-dense foods among young children (Kiefner-Burmeister et al., 2014; Lo, Cheung, Lee, Tam, & Keung, 2015; Sleddens, Kremers, De Vries, & Thijs, 2010).

In summary, current knowledge indicated that the instrumental feeding practices such as using food as reward or to discipline, and emotional feeding had detrimental effects on child dietary intake. Researchers held positive beliefs that praise may be effective in promoting children’s intake. However, studies examining these types of food parenting practices were predominantly conducted among children younger than 10 years. Two observational studies were conducted among older children and adolescents. One showed that using food as a reward to eat was associated with excessive intakes of SSBs, sweets and savory snacks ($\beta = 0.086$) among Flemish children at age 10 but had no predictive effect when they were 13-15 years old (Vereecken, Haerens, De Bourdeaudhuij, & Maes, 2010). Another showed that parental agreement with emotional and instrumental feeding practices (e.g., “when my adolescent children are bored, I give them food” and “I reward my adolescent children with food so that they will behave properly”) was correlated with fast food intake ($r = 0.29$, $p < 0.05$) among 14-18 year-old Costa Rican adolescents (Monge-Rojas et al., 2010). The effect of praising on older children and adolescents’ dietary intake is unknown. Intervention strategies may benefit from improving parents’ food parenting skills according to their existing practices of instrumental/emotional feeding.
5.1.5 Availability and Accessibility

In the context of food parenting practices, availability is defined as “the amount and types of foods that a parent brings into the home” (Vaughn et al., 2016). Food availability in the home, to some extent, reflects parenting practices of food procurement based on the amount and type of foods that would eaten by children. The physical presence of certain food items has often been used as a proxy to assess parenting practices related to food availability. Examples of this type of measurement include simple statements about the presence of a certain type or variety of food, such as “usually there are sweet beverages available in our home” (Van Grieken, Renders, Van De Gaar, Hirasing, & Raat, 2015) or “are there usually different kinds of vegetables available in your home?” (De Bourdeaudhuij et al., 2005). In some studies, an inventory of food items of one or more food groups was used to assess food availability in the household during a certain period of time (Bryant et al., 2008; Cullen et al., 2001; Davis Hearn et al., 1998; Golan & Weizman, 1998). Parenting practices related to food availability have also been assessed from a broader behavioral perspective not confined to the physical location of home, such as “on the previous day, did you provide the child with fruits?” (Wyse, Campbell, Nathan, & Wolfenden, 2011) or “do you avoid going to cafes or restaurants with your children which sell unhealthy foods?” (Ogden et al., 2006). Similarly, parenting practices related to food accessibility have also been operationalized as the presence of accessible food in the home and parent behaviors to make food in a form and/or location that facilitates consumption (Cullen et al., 2001; Fulkerson et al., 2008; Golan & Weizman, 1998).

Regardless of how the availability parenting practice was operationalized, multiple systematic reviews including studies that assessed both home food availability and availability-related parent behaviors have found that these variables were strong and consistent correlates of fruit and vegetable intakes (Cook, O’Reilly, Derosa, Rohrbach, & Spruijt-Metz, 2014; Ong, Ullah, Magarey, Miller, & Leslie, 2016; Pearson, Biddle, & Gorely, 2009; Rasmussen et al., 2006), snack intake (Blaine et al., 2017), SSB intake (Mazarello Paes et al., 2015), and intakes of healthy and unhealthy foods (Van Der Horst, Oenema, et al., 2007; Yee et al., 2017) among children and adolescents. In comparison, food accessibility was generally less studied and was likely to be merged into one.
construct with food availability (Vaughn et al., 2016; Yee et al., 2017). Several studies have shown the unique importance of food accessibility to promote healthy food intake among children and adolescents (Bere & Klepp, 2005; Cullen et al., 2003; Gebremariam et al., 2015).

Parenting practices related to food availability and accessibility may be in the nexus of multiple food parenting practices. Ventura and Birch (2008) believed that parents likely consume the foods available in the home, which has a modeling effect on their children’s dietary intake. As a result, associations between food availability and intake were confounded by parental modeling. Similarly, parents tend to facilitate their expectations and rules for their children’s dietary intake through making certain foods available and accessible. Therefore, food availability and accessibility are central to the overall impact of food parenting. Parenting training related to managing home food availability and accessibility would be an effective strategy to improve dietary intake among children and adolescents.

5.1.6 Modeling, Reasoning and Teaching

The modeling effect on their children’s dietary behaviors result from either purposeful or unintentional parental behaviors (Vaughn et al., 2016). In terms of purposeful modeling, the Comprehensive Feeding Practice Questionnaire assesses parental agreement on modeling healthy eating with four statements of “I model healthy eating for my child by eating healthy myself”, “I try to eat healthy foods in front of my child, even if they are not my favorite”, “I try to show enthusiasm about eating healthy foods”, and “I show my child how much I enjoy eating healthy foods” (Musher-Eizenman & Holub, 2007). Several observational studies showed that this type of parental modeling of healthy eating was positively correlated with children’s and adolescents’ fruit and vegetable intake (Draxten, Fulkerson, Friend, Flattum, & Schow, 2014; Entin et al., 2014; Harris & Ramsey, 2015). In addition, a four-year longitudinal study showed that maternal modeling related to refraining from eating unhealthy food (sweets and SSBs) in the presence of the child predicted significantly higher intakes of fruit and vegetables and lower intakes of sweets and SSBs among 13- to 15-year-old adolescents (Vereecken et al., 2010). In terms of unintentional modeling, a meta-analysis of 15 studies showed significant correlations between energy (Fisher’s transformed correlation β = 0.20, 95%
CI: 0.13 to 0.28) and fat intake (β = 0.21, 0.18 to 0.24) among parent-child pairs (Wang et al., 2011). Observational studies generally supported effects of parental modeling on children’s and adolescents’ dietary intakes by either intentionally demonstrating healthy intake and refraining from unhealthy intake or unintentionally exhibiting parents’ dietary practices.

Reasoning and teaching can be viewed as two derivatives of parental modeling. Reasoning is defined as the use of logic or explanations to influence child eating behavior (Vaughn et al., 2016). Teaching refers to parents’ instruction of knowledge or skills regarding what and how children should eat. Teaching can happen during reasoning, which make these two types of food parenting practices hard to differentiate. Some researchers emphasized that teaching is beyond reasoning and involves practicing skills (Musher-Eizenman & Kiefner, 2013). Examples of the operationalization of reasoning include “you told the child that a food will make him/her healthy, smart, strong” and “you told your child that fruit juice/soft drinks are not good for him/her?” (Hendy, Williams, Camise, Eckman, & Hedemann, 2009; Lippevelde et al., 2013). Examples of the operationalization of teaching included “you discussed with your child why it’s important to eat healthy foods” and “you asked your child to help you with food preparation” (Musher-Eizenman & Holub, 2007; O’Connor et al., 2010). These statements have subtle differences. They are sometimes combined as one parenting construct (Melbye, Gaard, & Verby, 2011). Reasoning and teaching appear to be promising food parenting practices to promote healthy eating among children and adolescents. However, observational studies showed lack of evidence for consistent positive associations between parental reasoning and teaching and healthy eating among children and adolescents (Yee et al., 2017).

5.2 Parenting Practices and Physical Activity among Children and Adolescents (pathway b)

The literature regarding parental influence on physical activity among children and adolescents has primarily been focused on two major factors—the modeling effect of parents’ physical activity (PA) and the general concept of parental support. A recent meta-analysis showed that parental modeling had a modest association with child PA (effect size r = 0.16, 95% CI 0.09-0.24) only among those who were 12 years or younger, and a moderate association between parental support and child PA (r = 0.38, 96% CI
0.30-0.46) across all age groups (Yao & Rhodes, 2015). Of the 36 studies included in this meta-analysis, all but one used parent PA as a proxy for parental modeling practices, which indicated the lack of study on direct measures of parental modeling of PA. The construct of parental support referred to aggregated concepts of encouragement, praise, watching/supervising, transportation, providing PA equipment and monitoring. Separate meta-analyses showed significant random effect sizes ranging from $r = 0.16$ to $0.34$ for watching/supervising, supplying PA equipment, providing transportation, co-activity and encouragement (Yao & Rhodes, 2015). Another systematic review of the role of social support on adolescent girls’ PA reported similar but relatively smaller effect sizes ($r = 0.10$ to $0.17$) for parental encouragement, modeling and instrumental support and a non-significant effect for parental co-participation (Laird, Fawkner, Kelly, McNamee, & Niven, 2016). In this study, instrumental support referred to providing financial support, transportation and PA equipment.

A closer look at the instruments used for assessing parental support provides practical information regarding the specific description of supportive physical activity parenting practices. The PA parenting practices of watching/supervision was described as “watch child participate in PA or sports” and “watch child closely and give child feedback on what he/she is doing” (Anderson & Coleman, 2008; Davison, Li, Baskin, Cox, & Affuso, 2011; Taylor et al., 2002). Examples of financial and equipment support included “parents buy sports clothing/equipment” and “paying for swimming or to attend football club” (Cleland et al., 2011; Jago, Fox, Page, Brockman, & Thompson, 2009). Co-participation was assessed by whether parents engage in a list of physical activities with their children together (Cleland et al., 2011). A number of variants of parental encouragement included parents reminding or verbally requesting, using their own behavior or setting an example, telling children to use neighborhood resources and playgrounds, or providing rewards to encourage children to be physically active or play sports (Anderson & Coleman, 2008; Davison et al., 2011; Gattshall, Shoup, Marshall, Crane, & Estabrooks, 2008; Jago et al., 2009; Kahan, 2005; King et al., 2011). These physical activity parenting practices may be effective strategies to promote in family-based pediatric obesity interventions.
5.3 Parenting Practices and Screen Time among Children and Adolescents (pathway b)

Parenting practices related to children’s and adolescents’ screen time generally fall into six categories: rules and limits, supervision/monitoring, co-viewing, modeling, instruction, and availability and accessibility (O’Connor, Hingle, et al., 2013). These screen time-related parenting practices apply to three domains (content, context and amount) of media use (O’Connor, Hingle, et al., 2013). Existing measures of screen time rules and limits focused on limits regarding total screen time, time of day, content restriction, and watching TV while eating (Jago, Edwards, Urbanski, & Sebire, 2013).

Findings from existing studies showed significant influences of parental rules and limits, role modeling and the availability and accessibility of electronic devices on children’s and adolescents’ screen time. Family rules regarding how much time they could spend watching TV/using computer/playing video games predicted significantly less time spent on these activities than those without respective rules among different samples of children and adolescents (Gingold, Simon, & Schoendorf, 2014; Lederer, King, Sovinski, & Kim, 2015; Ramirez et al., 2011). An early longitudinal study showed that parents’ TV viewing when daughters were 9 years significantly predicted daughters’ TV viewing at age 11 (Davison, Francis, & Birch, 2005). Another one-year longitudinal study with British 5th graders showed similar findings with both maternal and paternal weekend TV viewing time predicting a greater increase in children’s sedentary time (Atkin et al., 2013). Another study found that when parents reported greater frequency of their children seeing them use media devices, children had longer screen time (r = 0.37, p < 0.05) (Pinard et al., 2014). These findings suggested a parental modeling effect on children’s screen time. The availability and accessibility of electronic devices also influence child screen time. The presence of a TV in a child’s bedroom was consistently associated with greater screen time among children aged 5-17 (Feng, Reed, Esperat, & Uchida, 2011; Gingold et al., 2014; Ramirez et al., 2011). A similar effect was found related to the availability of gaming devices (Ramirez et al., 2011). However, a one-year longitudinal study of British 5th graders unexpectedly found that children with more electronic media in their bedroom and gaming consoles at baseline exhibited smaller increases in sedentary time. This contradictory finding may be the result of greater
sedentary hours at baseline leaving less room for children with more electronic devices to increase sedentary time.

5.4 Parenting styles in the context of pediatric obesity prevention

Parenting style refers to the emotional climate created by parents’ attitudes communicated to their children (Darling & Steinberg, 1993). As reviewed by Vollmer and Mobely (2013), the most widely applied typology of parenting styles in childhood obesity research was first proposed by Baumrind and later elaborated on by Maccoby and Martin (Macoby & Martin, 1983). This typology divides parenting styles into four quadrants by the two dimensions of demandingness/control/strictness and responsiveness/warmth/acceptance. The four parenting styles are authoritative (high control, high warmth), authoritarian (high control, low warmth), permissive/indulgent (low control, high warmth), and uninvolved/neglectful (low control, low warmth).

According to four previously conducted literature reviews, existing evidence predominantly supported the protective nature of the authoritative parenting style against pediatric overweight and obesity versus authoritarian, indulgent and uninvolved parenting styles (Shloim, Edelson, Martin, & Hetherington, 2015; Sleddens, Gerards, Thijs, de Vries, & Kremers, 2011; Sokol, Qin, & Poti, 2017; Vollmer & Mobley, 2013).

5.4.1 Parenting Style and EBRBs (pathway c)

Three longitudinal studies showed that the authoritative parenting style predicted greater fruit and vegetable intake, lower SSB intake, or general healthy eating among children and adolescents (Alsharairi & Somerset, 2015; Lohaus, Vierhaus, & Ball, 2009; Loveman et al., 2015; Schwartz et al., 2015). Similarly, three cross-sectional studies that applied similar measures of parenting styles found that children of authoritative parents consumed greater amounts of fruit and/or vegetables and fewer snacks; whereas children of uninvolved (neglectful) parents consumed the least amount of fruits and/or vegetables and more snacks among three samples of adolescents from the United Kingdom, Netherlands and Portugal (Franchini, Poínhos, Klepp, & de Almeida, 2011; Kremers, Brug, De Vries, & Engels, 2003; Neuhouser, Lilley, Lund, & Johnson, 2009). Additional cross-sectional studies with different measures of parenting styles also found that an authoritative parenting style was positively related to child FV intake (Lytte et al., 2003; Peters et al., 2013; Young, Fors, & Hayes, 2004) and negatively related to adolescents’
junk food intake (Zahra, Ford, & Jodrell, 2014). However, an uninvolved parenting style was positively correlated with unhealthy food intake (junk food and snacks) among children and adolescents (Lu Wang et al., 2017; Zahra et al., 2014). Several studies also found undesirable relationships between authoritarian and indulgent parenting styles and children’s and adolescents’ dietary intake (Alsharairi & Somerset, 2015; Campbell et al., 2007; Kremers et al., 2003; Lohaus et al., 2009; Park & Walton-Moss, 2012; Lu Wang et al., 2017; Zahra et al., 2014). However, some findings regarding the relationships between parenting styles and child dietary intake are inconsistent. For example, some studies showed that significant associations between authoritative parenting and preschoolers’ and adolescents’ FV intakes disappeared after adjusting for parents’ nutrition knowledge or self-efficacy in food parenting (Peters et al., 2013; Young et al., 2004) or were only significant among certain child or parent genders (Alsharairi & Somerset, 2015; Campbell et al., 2007). Some studies did not find any associations between parenting styles and child dietary intake (Berge, Wall, Loth, & Neumark-Sztainer, 2010; De Bourdeaudhuij et al., 2009; Vereecken et al., 2010).

Similar to dietary behaviors, observational studies generally showed that authoritative parenting styles were positively associated with physical activity and negatively associated with screen time-related behaviors (Berge, Wall, Loth, et al., 2010; Langer et al., 2014; Schmitz et al., 2002; Van der Geest et al., 2017); whereas authoritarian, indulgent and uninvolved parenting styles were positively associated with screen time-related behaviors among children and adolescents (Jago et al., 2011; Langer et al., 2014; Schmitz et al., 2002; Van der Geest et al., 2017). However, significant relationships were not always found across studies, disappeared after adjusting for mothers’ educational levels or existed only among certain child and parent genders (Berge, Wall, Loth, et al., 2010; Langer et al., 2014; Schmitz et al., 2002; Van der Geest et al., 2017).

5.4.2. Parenting Style and Parenting Practices (pathway a)

Several observational studies demonstrated associations between parenting style and food parenting practices. Among multiple samples of parents of children and adolescents, an authoritative parenting style was positively correlated with parental encouragement, modeling, and monitoring of FV intake as well as home FV availability.
(De Bourdeaudhuij et al., 2009; H Patrick, Nicklas, Hughes, & Morales, 2005; Van Der Horst & Sleddens, 2017; Young et al., 2004). In comparison, non-authoritative parenting style was associated with low home FV availability, high frequency of emotional feeding and using food as rewards (De Bourdeaudhuij et al., 2009; Patrick & Nicklas, 2005; Van Der Horst & Sleddens, 2017).

A few studies also demonstrated that the associations between general parenting dimensions and child EBRBs were mediated by EBRB-related parenting practices (Boots et al., 2015; Sebire et al., 2016). For example, a cross-sectional study with Australian mothers of children aged 2-7 showed that negative associations between the parenting dimensions of responsiveness and demandingness and child unhealthy snack intake were mediated by the parenting practice of food restriction (Boots et al., 2015). Another study with UK parents of preschoolers showed that a positive association between the parenting dimension of nurturance and child MVPA was mediated by parental role modeling (Sebire et al., 2016).

5.4.3 General Parenting, EBRB-related Parenting Practices and Child EBRBs (pathway m)

Several observational studies showed that general parenting constructs had moderating effects on associations between parenting practices and child EBRBs. Three studies showed that parental food restriction and control were associated with less unhealthy food intake (SSBs and snacks) among children and adolescents only if their parents were at moderate levels of demandingness or high levels of responsiveness (Langer, Seburg, JaKa, Sherwood, & Levy, 2017; Rodenburg et al., 2014; Van Der Horst, Kremers, et al., 2007). A 2-year longitudinal study of Dutch children showed that pressure-to-eat predicted higher SSB intake at age 8 among those parents at intermediate or high levels of demandingness (Sleddens et al., 2014). This cohort of Dutch children also showed that emotional feeding and instrumental feeding predicted lower fruit intake and/or higher snack and SSB intake among those parents who had high psychological and behavioral control, and covert control of healthy food availability predicted lower snack intake only if parents had low psychological control (Rodenburg et al., 2014; Sleddens et al., 2014). Interestingly, a cross-sectional study with U.S. parents and children (mean age 7) showed that parental support (social and logistic combined) was positively associated
with MVPA only if parents had high levels of permissiveness (+1 SD) in terms of general parenting (Langer et al., 2014).

5.5 EBRB-related Parenting Practices and General Parenting Among Latinos Parents

Cross-sectional studies compared Latino parents’ food-related parenting practices by acculturation levels and with parents from other racial/ethnic groups. Notable differences were found in the uses of coercive food parenting practices. Studies have shown that Latino parents of preschoolers who were Spanish-speaking, had shorter U.S. residency, or were first generation immigrants were more likely to use food to calm their children, use food as rewards, and push children to eat more than those who were English-speaking, had longer U.S. residency, or were later-generation immigrants (Alexandra Evans et al., 2011; Kaiser, Melgar-Quiñonez, Lamp, Johns, & Harwood, 2001; Power, O’Connor, Fisher, & Hughes, 2015; Seth et al., 2007). Compared to African American parents, Latino parents engaged more in coercive food parenting practices with their preschoolers such as spoon-feeding, physically struggling, and begging their child to eat (Hughes et al., 2006). Among this sample of Latino parents of preschoolers, about 38% were identified as primarily using coercive feeding practices (“parent-centered”) while another 39% were identified as primarily using feeding strategies including reasoning, encouraging, and praising (“child-centered”) (Hughes, Power, Orlet Fisher, Mueller, & Nicklas, 2005). A later study showed that immigrant Latino mothers were more likely to use “parent-centered” feeding practices while U.S. born Latino mothers were more likely to use “child-centered” feeding practices (Power et al., 2015). For older children, the Project F-EAT study showed that more Latino parents of adolescents agreed that they used pressure-to-eat compared to non-Hispanic white parents (Loth, MacLehose, Fulkerson, Crow, & Neumark-Sztainer, 2013). Findings from these studies indicated that parents of Latino origin tended to use “parent-centered” coercive food parenting practices to influence their children’s dietary intake.

Common themes identified from qualitative studies conducted among Latino parents include permissiveness about children’s food preferences and reluctance to restrict foods (Evans et al., 2011; Pesch, Harrell, Kaciroti, Rosenblum, & Lumeng, 2011; Turner, Navuluri, Winkler, Vale, & Finley, 2014). Semi-structured interviews with 32
Latino mothers of preschoolers showed that Latino mothers were conflicted about limiting what their children eat (Pesch et al., 2011). Focus groups with 33 pairs of Latino mothers and fathers of school-aged children (aged 8 ± 4 years) found that these parents commonly made permissive comments about their children’s food choices (e.g., “My child has the habit of eating [fast food] or we are allowing that habit.”). Other qualitative studies reported that Latino parents believed in “balanced meals” as “a little bit of everything” and agreed that children could eat junk food in moderation (Evans et al., 2011; Gallagher, 2010; Rosal, Goins, Carbone, & Cortes, 2004; Tiedje et al., 2014). To some extent, this phenomenon was supported by the low proportion (18%) of Latino parents who agreed that they intentionally keep some foods out of their adolescents’ reach (Loth et al., 2013).

Qualitative studies showed that Latino parents were aware of parental influences on their children’s weight and weight-related behaviors. Parents from different focus group studies acknowledged the importance of setting a healthy example for their children (Flores, Maldonado, & Durán, 2012; Martínez, Rhee, Blanco, & Boutelle, 2015; Turner et al., 2014). They also recognized multiple strategies to control the home food environment, such as not bringing unhealthy food home and making FV readily accessible in the refrigerator (Evans et al., 2011; Flores et al., 2012; Martínez et al., 2015). In addition, parents mentioned food parenting practices such as setting rules, monitoring, portion control, teaching, and motivating to encourage their children to eat healthy (Evans et al., 2011; Flores et al., 2012; Martínez et al., 2015).

A few studies examined the relationship between food parenting practices and dietary intake among Latino children and adolescents (Arredondo et al., 2006; Matheson, Robinson, Varady, & Killen, 2006; Soto, Arredondo, Horton, & Ayala, 2016). Among 812 Latino parents of children in kindergarten through 2nd grade, children’s healthy eating was positively correlated with parental monitoring (β = 0.45, P < 0.001) and praising (β = 0.32, P < 0.001), and children’s unhealthy eating was positively associated with parental control, such as using food as reward and pressure-to-eat (β = 0.17, P < 0.01, girls only) (Arredondo et al., 2006). Children’s healthy eating was also inversely associated with limit setting (β = -0.15, P < 0.01, boys only) (Arredondo et al., 2006). A similar positive effect of parental monitoring was found among 361 Latino children aged
7 to 13 (Soto et al., 2016). Parental monitoring was positively correlated with vegetable intake ($r = .17, p < .05$) and negatively correlated with fast food intake ($r = -.15, p < .05$) (Soto et al., 2016). This study also found that parental reinforcement (teaching and encouraging) was positively correlated with children’s daily FV intake ($r = 0.23, p<0.01$). Another cross-sectional survey with 108 Mexican American mothers and their fifth graders showed that mothers’ attitudes about making healthy food available was positively correlated with children’s fruit consumption ($r = 0.39, p <0.001$) and negatively correlated with children’s percent energy from fat intake ($r = -0.30, p < 0.05$, food-secure household only) and children’s energy intake ($r = -0.34, p < 0.05$, food-insecure household only) (Matheson et al., 2006). In addition, mothers’ attitudes about modeling healthy eating were inversely associated with children’s consumption of energy-dense foods ($r = -0.31, r < 0.05$, food-secure household only) (Matheson et al., 2006). These three observational studies identified several parenting practices that may either promote (e.g. limit setting, monitoring, modeling, encouraging, and making unhealthy food available) or impede (use food as rewards, pressure-to-eat) healthy eating among Latino children and adolescents.

Several parenting practices may either support or hinder physical activity among Latino children and adolescents (Lindsay, Wasserman, Muñoz, Wallington, & Greaney, 2018). A focus group discussion with 12 Latino children aged 10-12 showed that having parental involvement, encouragement and transportation support were important for being physically active (Snethen, Hewitt, & Petering, 2007). Children wanted to have their parents watch their sports games and compliment them when they performed well. Some also liked the idea of having parents play with them and to learn skills from their parents. They also noted their reliance on their parents’ transportation support which parents were often too busy to provide. Similarly, Latino parents of preschoolers ($n = 74$) rated parenting practices, such as “take them to the park”, “participating in the children’s activities” and “teaching them to dance and sing” as very important for their children to be physically active based on the nominal group technique (O’Connor, Cerin, et al., 2013). Parents also agreed that they role modeled activity to encourage children to be physically active (e.g., “let them see you be active.”) and that allowing too much
screen time and being emotionally and physically harsh would discourage their children from being physically active.

Findings from observational studies indicated a potential influence of parental modeling, encouragement and restriction on their children’s PA. In terms of parental role modeling, several studies demonstrated significant associations between physical activity levels of Latino parents and their children (Berg et al., 2013; Myers & Vargas, 2000; Ruiz, Gesell, Buchowski, Lambert, & Barkin, 2011; Sallis, Patterson, Buono, Atkins, & Nader, 1988). In addition, parents’ physical activity levels perceived by Mexican children aged 9-18 were positively associated with their own physical activity levels (β = 0.09-0.15, p < 0.001) (Siegel, Malina, Peña Reyes, Cárdenas Barahona, & Cumming, 2011). Two cross-sectional studies showed that parental prompting, praise or encouragement were positively correlated with physical activity levels (e.g. percent time spent in MVPA) among Latino young children (Arredondo et al., 2006; McKenzie et al., 2008). Another study showed that restrictive rules for indoor play (e.g., "no balls in the house") and outdoor play ("staying close to the house") were inversely associated with Mexican American adolescents’ physical activity levels (Sallis et al., 1993).

Few studies have examined screen time-related parenting practices among Latino parents. Some Latino parents believed that watching TV contributed to their preschoolers’ intellectual development and English language attainment (Gallagher, 2010). Taveras and colleagues (2009a) reported survey results with 200 multi-racial/ethnic parents of children aged 2-13 showing a high rate of TVs present in bedrooms of Latino children (74%) compared with non-Hispanic white children (22%). Some Latino parents recognized that screen time would impede their child’s physical activity (O’Connor, Cerin, et al., 2013). Overall, the manner in which Latino parents manage their children’s screen time and parental influences on screen time remains largely unknown.

Studies showed various characterizations of Latino parents’ general parenting styles. A multiethnic parenting study of 594 low-income mothers recruited from urban prenatal clinics found that Latino mothers were more authoritarian than non-Hispanic White mothers by showing inappropriate developmental expectations, lack of empathic awareness of children’s needs and holding strong beliefs about the use of corporal
punishment (Acevedo, 2000). A study with a small sample of 69 low-income Mexican American mothers (92% Spanish-speaking) of children aged 4-8 showed that these mothers more commonly had uninvolved (37%) and indulgent (28%) parenting styles than authoritative (19%) and authoritarian (16%) styles (Olvera & Power, 2010). This study also found that children of indulgent mothers were more likely to become overweight 3 years later than children of authoritative or authoritarian mothers (F (3, 59)=3.58, P<.05). Another study with a sample of 98 first generation Latino parents (83% with an annual income < $35,000) of children aged 4-9 showed that a majority of Latino parents had a protective parenting style which was characterized by both high levels of control and warmth but low levels of autonomy granting (e.g., asking child’s opinion) (Rodríguez, Donovick, & Crowley, 2009). General parenting and style may be subject to the special context of Latino culture. A focus group study with 19 Mexican American high school students found that they commonly considered parental control to be a form of caring (Crockett, Brown, Russell, & Shen, 2007). They still considered a less warm or open parenting style as satisfactory as long as parents fulfilled their responsibility to support the family or provide instrumental support (e.g. forbid the child from going out to play because of safety concerns) (Crockett et al., 2007). In this case, the interplay between general parenting and food- and activity-related parenting practices and the influence on children’s and adolescents’ EBRBs may differ between Hispanic and non-Hispanic families. Further studies need to investigate the influence of general parenting and EBRB-specific parenting practices on Latino children’s and adolescent’s EBRBs in order to provide empirical support to enhance intervention effectiveness for improving EBRBs.

5.6 Consideration of EBRB-related Parenting Practices and General Parenting in Pediatric Obesity Prevention

Existing parenting studies in the field of pediatric obesity prevention provided important theoretical and empirical support to enhance components of parental involvement related to general parenting and EBRB-specific parenting practices in pediatric obesity prevention programs. First, EBRB-specific parenting practices that have been shown to promote or impede healthy EBRBs need to be adequately addressed. EBRB-related parenting practices that should be promoted include setting expectations...
(demand or encourage) on FV intake; setting limit on intakes of SSBs, sweets and salty snacks and fast foods, and screen time; monitoring; managing healthy food and activity environment (availability and accessibility of healthy and unhealthy foods and electronic devices); providing social, instrumental and/or logistic support for healthy EBRBs (FV and PA); and role modeling (demonstrating healthy EBRBs and avoiding unhealthy EBRBs). EBRB-related parenting practices that should be limited include pressure-to-eat, instrumental feeding (especially using food as reward), emotional feeding, and modeling of unhealthy EBRBs. Second, general parenting styles not only directly influence weight-and EBRB-related behaviors among children and adolescents but also interact with EBRB-related parenting practices. Existing studies have shown that the authoritative parenting style is protective in terms of children’s and adolescents’ weight and EBRBs versus other parenting styles. Addressing general parenting styles is equally as important as addressing EBRB-related parenting practices. Therefore, intervention programs need to incorporate both general parenting and EBRB-related parenting practices to enhance program effectiveness.

Latino parents commonly opt for coercive parenting practices (pressure-to-eat, using food as reward and emotional feeding) and tend to be permissive regarding offering foods based on children’s preferences. Several qualitative studies indicated Latino parents’ awareness of parental influence on their children’s EBRBs and recognition of EBRB-related parenting practices such as modeling and managing availability and accessibility. However, the high prevalence of pediatric obesity among the Latino youth population emphasizes the importance of improving Latino parenting practices related to weight-related behaviors. Even though the influence of certain parenting styles may vary considering the specific cultural context, the interplay between general parenting and EBRB-related parenting practices can influence Latino children and adolescents’ behavioral outcomes. Pediatric obesity prevention programs need to include parenting training for both EBRB-specific parenting practices and general parenting skills for Latino parents. In addition, more studies are needed to clarify the mechanism for how general parenting influences Latino children’s EBRBs.
6. Involving Latino Fathers in Pediatric Obesity Prevention

Fathers are important stakeholders in pediatric obesity prevention but are underrepresented in associated research studies. A series of literature reviews showed that only around 1% of studies exclusively examined the fathers’ role in child and adolescent psychopathology over the past three decades (Parent, Forehand, Pomerantz, Peisch, & Seehuus, 2017; Phares & Compas, 1992; Phares, Fields, Kamboukos, & Lopez, 2005). A recent systematic review also showed that only 1% of studies exclusively examined the fathers’ role in pediatric obesity (Davison et al., 2018). In addition, only 16% of studies examined the fathers’ role separately when both parents were included (Davison et al., 2016). The inclusion gap between mothers and fathers may result from the notion that mothers take the primary responsibility in caregiving as well as the reality that fathers are harder to recruit (Davison et al., 2016; Parent et al., 2017).

Fathers can have significant influence on children’s weight status, dietary intake and physical activity. A number of studies have reported significant associations between fathers’ and children’s weight status (Freeman et al., 2012; Fuemmeler et al., 2011; Lloyd, Lubans, Plotnikoff, & Morgan, 2014). A nationally representative sample of 8 to 9-year-old Australian children showed that compared to children with normal weight parents, children with overweight or obese fathers and normal weight mothers were 4 or 15 times more likely to be obese, but those with normal weight fathers and overweight or obese mothers did not have significantly increased obesity risk (Freeman et al., 2012). Fathers’ food and physical activity-related attitudes and practices have also been shown to have significant influence on children’s weight status. Adolescent girls who reported that their fathers cared about healthy eating and exercising had lower BMIs than those who reported that their fathers did not care about healthy eating and exercising (BMI: 22.7 vs. 21.6 kg/m², p = 0.043) (Berge, Wall, Bauer, & Neumark-Sztainer, 2010). A number of studies also found significant associations between fathers’ and children’s and adolescents’ consumption of fruits (Hall et al., 2011), vegetables (Harris & Ramsey, 2015), SSBs (Guerrero, Chu, Franke, & Kuo, 2016; Harris & Ramsey, 2015), salty snacks and sweets (Hall et al., 2011), and fast food (Guerrero et al., 2016; McIntosh et al., 2011) as well as physical activity and sedentary behaviors (Guerrero et al., 2016; Hall et al., 2011; McIntosh et al., 2011; Vollmer, Adamsons, Foster, & Mobley, 2015).
The involvement of fathers in child care has been increasing (Hofferth & Lee, 2015; Yogman & Garfield, 2016). Data from the American Time Use Survey showed that fathers’ time spent in child care had almost tripled from 2.5 hours per week in 1965 to 7 hours per week in 2011 (Parker & Wang, 2013). Substantial proportions of fathers reported involvement in child care and perceived responsibilities in food-related parenting (Guerrero et al., 2016; Khandpur, Charles, & Davison, 2016; Krall, Wamboldt, & Lohse, 2014; Mallan et al., 2014). For example, a semi-structured interview with 37 fathers of children aged 2-10 showed that the majority of fathers (62%) reported sharing food parenting responsibilities with mothers, such as planning, procuring and preparing foods (Khandpur et al., 2016). A nationally representative sample of fathers with 2 to 4-year-old preschoolers showed that 43% of fathers reported having a great deal of influence on their children’s nutrition and about 50% of fathers reported preparing food and assisting their child with eating at least once a day (Guerrero et al., 2016).

Significant associations between fathers’ and children’s weight status and EBRBs as well as fathers’ significant involvement in EBRB-related childcare suggest that fathers play an important role in pediatric obesity. Research studies and intervention programs need to include fathers as an important stakeholder in pediatric obesity prevention. This may be especially crucial for Latino families. National data showed that the majority (71%) of U.S. youth of Hispanic origin have fathers present in their household (Federal Interagency Forum on Child and Family Statistics, 2017). The Latino culture highly values “familism” and “respeto” and the gender roles of “machismo” and “marianismo” (O’Connor, Perez, Garcia, & Gallagher, 2018; Saracho & Spodek, 2008). Even though mothers are typically the primary caregivers in the Latino family, fathers are influential household figures in charge of major decisions which include what the family eats and does. In terms of food parenting practices, qualitative studies indicated that Latino fathers are less engaged in food parenting practices than mothers, and they tend to be more permissive about what their children eat (Davis, Cole, Blake, McKenney-Shubert, & Peterson, 2016; Evans et al., 2011; Lora, Cheney, & Branscum, 2016; Mena, Gorman, Dickin, Greene, & Tovar, 2015). Latino mothers stated that fathers’ dietary preferences significantly influenced dietary choices of the family, and some Latino mothers complained about fathers bringing less healthy food home (Lora et al., 2016; Mena et al.,
In terms of physical activity and screen-time, Latino fathers played a relatively more active role in supporting children’s physical activity than mothers who were less likely to be involved in children’s screen time activities (Davis et al., 2016; Lindsay, Wallington, Muñoz, & Greaney, 2018; Lora et al., 2016; Mena et al., 2015). Considering the disproportionately high obesity rate among Latino children and adolescents and the potentially important role of fathers, further research is warranted to investigate the influence of Latino fathers’ parenting practices. Intervention studies are needed that emphasize fathers’ involvement in promoting healthy eating, physical activity and screen-time behaviors among children and adolescents.

7. Summary

Energy balance-related behaviors including intakes of fruit and vegetables, SSBs, sweets and salty snacks; physical activity and screen time have substantial public health significance related to the high prevalence of pediatric obesity among Latino families. Existing weight-related healthy lifestyle intervention programs generally showed modest effects on improving children’s and adolescents’ EBRBs, indicating that current efforts to reverse the epidemic of pediatric obesity are inadequate. Parental involvement is a promising component to enhance program effectiveness. The potential mechanism of parental influence on child EBRBs involves the interaction between general parenting and EBRB-related parenting practices. More empirical evidence is needed to demonstrate the interactive pathways involving general parenting, EBRB-related parenting practices and child EBRBs. In addition, parenting education that incorporates both EBRB-related parenting practices and general parenting skills would be an effective strategy to enhance program effectiveness.

Father involvement is an underutilized resource in pediatric obesity prevention. Involving fathers would be another effective strategy to improve program effectiveness. This may be especially true for Latino families as fathers are a central figure in Latino households. Latino adolescents are the largest minority group with the highest overweight and obesity rate in the U.S., and their EBRBs are likely to be more obesogenic as they grow older. This population would benefit from a weight-related healthy lifestyle intervention program with paternal parenting education related to parenting practices.
around EBRB and general parenting skills to support early adolescents’ healthy lifestyle behaviors.

**Research objectives and hypotheses**

Objective 1 (Chapter 2):
The first objective is to utilize a population-based dataset including adolescent-reported parenting style, EBRB-related parenting practices and EBRBs to test the following hypotheses regarding Baumrind and Steinberg’s contextual model of parenting style:
Hypothesis 1: EBRB-related parenting practices and general parenting dimensions and styles are significantly associated with adolescents’ EBRBs.
Hypothesis 2: Parenting styles moderate associations between EBRB-related parenting practices and adolescents’ EBRBs.
Hypothesis 3. EBRB-related parenting practices mediate the associations between general parenting dimensions and styles and adolescents’ EBRBs.

Objective 2 (Chapter 3):
The second objective is to explore Latino fathers’ perspectives and parenting practice experiences regarding early adolescents’ eating, physical activity and screen-time behaviors using focus groups discussions.
Research question 1: What are Latino fathers’ perspectives and beliefs regarding early adolescents’ eating, physical activity and screen-time?
Research question 2: What are Latino fathers’ food and activity-related parenting practices?
Research question 3: What are the potential barriers and facilitators for Latino fathers to promote healthy lifestyle behaviors among early adolescents?

Objective 3 (Chapter 4):
The third objective is to examine the criterion validity of the measures of paternal EBRB-related parenting practices against adolescents’ corresponding EBRBs and the agreement between fathers’ and adolescents’ reports.
Hypothesis 1: Adolescent-reported paternal EBRB-reported parenting practices are significantly correlated with adolescents’ corresponding EBRBs.
Hypothesis 2: There are incongruencies between father-reported and adolescent-reported paternal EBRB-related parenting practices.

Objective 4 (Chapter 5):
The fourth objective is to pilot test a healthy lifestyle curriculum for Latino fathers and children to assess feasibility based on acceptability and assessment of preliminary effectiveness regarding behavioral outcomes.

Hypothesis 1: The healthy lifestyle intervention program is feasible and acceptable among Latino fathers and their adolescents.

Hypothesis 2: Parents’ EBRB-related parenting practices, general parenting styles, and parents’ and adolescents’ EBRBs are improved based on pre- and post-intervention assessment.
Chapter 2. Influence of Parenting Styles in the Context of Adolescents’ Energy Balance-Related Behaviors: Findings from the FLASHE Study

1. Introduction

Based on nationally representative data (2015-2016), about 40% of adolescents aged 12 or older were either overweight or obese in the United States (Skinner et al., 2018). National or population-based data showed that less than 15%, 5% and 8% of adolescents aged 12 or older met recommendations for daily fruit intake, vegetable intake, and moderate-to-vigorous physical activity, respectively (National Cancer Institute, 2015a, 2015b; National Physical Activity Plan Alliance, 2016). On the contrary, about 75% of adolescents consumed excessive amounts of solid fats and added sugars and 70% had screen time over 2 hours in a day (National Physical Activity Plan Alliance, 2016; U.S. Department of Agriculture & National Cancer Institute, 2015c). Eating, physical activity and screen time are energy balance-related behaviors (EBRBs) (Hall et al., 2012). Meeting guidelines for dietary intake, physical activity and screen time have important roles in the prevention of excess weight gain during childhood and adolescence; therefore, effective promotion of these healthy lifestyle behaviors is a critical component of public health efforts to prevent obesity.

Systematic reviews have consistently shown that behavior-based pediatric obesity intervention programs produced promising but modest effects on weight- and/or behavior-related outcomes among children and adolescents (Biddle et al., 2014; Diep et al., 2014; Kobes et al., 2018; Owen et al., 2017). Parents are responsible for the physical and psychosocial environment for the socialization of their children. Multiple reviews suggested that active parent engagement has been a key element to enhance program effectiveness (Guerra, Da Silveira, & Salvador, 2016; Meiklejohn et al., 2016; Murimi et al., 2018; Schlechter et al., 2016). Another review indicated that parental involvement was more effective among preschoolers than older children and adolescents (Kader et al., 2015). This may be because older children and adolescents become more autonomous and are subjected to greater influences regarding food and physical activity outside of the home than younger children. Intervention programs for older children and adolescents
may also tend to have less and/or passive parental involvement components. The influence of parents on adolescents’ lifestyle behaviors needs further study.

Darling and Steinberg’s (1993) conceptual model of parenting styles provides a theoretical framework to understand potential mechanisms of parental influence on adolescents’ development. Core constructs of this model are parenting styles, context-specific parenting practices and adolescent behavioral outcomes. Parenting styles refer to the general emotional climate of parent-child interactions in which parents’ behaviors are expressed. The commonly applied typologies of parenting styles are authoritative (high demandingness, high responsiveness), authoritarian (high demandingness, low responsiveness), permissive (low demandingness, high responsiveness) and uninvolved (low demandingness, low responsiveness) (Macoby & Martin, 1983). This model emphasizes the overarching effects of parenting styles on adolescents’ behavioral outcomes with context-specific parenting practices.

Parenting styles have been shown to exert potential influence in the context of adolescents’ EBRBs. Authoritative parenting styles have been more commonly associated with healthy adolescents’ EBRBs, whereas other parenting styles were often associated with less desirable EBRBs among adolescents (Berge et al., 2010; Hennessy et al., 2012; Pearson et al., 2009; Wang et al., 2017). Parents with an authoritative parenting style were more likely to use positive parenting practices that might promote healthy dietary intake among adolescents (De Bourdeaudhuij et al., 2009; Van Der Horst, Kremers, et al., 2007). Thus, parenting practices around adolescents’ EBRBs may mediate the effects of parenting styles. This mediated effect has been reported in studies among parents with preschoolers and school-aged children (Boots et al., 2015; Sebire et al., 2016). A few studies also found that parenting styles moderated the effects of parenting practices on younger children’s EBRBs (Langer et al., 2017; Sleddens et al., 2014). In summary, parenting styles may influence adolescents’ EBRBs through two mechanisms. The first mechanism involves the moderating effects of parenting dimensions/styles (m) on the associations between parenting practices and adolescents’ EBRBs (Figure 2.1 A). The second mechanism involves the total (c), indirect (or mediated, ab) and direct (c’ = c- ab) effects of parenting dimensions/styles on
adolescents’ EBRBs (Figure 2.1 B). Further knowledge regarding the influence of parenting styles could be valuable for enhancing parental components for healthy lifestyle intervention programs among adolescents. The inclusion of parenting skill education as part of intervention programs may enhance parent-adolescent relationships and food- and activity-related parenting practices.

A. The Moderation Model:

![Moderation Model Diagram]

B. The Mediation Model:

![Mediation Model Diagram]

Figure 2.1 The influence of parenting dimensions and styles in the context of adolescents’ EBRBs.

Therefore, the purpose of the current study was to examine the potential influence of parenting dimensions/styles on adolescents’ EBRBs based on a modified model of Darling and Steinberg’s conceptual model of parenting styles (Figure 2.1). The hypotheses included 1) parenting practices around EBRBs are associated with corresponding adolescents’ behaviors (b); 2) these associations are moderated by parenting dimensions and styles (m); 3) parenting dimensions and styles are associated with adolescents’ EBRBs (c); and 4) EBRB-related parenting practices mediate associations between parenting dimensions/styles and adolescents’ EBRBs (ab). The current study utilized adolescent responses in a population-level dataset from a web-
based survey of adolescents and their parents made available by the National Cancer Institute (NCI).

2. Methods

2.1. FLASHE Study Design and Sample

The NCI collected survey data from parent and adolescent dyads for the Family Life, Activity, Sun, Health, and Eating (FLASHE) Study between April and October 2014. The primary focus of the FLASHE Study was to examine psychosocial, intrapersonal (parent-adolescent) and environmental correlates of adolescent dietary intake and physical activity based on adolescent responses to survey items (Oh et al., 2017). Westat, Inc. was contracted to recruit, enroll and collect data from a nationwide Ipsos consumer opinion panel via web-based surveys. The Ipsos panel was screened to identify a sample of potential participants to be representative of the general U.S. population. Parents were eligible for inclusion in the study if they were ≥ 18 years, a parent or legal guardian of an eligible adolescent, and lived with the adolescent ≥ 50% of the time. Adolescents were eligible if they were 12–17.5 years and lived with the adult panel member ≥ 50% of the time. For households with more than one eligible adolescent, one was randomly selected until the gender-balanced quota for each age range (12-13, 14-15, 16-17) was full. Eligible dyads were randomized to receive either the diet survey or the physical activity survey first. Whichever survey was completed first included demographic and parenting style questions at the end. A total of 5027 dyads were eligible for the study; 1945 (38.7%) were enrolled. After excluding adolescents (n = 154) who had health conditions preventing them from participating in physical activity, the total sample size for the current analysis was 1705. However, analysis sample size varied due to missing data for certain variables. All surveys, datasets, codebooks, and data user guides were available at an NCI website (https://cancercontrol.cancer.gov/brp/hbrb/flashe.html). The FLASHE Study was approved by Westat, Inc., and NCI Special Studies Institutional Review Boards. The University of Minnesota Institutional Review Board determined that analysis involving a de-identified, public-use version of the FLASHE Study data was exempt from review.
2.2 Measures of Parenting Dimensions and Styles

The FLASHE adolescent demographic survey included six items assessing three parenting dimensions with two items for each dimension. The three parenting dimensions were demandingness, responsiveness, and autonomy-granting. These items were selected from the 15-item Parenting Style Inventory II which has been previously tested for validity among a separate sample of 6th-8th graders (Darling & Toyokawa, 1997). Statements related to demandingness were “my parent(s) expect me to follow family rules” and “my parent(s) let me get away with things” (reverse coded). Statements related to responsiveness were “I can count on my parent(s) to help me out if I have a problem” and “my parent(s) don't like me to tell them my troubles” (reverse coded). Statements of autonomy granting were related to “my parent(s) respect my privacy” and “my parent(s) make most of the decisions about what I can do” (reverse coded). Five-point response options ranged from “strongly disagree” to “strongly agree”. A mean score was calculated for each dimension and a median score was used to divide dimensions of demandingness and responsiveness into high and low levels (Sleddens et al., 2011), from which four types of parenting styles (Figure 2.2) were determined (Macoby & Martin, 1983).

![Figure 2.2 Four types of parenting styles](image)

2.3 Measures of Parenting Practices

The FLASHE adolescent diet and activity surveys assessed adolescent-reported parenting practices related to FV intake (6 items), junk food and sugary drink (JF/SD) intake (6 items), physical activity (PA, 5 items) and screen time (ST, 6 items) These items were taken from a collection of previously developed questionnaires which
included the Child Feeding Questionnaire (Birch et al., 2001), the Comprehensive Feeding Practices Questionnaire (Musher-Eizenman & Holub, 2007), the Parental Feeding Style Questionnaire (Wardle et al., 2002), the Parenting strategies for Eating and Activity Scale (Larios, Ayala, Arredondo, Baquero, & Elder, 2009), and the Activity Support Scale (Davison et al., 2011). The psychometric properties of these selected items were assessed as part of their specific questionnaires or scales but were not examined as used in the FLASHE study. Therefore, the present study performed correlation analyses and exploratory factor analysis in the scale construction of these parenting practices to ensure construct validity with 2 scales each constructed for FV and ST and 1 scale each for JF/SD and PA (Appendix A).

Scores for EBRB-parenting practices scales were calculated using mean scores of summed adolescent responses on a 5-point Likert scale from strongly disagree (1) to strongly agree (5). For FV parenting practices, the FV Parenting Practices scale 1 included three items: “my parent(s) buy fruits and vegetables for me”, “my parent(s) try to eat fruits and vegetables when I'm around” and “my parent(s) encourage me to try different kinds of fruits and vegetables” (Cronbach’s α = 0.78). The FV Parenting Practices scale 2 included three items: “my parent(s) and I decide together how many fruits and vegetables I have to eat”, “my parent(s) have to make sure that I eat enough fruits and vegetables”, and “my parent(s) make me eat fruits and vegetables” (Cronbach’s α = 0.80). The JF/SD-related parenting practices scale included three items: “my parent(s) don’t buy a lot of junk food or sugary drinks for me”, “my parent(s) try to avoid eating junk food or sugary drinks when I'm around”, and “my parent(s) and I decide together how much junk food or sugary drinks I can have” (Cronbach’s α = 0.70). The PA-related parenting practices scale included five items: “my parent(s) have to make sure that I get enough physical activity”, “my parent(s) take me places where I can be physically active”, “my parent(s) and I decide together how much physical activity I have to do”, “my parent(s) make me exercise or go out and play”, and “my parent(s) try to be physically active when I'm around” (Cronbach’s α = 0.85). The ST Parenting Practices scale 1 included four items: “my parent(s) and I decide together how much screen time I can have”, “my parent(s) decide how much screen time I can have”, “my parent(s) have to make sure that I do not have too much screen time”, and “my parent(s) try to limit their
screen time when I'm around” (Cronbach’s α = 0.85). The ST Parenting Practices scale 2 included two items: “if I've had a bad day, my parent(s) let me have screen time to make me feel better” and “my parent(s) take me places where I can play video games, watch movies, etc” (correlation between items: r = 0.34, p < 0.0001)

2.4 Adolescents’ Dietary Intake

The FLASHE adolescent diet survey included a dietary screener to assess adolescents’ food intake daily frequencies. This screener was modified from the Dietary Screener Questionnaire (Epidemiology and Genomics Research Program, NCI, 2010) and the National Youth Physical Activity and Nutrition Study (CDC, 2010). Both surveys have been validated and used among adolescent populations (Program Epidemiology and Genomics Research, NCI, 2018; CDC, 2013). Adolescents reported their intake frequencies of 20 food items and 7 beverage items during the past 7 days. Before combining food items into the daily food frequency scales, each item response was converted to a daily frequency: Never = 0; 1-3 times in past 7 days = 0.29; 4-6 times in past 7 days = 0.71; 1 time per day = 1; 2 times per day = 2; and 3 or more times per day = 3 (NCI, 2017). The total intake frequencies for fruits and vegetables were summed from intake frequencies of 100% fruit juice, fruit, green salad, other non-fried vegetables, cooked beans and other potatoes (not fried). Intake frequencies for junk food and sugary drinks (JF/SD) were summed from intake frequencies of candy/chocolate, cookies/cake, potato chips, fried potatoes, frozen desserts, regular soda, energy drinks, sweetened fruit drinks, and sports drinks. According to the FLASHE user’s guide, daily intake frequencies were top-coded to deal with potential overestimations. If reported intake corresponded to z scores |≥ 3.29|, it was removed and replaced by imputing the nearest value with z scores |< 3.29| (NCI, 2017).

2.5 Adolescents’ Physical Activity and Screen Time

The FLASHE adolescent PA survey consisted of a 15-item Youth Activity Profile (YAP) questionnaire (Saint-Maurice & Welk, 2015). This questionnaire enabled calibrated estimation of moderate-to-vigorous physical activity (MVPA) and sedentary behaviors among 4th-12th graders wearing accelerometers (Saint-Maurice & Welk, 2015). Adolescents reported their physical activity in school and out of school during weekdays and on weekends, and sedentary behaviors regarding use of TV, video games,
computer and phone, and general sedentary habits. Their weekly minutes spent engaged in MVPA and sedentary time were calibrated using the FLASHE motion study data collected from a subsample of adolescents wearing an accelerometry-based activity monitor (Saint-Maurice et al., 2017). Estimated MVPA and sedentary time data were only available among adolescents enrolled in a regular middle or high school. In the current study, weekly hours spent in MVPA were calculated by summing weekly minutes in MVPA in school and out of school and on the weekend divided by 60. Weekly sedentary hours were calculated by dividing weekly sedentary minutes by 60.

2.6 Socio-demographic Information and Parental-Weight Status

Adolescents reported their age, sex, race/ethnicity, and language spoken at home in the FLASHE adolescent demographic survey. Parents reported their age, sex, educational attainment, employment status, marital status, annual household income, height and weight, and number of children in the household in the parent demographic survey. These socio-demographic and weight-related variables were considered as potential covariates.

2.7 Statistical Analysis

All analyses were conducted using SAS software (version 9.4, Cary, NC). Descriptive statistics (mean, standard deviations [SD], median, interquartile range [IQR], percent) were first performed on all relevant variables. Square root transformations were performed on dependent variables (adolescents’ daily intake frequencies of FV and JF/SD, weekly hours of MVPA and screen time) to improve normality of the distribution. Multivariate analyses were conducted to identify the socio-demographic- and weight-related covariates of adolescents’ EBRBs. Stepwise selection with α set at ≤ .10 was used to enter and ≤ .05 was used to keep covariates from the model. Bivariate correlations among adolescents’ EBRBs, EBRB-related parenting practices, and parenting dimensions/styles were examined using Pearson correlation prior to regression analyses. Moderation analyses were conducted by adding interaction terms (parenting dimensions and parenting styles) to the multivariate regression models of EBRB-related parenting practices and adolescents’ EBRBs. If interaction terms were significant (p < 0.10) (Rodenburg et al., 2014), stratified analyses were conducted by four quartiles of parenting dimensions and four types of parenting styles with Bonferroni correction for
multiple comparisons in the single adjusted model (p < 0.008). If both parenting styles and EBRB-related parenting practices were significantly associated with adolescents’ EBRBs (p < 0.05), simple mediation analyses were conducted where explanatory variables were parenting dimensions, outcome variables were adolescents’ EBRBs, and mediators were parenting practices around EBRBs. All multivariate linear regression analyses were adjusted for adolescents’ age, sex, race/ethnicity, number of children in the household, and parents’ sex, nativity, educational attainment and weight status. Confidence intervals of indirect (or mediated) effects were calculated using the PROCESS macro for SAS (version 3.1) developed by Hayes (2017).

3. Results

3.1 Socio-demographic Characteristics of Parents and Adolescents

Adolescents were about equally distributed by age groups of 12-13, 14-15 and 16-17 and by sex (Table 2.1). Nearly 60% of adolescents were non-Hispanic White and over 80% were born in the U.S. and only spoke English at home. About one-third were the only child in the household. More than two thirds of parents were female. About 45% of parents reported having college or higher level of education and over 60% were employed. Nearly 60% of parents had a body mass index (BMI) categorized as either overweight or obese.
Table 2.1. Participants’ sociodemographic characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adolescents</strong></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>12-13</td>
<td>510 (29.9%)</td>
</tr>
<tr>
<td>14-15</td>
<td>539 (31.6%)</td>
</tr>
<tr>
<td>16-17</td>
<td>494 (29.0%)</td>
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<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>765 (44.9%)</td>
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<tr>
<td>Female</td>
<td>775 (45.5%)</td>
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<tr>
<td>Race/ethnicity</td>
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<tr>
<td>Hispanic</td>
<td>150 (8.8%)</td>
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<tr>
<td>Non-Hispanic Black</td>
<td>252 (14.8%)</td>
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<tr>
<td>Non-Hispanic White</td>
<td>988 (58.0%)</td>
</tr>
<tr>
<td>Other</td>
<td>138 (8.1%)</td>
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<tr>
<td>U.S. born</td>
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<tr>
<td>Yes</td>
<td>1509 (88.5%)</td>
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<td>No</td>
<td>29 (1.7%)</td>
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<td>Language spoken at home</td>
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<td>English only</td>
<td>1413 (82.9%)</td>
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<tr>
<td>Not English only</td>
<td>124 (7.3%)</td>
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<tr>
<td>Number of children in the household</td>
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<tr>
<td>1</td>
<td>632 (37.1%)</td>
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<td>2 or more</td>
<td>1003 (58.8%)</td>
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<td><strong>Parents</strong></td>
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<td>Age groups</td>
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<td>18-34</td>
<td>184 (10.8%)</td>
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<td>35-44</td>
<td>705 (41.4%)</td>
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<td>45-59</td>
<td>701 (41.1%)</td>
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<td>60+</td>
<td>49 (2.9%)</td>
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<tr>
<td>Sex</td>
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<tr>
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<td>439 (25.8%)</td>
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<td>Female</td>
<td>1200 (70.38%)</td>
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<td>Education</td>
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<tr>
<td>High school or lower</td>
<td>295 (17.3%)</td>
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<tr>
<td>Some college</td>
<td>571 (33.5%)</td>
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<td>College degree or higher</td>
<td>768 (45.0%)</td>
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<td>Work status</td>
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<tr>
<td>Employed or self-employed</td>
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<td>Unemployed</td>
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<td>Household income</td>
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<td>$0 to $99,999</td>
<td>1286 (75.4%)</td>
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<td>$100,000 or more</td>
<td>334 (19.6%)</td>
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<td>Weight status</td>
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<tr>
<td>Under or normal weight</td>
<td>627 (36.8%)</td>
</tr>
<tr>
<td>Overweight or obese (BMI ≥ 25)</td>
<td>993 (58.2%)</td>
</tr>
</tbody>
</table>
3.2 Adolescents’ EBRBs, EBRB-related Parenting Practices and Parenting Dimensions

On average, adolescents reported eating fruits and vegetables $2.8 \pm 2.0$ times/day and junk food/sugary drinks $3.1 \pm 2.1$ times/day. They spent $13.0 \pm 2.3$ hours/week in MVPA and $23.2 \pm 1.1$ hours/week in screen time activities. Most adolescents (70%) somewhat or strongly agreed with statements regarding FV Parenting Practices 1. About one-third of adolescents (32%) somewhat or strongly agreed with statements regarding FV Parenting Practices 2. One quarter (25%) of adolescents somewhat or strongly agreed with statements regarding JF/SD Parenting. About 20% of adolescents somewhat or strongly agreed with statements regarding PA Parenting Practices with about 17% and 14% of adolescents somewhat or strongly agreeing with ST Parenting Practices 1 and ST Parenting Practices 2, respectively. In terms of parenting dimensions, about 56%, 73%, and 17% of adolescents somewhat or strongly agreed with statements indicating parental demandingness, responsiveness, and autonomy granting. Accordingly, proportions of parents characterized by parenting styles were 42% authoritative, 14% authoritarian, 19% permissive and 15% neglectful. Medians and interquartile ranges of adolescents’ EBRBs, adolescent-reported parenting practices and dimensions are presented in Table 2.2.

Note: A total sample of 1705 dyads. Percentages do not add up to 100% because of missing responses.
Table 2.2 Medians and interquartile ranges of adolescents’ EBRBs, adolescent-reported parenting practices and dimensions

<table>
<thead>
<tr>
<th>Adolescents’ EBRBs</th>
<th>Median</th>
<th>Interquartile Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>FV intake (times/day)</td>
<td>2.3</td>
<td>1.4 to 3.6</td>
</tr>
<tr>
<td>JF/SD intake (time/day)</td>
<td>2.6</td>
<td>1.7 to 3.9</td>
</tr>
<tr>
<td>MVPA (hours/day)</td>
<td>13.2</td>
<td>11.4 to 14.8</td>
</tr>
<tr>
<td>Screen time (hours/day)</td>
<td>22.9</td>
<td>22.5 to 23.7</td>
</tr>
</tbody>
</table>

Adolescent-reported parenting practices (range)

| FV Parenting Practices 1 (1 – 5)        | 4.5     | 4.0 to 5.0          |
| FV Parenting Practices 2 (1 – 5)        | 3.3     | 2.5 to 4.0          |
| JF/SD Parenting Practices (1 – 5)       | 3.3     | 2.7 to 4.0          |
| PA Parenting Practices (1 – 5)           | 3.2     | 2.4 to 3.8          |
| ST Parenting Practices 1 (1 – 5)         | 3.0     | 2.0 to 3.8          |
| ST Parenting Practices 2 (1 – 5)         | 2.5     | 2.0 to 3.5          |

Adolescent-reported parenting dimensions (range)

| Demandingness (1 – 5)                   | 4.0     | 3.5 to 4.5          |
| Responsiveness (1 – 5)                  | 4.5     | 4.0 to 5.0          |
| Autonomy granting (1 – 5)               | 3.0     | 2.5 to 3.5          |


3.3 Associations between Adolescents’ EBRBs and Corresponding Parenting Practices, and the Moderation Effects of Parenting Dimensions and Styles

After adjusting for adolescent age, sex, and race/ethnicity; number of children in the household; and parent sex, nativity, education attainment, and weight status, all parenting practices scales had significant associations with adolescents’ EBRBs except for the ST Parenting Practices scale 1. Associations were as follows: \( \beta = 0.24 \) for FV Parenting Practices scale 1, \( 0.12 \) for FV Parenting Practices scale 2, \(-0.12\) for JF/SD
Parenting Practices scale, 0.04 for PA Parenting Practices scale, and 0.02 for ST Parenting Practices scale 2; all p < 0.0001.

Moderation analyses found that the parenting dimensions of demandingness and responsiveness had significant interactions with parenting practices for predicting adolescents’ JF/SD intake (β = -0.05, p = 0.01 and β = -0.09, p < 0.0001, respectively). Autonomy granting also showed moderating effects on parenting practices for predicting adolescents’ FV intake and screen time (β = 0.05, p = 0.01 for the FV Parenting Practices scale 1 and β = 0.007, p = 0.03 for the ST Parenting Practices scale 2).

Stratified analysis further showed that associations between the JF/SD Parenting Practices scale and adolescents’ JF/SD intake were no longer significant at the lowest quartile of demandingness and the lower quartiles of responsiveness (Table 2.3). However, stratified analysis did not show significant differences in regression coefficients of the FV Parenting Practices scale 1 and the ST Parenting Practices scale 2 by quartiles of autonomy granting.

<table>
<thead>
<tr>
<th>Quartiles</th>
<th>Demandingness</th>
<th>Responsiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>95% CI</td>
</tr>
<tr>
<td>1 (lowest)</td>
<td>0.050</td>
<td>(-0.051 to 0.150)</td>
</tr>
<tr>
<td>2</td>
<td>-0.169*</td>
<td>(-0.230 to -0.109)</td>
</tr>
<tr>
<td>3</td>
<td>-0.136*</td>
<td>(-0.212 to -0.061)</td>
</tr>
<tr>
<td>4 (highest)</td>
<td>-0.132*</td>
<td>(-0.172 to -0.093)</td>
</tr>
</tbody>
</table>

Values for demandingness and responsiveness per quartile from lowest to highest: 1 to 3, 3.5, 4, 4.5 to 5 and 1 to 3, 3.5 to 4, 4.5, 5, respectively.

β: regression coefficients of associations between JF/SD parenting practices and adolescents’ JF/SD intake stratified by quartiles of either demandingness or responsiveness after adjusting for adolescents’ age, sex, and race/ethnicity; number of children in the household; and parents’ sex, nativity, education attainment, and parents’ weight status.

*p < 0.001

Superscript letters a and b distinguish significant differences among regression coefficients (p < 0.008 after Bonferroni correction).
Parenting styles also moderated the association between JF/SD Parenting Practices and adolescents’ JF/SD intake as well as the association between PA Parenting Practices and adolescents’ PA (Table 2.4). Significant negative associations between JF/SD Parenting Practices and adolescents’ JF/SD intake were no longer observed when parenting styles were authoritarian and uninvolved. The regression coefficient of JF/SD Parenting Practices was significantly different under the condition of uninvolved parenting style as compared to authoritative and permissive parenting styles. In addition, a positive association between PA Parenting Practices and adolescents’ PA was no longer observed when the parenting style was authoritarian. Regression coefficients of PA Parenting Practices were significantly different between parenting styles of authoritarian and uninvolved.

Table 2.4 Moderation effects of parenting styles on the associations between parenting practices and adolescents’ junk food and sugary drink (JF/SD) intake and physical activity (PA)

<table>
<thead>
<tr>
<th>Parenting styles</th>
<th>JF/SD Parenting Practices X adolescents’ JF/SD intake</th>
<th>PA Parenting Practices X adolescents’ PA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>95% CI</td>
</tr>
<tr>
<td>Authoritative</td>
<td>-0.158*</td>
<td>(-0.198, -0.117)a</td>
</tr>
<tr>
<td>Authoritarian</td>
<td>-0.046</td>
<td>(-0.120, 0.029)ab</td>
</tr>
<tr>
<td>Permissive</td>
<td>-0.186*</td>
<td>(-0.242, -0.130)a</td>
</tr>
<tr>
<td>Uninvolved</td>
<td>0.048</td>
<td>(-0.507, 0.153)b</td>
</tr>
</tbody>
</table>

Covariates adjusted in moderation models included adolescents’ age, sex, and race/ethnicity; number of children in the household; and parents’ sex, nativity, education attainment, and parents’ weight status.

*p < 0.001

Superscript letters a and b distinguish significant differences among regression coefficients (p < 0.008 after Bonferroni correction).

3.4 Associations of Parenting Dimensions with Adolescents’ EBRBs, and Mediation Effects of EBRB-Related Parenting Practices

As shown in table 2.5, demandingness had significant associations with all adolescents’ EBRBs. Responsiveness had significant associations with adolescents’
JF/SD intake and ST but not with FV intake and PA. Autonomy granting was significantly associated with adolescents’ FV intake, JF/SD intake and PA but not with screen time.

Both the FV Parenting Practices scale 1 and scale 2 mediated the association between demandingness and adolescents’ FV intake and the association between autonomy granting and adolescents’ FV intake (Table 2.5). JF/SD Parenting Practices mediated the associations of demandingness and responsiveness with adolescents’ JF/SD intake; but not the association between autonomy granting and adolescents’ JF/SD intake. PA Parenting Practices mediated the association between demandingness and adolescents’ PA but not the associations between autonomy granting and adolescents’ PA. The ST Parenting Practices scale 2 mediated the association between demandingness and adolescents’ ST but not the association between responsiveness and adolescents’ ST.

The positive associations between demandingness and adolescents’ FV intake and PA, the negative association between responsiveness and adolescents’ JF/SD intake, and the positive association between autonomy granting and adolescents’ FV intake were no longer significant after adjusting for the mediating effects of corresponding parenting practices. The positive association between autonomy granting and adolescents’ PA was also no longer significant after adjusting for the non-significant mediating effect of PA Parenting Practices.

3.5 Associations between Parenting Styles and Adolescents’ EBRBs, and Mediation Effects of EBRB-Related Parenting Practices

The authoritative parenting style was significantly associated with greater adolescents’ FV intake, and lower JF/SD intake and ST (Table 2.6). The authoritarian parenting style was not associated with any adolescents’ EBRBs (not shown in the table). A permissive parenting style was significantly associated with lower adolescents’ FV intake and greater JF/SD intake. An uninvolved parenting style was significantly associated with greater adolescents’ JF/SD intake and ST. None of the parenting styles had significant associations with adolescents’ PA (not shown in the table).

Both the FV Parenting Practices scale 1 and scale 2 mediated the positive association between an authoritative parenting style and adolescents’ FV intake but not the associations between adolescents’ FV intake and a permissive parenting style (Table
2.6. JF/SD Parenting Practices mediated the associations of authoritative and permissive parenting styles with adolescents’ JF/SD intake. The ST Parenting Practices scale mediated the associations of authoritative and uninvolved parenting styles with adolescents’ ST. In addition, associations between an authoritative parenting style and adolescents’ FV intake and a permissive parenting style and adolescents’ JF/SD intake were no longer significant after adjusting for the mediating effects of corresponding parenting practices.
Table 2.5 Mediation effects of EBRB-related parenting practices on the associations between parenting dimensions and adolescents’ EBRBs

<table>
<thead>
<tr>
<th>Mediators</th>
<th>Associations</th>
<th>c</th>
<th>c’</th>
<th>ab</th>
<th>% of total effect mediated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Parenting dimensions x adolescents’ EBRBs</td>
<td>β (95% CI)</td>
<td>β (95% CI)</td>
<td>β (95% CI)</td>
<td></td>
</tr>
<tr>
<td>FV Parenting Practices 1</td>
<td>Demandingness x FV</td>
<td>0.060 (0.018, 0.102)</td>
<td>0.011 (-0.031, 0.052)</td>
<td>0.050 (0.034, 0.066)</td>
<td>82.4%</td>
</tr>
<tr>
<td></td>
<td>Autonomy granting x FV</td>
<td>0.054 (0.015, 0.094)</td>
<td>0.036 (-0.001, 0.074)</td>
<td>0.018 (0.003, 0.034)</td>
<td>33.3%</td>
</tr>
<tr>
<td>FV Parenting Practices 2</td>
<td>Demandingness x FV</td>
<td>0.060 (0.018, 0.102)</td>
<td>0.041 (-0.000, 0.083)</td>
<td>0.019 (0.008, 0.031)</td>
<td>31.3%</td>
</tr>
<tr>
<td></td>
<td>Autonomy granting x FV</td>
<td>0.060 (0.018, 0.102)</td>
<td>0.066 (0.028, 0.104)</td>
<td>-0.012 (-0.023, -0.001)</td>
<td>-21.7%</td>
</tr>
<tr>
<td>JF/SD Parenting Practices</td>
<td>Demandingness x JF/SD</td>
<td>-0.098 (-0.138, -0.058)</td>
<td>-0.079 (-0.119, -0.040)</td>
<td>-0.018 (-0.03, -0.009)</td>
<td>18.7%</td>
</tr>
<tr>
<td></td>
<td>Responsiveness x JF/SD</td>
<td>-0.041 (-0.076, -0.006)</td>
<td>-0.021 (-0.056, 0.014)</td>
<td>-0.020 (-0.031, -0.011)</td>
<td>48.9%</td>
</tr>
<tr>
<td></td>
<td>Autonomy granting x JF/SD</td>
<td>-0.053 (-0.091, -0.016)</td>
<td>-0.051 (-0.087, -0.014)</td>
<td>-0.003 (-0.012, 0.006)</td>
<td>5.2%</td>
</tr>
<tr>
<td>PA Parenting Practices</td>
<td>Demandingness x PA</td>
<td>0.016 (0.003, 0.028)</td>
<td>0.012 (-0.000, 0.025)</td>
<td>0.004 (0.001, 0.007)</td>
<td>23.8%</td>
</tr>
<tr>
<td></td>
<td>Autonomy granting x PA</td>
<td>0.013 (0.001, 0.025)</td>
<td>0.011 (-0.000, 0.022)</td>
<td>0.002 (-0.001, 0.005)</td>
<td>15.3%</td>
</tr>
<tr>
<td>ST Parenting Practices 2</td>
<td>Demandingness x ST</td>
<td>-0.020 (-0.028, -0.012)</td>
<td>-0.015 (-0.023, -0.008)</td>
<td>-0.005 (-0.007, -0.003)</td>
<td>23.0%</td>
</tr>
<tr>
<td></td>
<td>Responsiveness x ST</td>
<td>-0.016 (-0.022, -0.009)</td>
<td>-0.015 (-0.021, -0.008)</td>
<td>-0.001 (-0.003, 0.001)</td>
<td>5.7%</td>
</tr>
</tbody>
</table>

*Only significant associations between parenting dimensions and adolescents’ EBRBs are listed in the table.

c, c’ and ab are total, direct and indirect effects between parenting dimensions and adolescents’ EBRBs. Indirect effects are mediated by EBRB-related parenting practices.

% of total effect mediated = (ab / c) x 100%.
All paths are adjusted for adolescents’ age, sex, and race/ethnicity; number of children in the household; and parents’ sex, nativity, education attainment, and parents’ weight status.

Table 2.6 Mediation effects of EBRB-related parenting practices on the associations between parenting styles and adolescents’ EBRBs

<table>
<thead>
<tr>
<th>Mediators</th>
<th>Associations</th>
<th>c β (95% CI)</th>
<th>c’ β (95% CI)</th>
<th>ab β (95% CI)</th>
<th>% of total effect mediated</th>
</tr>
</thead>
<tbody>
<tr>
<td>FV Parenting Practices 1</td>
<td>Authoritative x FV</td>
<td>0.111 (0.049, 0.172)</td>
<td>0.031 (-0.030, 0.091)</td>
<td>0.080 (0.058, 0.105)</td>
<td>72.3%</td>
</tr>
<tr>
<td></td>
<td>Permissive x FV</td>
<td>-0.099 (-0.174, -0.025)</td>
<td>-0.099 (-0.174, -0.025)</td>
<td>-0.000 (-0.024, 0.023)</td>
<td>0.3%</td>
</tr>
<tr>
<td>FV Parenting Practices 2</td>
<td>Authoritative x FV</td>
<td>0.111 (0.049, 0.172)</td>
<td>0.083 (0.023, 0.143)</td>
<td>0.028 (0.013, 0.045)</td>
<td>25.1%</td>
</tr>
<tr>
<td></td>
<td>Permissive x FV</td>
<td>-0.099 (-0.174, -0.025)</td>
<td>-0.085 (-0.158, -0.012)</td>
<td>-0.014 (-0.033, 0.002)</td>
<td>14.2%</td>
</tr>
<tr>
<td>JF/SD Parenting Practices</td>
<td>Authoritative x JF/SD</td>
<td>-0.113 (-0.172, -0.055)</td>
<td>-0.079 (-0.137, -0.021)</td>
<td>-0.034 (-0.051, -0.021)</td>
<td>30.4%</td>
</tr>
<tr>
<td></td>
<td>Permissive x JF/SD</td>
<td>0.075 (0.004, 0.147)</td>
<td>0.057 (-0.014, 0.127)</td>
<td>0.018 (0.003, 0.036)</td>
<td>24.4%</td>
</tr>
<tr>
<td></td>
<td>Uninvolved x JF/SD</td>
<td>0.124 (0.045, 0.204)</td>
<td>0.113 (0.035, 0.190)</td>
<td>0.012 (-0.004, 0.029)</td>
<td>9.4%</td>
</tr>
<tr>
<td>ST Parenting Practices 2</td>
<td>Authoritative x ST</td>
<td>-0.028 (-0.039, 0.017)</td>
<td>-0.025 (-0.035, -0.014)</td>
<td>-0.004 (-0.006, -0.002)</td>
<td>13.1%</td>
</tr>
<tr>
<td></td>
<td>Uninvolved x ST</td>
<td>0.030 (0.015, 0.046)</td>
<td>0.025 (0.009, 0.040)</td>
<td>0.006 (0.003, 0.010)</td>
<td>19.4%</td>
</tr>
</tbody>
</table>

*Only significant associations between parenting styles and adolescents’ EBRBs are listed in the table.

c, c’ and ab are total, direct and indirect effects between parenting dimensions and adolescents’ EBRBs. Indirect effects are mediated by EBRB-related parenting practices.

% of total effect mediated = (ab / c) x 100%.

All models were adjusted for adolescents’ age, sex, and race/ethnicity; number of children in the household; and parents’ sex, nativity, education attainment, and parents’ weight status.
4. Discussion

The current study examined two major mechanisms for how parenting dimensions/styles can potentially influence adolescents’ EBRBs. These mechanisms were based on a modified Darling and Steinberg’s conceptual model of parenting styles and were examined using a population-based online panel of adolescents aged 12-17. Several significant moderating effects of parenting dimensions and styles on the associations between parenting practices and adolescents’ EBRBs were observed. Parenting dimensions and styles demonstrated both direct and indirect (mediated by parenting practices) associations with adolescents’ EBRBs with the consideration of parenting practices specific to adolescents’ EBRBs. The study findings provided theoretical support for enhancing the effectiveness of behavior-based pediatric obesity prevention programs among adolescents with parental involvement. One potential strategy could be combining general parenting skill education with healthy lifestyle education.

Similar to a number of previous studies using different measures of parenting dimensions (Franchini, Poínhos, Klepp, & de Almeida, 2011; Taylor, Wilson, Slater, & Mohr, 2011; Van Der Horst et al., 2007; Wang et al., 2017), adolescents from the current study reported high levels of parental demandingness and responsiveness. This resulted in a relatively large proportion of parents who were characterized as having an authoritative parenting style and about equally small proportions of parents who were characterized as having authoritarian and uninvolved parenting styles. Even though cross-study comparisons of the categorization of parenting styles may not be appropriate because of differences in methodologies, the current distributions of parenting styles were comparable to several previous studies (Berge, Wall, Loth, & Neumark-Sztainer, 2010; Franchini et al., 2011; Jago et al., 2011).

Both parenting dimensions and styles showed several moderating effects on the associations between parenting practices and adolescents’ EBRBs. JF/SD Parenting Practices were associated with a lower intake of JF/SD by adolescents only if demandingness or responsiveness were at higher quartiles. A previous study of Dutch adolescents aged 12-17 showed similar findings with parental restriction associated with less sugar-sweetened beverage consumption only at the second and third quartiles of demandingness and the highest quartile of responsiveness (Van Der Horst et al., 2007).
Another two-year longitudinal study also found that parental encouragement of healthy eating was inversely associated with sugary drink intake among children aged 10 years when parental behavioral control was high versus low and intermediate (Sleddens et al., 2014). The current study further showed that the potential preventive effects of JF/SD parenting practices were moderated by parenting styles where the negative association was significant only among authoritative and permissive parents. In addition, the current study found a moderating effect of parenting styles on PA Parenting Practices as the PA Parenting Practices scale was no longer positively associated with adolescents’ PA among those identified with authoritarian parents. A previous study showed that parental support was associated with greater objectively measured moderate-to-vigorous physical activity at greater permissiveness (+1 SD) but not at lower permissiveness (-1 SD) among children around age 7 (Langer et al., 2014).

Autonomy granting appeared to moderate the effects of the FV Parenting Practices scale 1 and the ST Parenting Practices scale 2, however the effects were not significant in the stratified analysis. The influences of parenting dimensions and styles on FV- and ST-parenting practices remained unclear. This may be because the measures included in the FLASHE survey were not sensitive enough to adequately assess parenting dimensions and/or ST Parenting Practices. In general, findings regarding the moderating effect of parenting styles suggested that the effectiveness of parenting practices on adolescents’ EBRBs may differ by the emotional climates created by parents. In addition, parents with different parenting styles may engage in food- and activity-related parenting practices differently.

All parenting dimensions showed one or more positive associations with adolescents’ FV intake and/or PA and negative associations with adolescents’ JF/SD intake and/or ST. The majority of these associations were mediated with corresponding parenting practices, which resulted in non-significant direct associations. Similarly, a previous study showed that demandingness and responsiveness were associated with greater healthy snack intake and less unhealthy snack intake among Australian 2- to 7-year-old children; and these associations were mediated by parental restriction on unhealthy eating and healthy food availability (Boots et al., 2015). Several other studies also demonstrated positive effects of responsiveness on children and adolescents’ healthy
food intake (Franchini et al., 2011; Taylor et al., 2011; Xu, Wen, Rissel, Flood, & Baur, 2013). However, the direct associations between parenting dimensions and adolescents’ EBRBs may not be significant after excluding the mediating effects of behavior-specific parenting practices.

Consistent with existing literature (Berge, Wall, Loth, et al., 2010; Hennessy et al., 2012; Pearson et al., 2009; Wang et al., 2017), the authoritative parenting style showed associations with greater FV intake and less JF/SD intake and ST among adolescents. Despite the finding that these associations were mediated by corresponding parenting practices, significant direct associations between parenting styles and adolescents’ EBRBs were observed after excluding the mediating effects. Permissive and uninvolved parenting styles were associated with less FV intake, and greater JF/SD intake and/or ST among adolescents. These associations were either not mediated or remained significant after adjusting for the mediating effects of parenting practices assessed in the FLASHE survey. The overall findings suggested that addressing overall parenting styles may be more important for influencing adolescents’ EBRBs than a focus on parenting dimensions.

This theory-based study examined the influence of parenting dimensions and styles on both food- and activity-related EBRBs among a large population-based sample of adolescents in the U.S. However, several limitations existed. Secondary data analysis was confined by the original design and broad scope of the FLASHE study. Survey items of parenting styles and parenting practices were kept relatively brief to reduce respondent burden (Nebeling et al., 2017). Moreover, adolescents were not asked to report with a certain parent (father or mother) in mind. In addition, this online panel of U.S. adolescents was predominantly non-Hispanic white and from households with relatively high income and parent educational attainment. Therefore, the study findings may not be generalizable to adolescents with lower socioeconomic status and other racial/ethnic backgrounds because of cultural differences in norms around parenting and familial roles (Bornstein 2012). Although the theoretical background of the current study assumed potential causal relationships among parenting style, parenting practices and adolescents’ behavioral outcomes, the nature of cross-sectional studies limits conclusions about directionality and causality.
In conclusion, the results from the current study supported the theory-based hypotheses to some extent. Parenting practices were associated with adolescents’ FV intake and JF/SD intake, PA and ST. Parenting dimensions (demandingness and responsiveness) and parenting styles (authoritative and permissive parenting styles) moderated the association between JF/SD Parenting Practices and adolescents’ JF/SD intake. Parenting styles (authoritative, permissive and uninvolved parenting styles) also moderated the association between PA Parenting Practices and adolescents’ PA. All three parenting dimensions and all but the authoritarian parenting styles were associated with one or more adolescent EBRBs; the majority of which were mediated by behavior-specific parenting practices especially for parenting dimensions. Future studies need to investigate how to incorporate constructs of parenting dimensions and styles into behavior-based interventions with parental involvement to improve their effectiveness for the promotion of healthy lifestyles among adolescents. For example, program effectiveness could be compared between childhood obesity interventions with and without parenting skill education components related to building stronger parent-adolescent relationships.
Chapter 3. Latino Fathers’ Perspectives and Parenting Practices Regarding Eating, Physical Activity and Screen Time Behaviors of Early Adolescent Children: Focus Group Study

1. Introduction

Mothers are traditionally considered the primary caregivers for children. Existing research studies regarding childhood obesity are primarily focused on practices of mothers or other female caregivers while fathers’ perspectives and experiences are less commonly reported (Davison et al., 2016). However, food- and activity-related parenting practices of fathers predicted children’s behaviors in several studies (Davison, Cutting, & Birch, 2003; Lloyd, Lubans, Plotnikoff, Collins, & Morgan, 2014). Significant positive relationships were observed between fathers’ and children’s body weight, dietary intake, physical activity, and screen time (Freeman et al., 2012; Hall et al., 2011; Neshteruk, Nezami, Nino-Tapias, Davison, & Ward, 2017). In addition, a seven-week community-based healthy lifestyle program reported that fathers’ involvement significantly mediated the intervention effect on children’s physical activity (Lloyd, Lubans, Plotnikoff, & Morgan, 2015). Over the past four decades, the time that fathers spend caring for children significantly increased from two and half hours to seven hours per week (Parker & Wang, 2013). Additional research studies are needed to investigate paternal influence on childhood obesity.

Latino children are at higher risk of being overweight and obese than other racial/ethnic groups (Ogden, Carroll, Fryar, & Flegal, 2015), which supports further study of potential familial involvement in obesity risk reduction. Two thirds of Latino children in the U.S. under the age of 18 live in two-parent families (United States Census Bureau, 2016). In Latino families, fathers are usually considered the head of the household with primary responsibility for leadership and major decisions (Saracho & Spodek, 2008; Villarruel & Chahin, 1997). Latino fathers may have significant influence on child behavior. For example, Latino mothers reported that their husbands decided what to eat at home by stating their food preferences and bringing less healthy food home (Mena et al., 2015; Rhoads-Baeza & Reis, 2012). In other studies, Latino mothers acknowledged that fathers engaged in physical activity with children and supported children’s healthy eating
(Lora et al., 2016; Tovar, Mena, Risica, Gorham, & Gans, 2015). However, previous studies have not directly and exclusively examined Latino fathers’ perspectives and involvement in healthy lifestyle behaviors among early adolescent children. Further understanding of Latino paternal influence on children’s healthy lifestyle behaviors is important to support public health interventions and counseling programs implemented by nutrition and dietetics professionals to prevent and or treat childhood obesity among this high-risk population.

Focus group interviews are an appropriate and time-efficient method to obtain information about participants’ feelings, opinions and experiences related to non-sensitive topics by creating a comfortable environment for a small group of people with shared traits and/or experiences (Krueger & Casey, 2015). Previous studies reported that topics related to child feeding and healthy family lifestyles were acceptable and non-sensitive among Latino males, thus enabling them to share their perspectives and experiences during focus group interviews (Lowenstein et al., 2013; Turner et al., 2014). In addition, focus groups were utilized as part of a community-based participatory research (CBPR) approach to design and implement a previous family-centered health intervention for Latino early adolescents (Arroyo-Johnson et al., 2015).

An interest in paternal involvement in healthy lifestyle intervention programs for Latino adolescents emerged from an existing CBPR collaboration focused on prevention of substance use (Allen, Svetaz, et al., 2013). Participants in the previous program were primarily mothers and children. Acknowledging the importance of paternal involvement, the existing collaborative community-university team initiated the development of a community-based father-focused childhood obesity prevention program titled “Padres Preparados, Jóvenes Saludables”. This focus group study was conducted as part of the formative development phase. Therefore, the purpose was to explore Latino fathers’ perspectives and parenting practice experiences regarding early adolescents’ eating, physical activity and screen-time behaviors.
2. Methods

2.1 Sample and Study Design

The CBPR approach requires that the community be involved as equal partners in all phases of the research study (Wallerstein & Duran, 2006). In the current study, collaborative Latino-serving community agencies were engaged in developing the focus group protocol, assisting in participant recruitment, hosting focus group sites and trainings, convening a father advisory board, and analyzing and interpreting data.

Participants were recruited using flyers or verbal announcements at three community centers and one charter school that primarily served Latino populations in Minneapolis, St. Paul and Rochester, MN. Individuals indicating an interest in participation were screened based on eligibility criteria including 1) being a father or male caregiver, 2) identifying as Latino, 3) Spanish-speaking, 4) having at least one child between 10-14 years old, and 5) living with or having meals with this child at least three days in a week.

Focus group questions were developed by the research team in collaboration with staff at two community agencies and an expert in focus group methodology (Krueger & Casey, 2015). The research team and community agency staff were primarily bilingual and bicultural with Mexican/Hispanic heritage and expertise and knowledge in nutrition and parenting education, and/or Latino culture and community needs. The research group identified relevant focus group questions from existing studies conducted among Latino parents and drafted additional questions in English (Gomel & Zamora, 2007; Kaiser & Baumann, 2010; Tschann et al., 2013; Turner et al., 2014). These questions were circulated for revision and finalized upon group consensus. Probes were added after open-ended questions to ensure that important concepts were discussed. A final list of focus group questions and probes are presented in Figure 3.1. Questions and probes were translated into Spanish by bilingual and bicultural staff.
Nutrition

1. What do you think about the food that your child eats?
2. What concerns do you have about what your child eats?
   *Prompts were provided if not mentioned by the participants, which include skipping breakfast, drinking too many sugary beverages, not eating enough vegetables, eating too many sweets and snack foods.*
3. What do you say or do to help your child with these situations?
   *Prompts were provided if not mentioned by the participants, which include having rules about foods and beverages, setting an example for your child, having some foods and beverages available or other not available.*
4. Looking at this list of what you say or do to help your child, what works or doesn’t work in your family and why?
5. How is what you say or do different from what your spouse might say or do?

Physical activity

1. What do you think about your child’s physical activity?
2. What concerns do you have about your child’s physical activity?
   *Prompts were provided if not mentioned by the participants, which include lack of physical activity, too much TV, and too many video games.*
3. What do you say or do to help your child with this?
   *Prompts were provided if not mentioned by the participants, which include having rules about being active or not being active, setting an example for your child, making some opportunities available or others not available.*
4. Looking at these things that you say or do to help your child, what works or doesn’t work in your family and why?
5. How is what you say or do different from what your spouse might say or do?

Family and culture:

1. Sometimes parents and children disagree about rules for eating or physical activity. How are rules shared in your family? How are disagreements managed in your family?
2. What family traditions help you and your child to eat healthy or be physically active?
3. What prevents you and your child from eating healthy and being physically active?
4. Think about the experiences you had in a different country where you lived. Do you think that has affected your eating and physical activity habits and those of your family?

Figure 3.1 Questions used in four focus groups with 26 primarily Mexican American fathers about their perspectives and experiences regarding their 10- to 14-year-old adolescents’ eating, physical activity, and screen time behaviors.
Trained Latino male moderators conducted focus groups in Spanish. Each group had one assistant moderator to take notes and audio-record the sessions. At the end of each session, participants were asked to complete a 16-item survey to report demographic characteristics, and frequency of family meals, and purchasing and preparing foods for their family. Three focus group sessions were conducted between March and April 2016 and an additional session was conducted in October 2016 to achieve data saturation. Each session lasted approximately 120 minutes and each participant received $50 in cash. This study was approved by the University of Minnesota Institutional Review Board. Participants provided written informed consent prior to data collection.

2.2 Data Analysis

Focus group audio recordings were transcribed verbatim in Spanish and translated into English. Bilingual and bicultural research staff reviewed the accuracy of the translation (Martinez et al., 2015). Data coding was completed using NVivo 11 software (QSR International, Melbourne, Australia, 2016). Two researchers applied open coding methods to independently code one transcript line by line (Saldaña & Johnny, 2013). Discussion followed prior to coding additional transcripts to resolve discrepancies, refine existing codes, and develop a codebook. The codebook included inductively assigned codes (summative paraphrases or labels), a definition and an exemplary quote for each code. The codes were categorized by similarity of content and attributes. Codes were generally related to eating, physical activity and screen-time preferences and behaviors of fathers, children, or female caregivers, health beliefs and concerns, general parenting beliefs and practices, fathers’ or female caregivers’ parenting beliefs or practices regarding eating, physical activity and screen time, difficulties and challenges, and cultural traditions and transitions. Data saturation was determined when no new coding categories were identified (Carlsen & Glenton, 2011).

Themes were identified based on codes related to food/eating, physical activity, and screen time using the constant comparison method (Corbin, Strauss, & Strauss, 2008). Two researchers independently examined each code and responses across multiple codes by comparing queries from all four transcripts. Differences were reconciled through discussion to reach consensus. The identification of themes was also informed by existing literature on health behaviors and food and activity parenting, the social
cognitive theory, a content map of fundamental constructs in food parenting practices, and a systematic review on media parenting (Rodríguez et al., 2009; Glanz, Rimer, & Viswanath, 2008; Jago, Edwards, et al., 2013; Vaughn et al., 2016). The intrapersonal, interpersonal and socioenvironmental levels from the socioecological model were applied as a potential framework for theming (Glanz et al., 2008). An exemplary quote of each theme and subtheme were selected based on being the most representative and concise comments from fathers from all four focus groups. Themes, subthemes and exemplary quotes were reviewed and discussed by the two researchers with the involvement of two Latino male researchers. Both Latino male researchers were fathers and one was of Mexican heritage. The focus group findings were presented to community partners on several occasions, and in different formats including presentations, and factsheets and articles, which they co-wrote and published on their agency websites and distributed to the community. In addition, one agency convened a father advisory group where six Latino fathers discussed findings to confirm relevancy and appropriateness for application to future community-based, family-focused programs.

3. Results

Twenty-six fathers participated in four focus groups with group sizes ranging from five to eight. Mean age of fathers was 43 ± 10. Average length of stay in the U.S. was 20 ± 8 years. Twenty-five fathers were born in Mexico, 12 fathers reported having less than a high school diploma, 13 fathers reported a family monthly income below 2000 dollars, and 18 fathers reported only speaking Spanish or speaking more Spanish than English at home. Eighteen and eight fathers responded to questions with a son or daughter in mind, respectively. Twenty-three of 25 fathers reported having three or more family meals in a week, 13 of 17 reported often or always doing grocery shopping, and six of 17 reported often or always preparing meals for the family based on available data.

Three major themes with sub-themes were identified including 1) fathers’ beliefs and concerns about diet, physical activity and screen time, 2) food and activity parenting practices, and 3) factors that influenced food and activity parenting practices. Detailed findings were summarized below.
3.1 Mexican American Fathers’ Beliefs and Concerns About Diet, Physical Activity And Screen Time

Mexican American fathers generally recognized the importance of nutrition as indicated by stating that a poor diet had impaired their health or the health of their family members and that good nutrition could protect their children from obesity and illness and improve school performance. Fathers stated that healthy foods and beverages included fruits, vegetables, natural foods without chemicals, homemade foods and water, whereas sugary drinks and sweets, processed and pre-packaged foods, canned foods, hamburger, and foods and produce treated with hormones, pesticides and preservatives were considered unhealthy foods and beverages. They described healthy dietary practices as balancing intake, controlling portions, being aware of what one eats, and eating breakfast. They worried that children’s dietary intake was not healthy, especially the consumption of sugary drinks. In addition, seven fathers from four groups expressed distrust of industrialized food production and processing where chemicals such as pesticides, hormones and preservatives were used.

Mexican American fathers generally valued physical activity based on aspects of disease prevention, child development, and weight maintenance. They blamed screen time for impairing eyesight, preventing children from being active and wasting time. Sixteen fathers from four groups reported that their children were active and seven fathers from four groups described their children as inactive. Eleven fathers expressed concern about children spending time on video games, TV, internet, and cell phones. All comments regarding physical activity and screen time were relevant to boys and girls, except for comments regarding time spent playing video games which were only relevant to boys.

3.2 Mexican American Fathers’ Food and Activity Parenting Practices

Mexican American fathers discussed a variety of parenting practices or actions related to children’s diet, physical activity and screen time. A list of these parenting practices and exemplary quotes are shown in Table 3.1.
Table 3.1 Selected focus group comments from 26 primarily Mexican-American fathers related to parenting practices regarding food intake, physical activity, and screen time behaviors of their 10- to 14-year-old adolescents

<table>
<thead>
<tr>
<th>Parenting practices</th>
<th>Exemplary quotes*</th>
</tr>
</thead>
</table>
| Setting expectations                 | *Eating:* “you [the child] don’t leave the table until you finish vegetables” (group 1)  
  *Physical activity:* “I insisted that I wanted him to play outside” (group 3) |
| Setting limits                       | *Eating:* “I have one [rule] about soft drinks, only one a day if they have any” (group 1)  
  *Screen time:* “I set them a time, only half an hour” (group 2) |
| Availability and accessibility       | *Eating:* “I make them a smoothie that includes tomatoes, lettuce, spinach or other vegetables” (group 3)  
  *Physical activity:* “I put my daughter in a program here at the W [YWCA] for a year” (group 3)  
  *Screen time:* “I broke [his gaming device]” (group 2) |
| Role modeling                        | *Eating:* “I started to quit the habit of drinking [sugary drinks], …, now my son realizes this” (group 4)  
  *Physical activity:* “exercising, setting the example, I am the first one who gets ready to go out” (group 1) |
| Teaching and reasoning                | *Eating:* “when he wants something sweet and I tell him that it has a lot of calories” (group 2)  
  *Physical activity:* “I try to tell her it will help her” (group 4) |
| Monitoring                            | *Eating:* “watch how much he is eating” (group 2)  
  *Physical activity:* “I try to tell her it will help her” (group 4) |
| Providing incentives for desirable behaviors | *Eating:* “if you eat this salad, I’ll give you a small piece of chocolate” (group 2)  
  *Physical activity:* “sometimes she doesn’t want to go [dancing], I motivate her by buying things … that she needs so that she continues to go” (group 4)  
  *Screen time:* “he reads first and then I let him play” (group 2) |
| Doing things together with their child | *Eating:* “We try to eat at the same time, to know what each one eats” (group 3)  
  *Physical activity:* “we went snowboarding once a week in the winter” (group 1)  
  *Screen time:* “we rent a movie and we spend more time together” (group 4) |

*Exemplary quotes were extracted verbatim from the English translations of transcripts from four focus groups. The selection of exemplary quotes is based on the presentation of all four groups by including different fathers with most relevant and concise comments.
3.2.1 Setting Expectations

Fathers talked about their expectations for their child to eat fruits, vegetables, appropriate portions of foods, traditional foods, and to finish foods to avoid waste. Eleven fathers from four groups stated that they force or pressure their child to do what they expect or they “make” their child eat or keep a rule about food/beverage intake. Seven fathers from three groups expressed their expectations for physical activity in a similar way such as “pushing him to play”, “insist on”, and “not ask for permission, simply tell [the child what he or she should do]”. Four fathers from two groups also reported making suggestions such as “why don’t you go to the park and run”, “have fun, play, learn”, and providing options for children to engage in activities.

3.2.2 Setting Limits

Sugary drinks were the most frequently restricted food/beverage by fathers. Other restricted foods included sweets, fast foods and chips. Fathers emphasized controlling portions and frequency of consumption. A common practice of limit setting was “not take them completely away, but control how much you give them” because fathers believed that “it seems mean to not give any”, “most kids eat hamburgers and pizzas with fries”, and “a little of everything [foods] and nothing [bad] will happen”. Thus, fathers reported giving children sugary drinks, sweets, salty snacks and fast foods “up to a certain point”, “at least not every day”, or “no more tomorrow”. In terms of screen time, six fathers from two groups reported setting time limits and requiring children to read or do homework before using electronic devices.

3.2.3 Availability and Accessibility

Fathers influenced the home food environment through their involvement in planning, buying and/or preparing foods. They acknowledged that “what you take home to eat is what they are going to eat”. Fathers reported that they stopped or were avoiding buying sugary drinks and fast foods or offered “unhealthy” foods under certain conditions such as “sometimes”, “once in a while”, “on the weekend”, and “at a party or restaurant”. They also reported purchasing fruits and vegetables for their child to eat. Fifteen fathers from four groups reported preparing or cooking foods for children to eat. To encourage their child to eat fruits and vegetables, fathers reported using strategies
such as “*vary the vegetables*”, “*find out what their tastes are*”, “*make smoothies*”, “*cut up*”, and “*ask what they would like*”.

Fathers reported providing various opportunities to support children’s physical activity, which included registering their child in classes (soccer, boxing, karate, swimming, and basketball), purchasing a gym membership, making equipment available at home, and taking their child to trainings or outside to play. To control their child’s screen time, eight fathers from three groups reported that they “*turn off*”, “*cut the internet*”, or “*take away*” devices.

### 3.2.4 Role Modeling

Fathers recognized that their positive and negative role modeling influenced their child’s behaviors. Twelve fathers from four groups reported setting an example for what and how they wanted their child to eat, which included eating vegetables and not consuming fast food and sugary drinks. Four fathers from two groups stated that they took the initiative to go out and be active so that their child would follow their example.

### 3.2.5 Teaching and Reasoning

Fifteen fathers from four groups reported that they encourage their child to eat healthy by using teaching and/or reasoning practices, such as talking about the benefits of good nutrition and health properties of foods (calorie and nutrients), teaching cooking skills, and letting the child watch food-related cartoons and documentaries. Seven fathers from three groups mentioned teaching the benefits of physical activity, coaching sports, or discussing professional players from athletic games with their children. For example, one father told his son who liked soccer that if he wanted to play like a soccer star, he should eat healthy and play sports.

### 3.2.6 Monitoring

Nine fathers from four groups reported that they monitored their child’s food consumption. They observed the type and quantity of both healthy and less healthy foods consumed by their children. For example, one father reported that his two sons were diagnosed with hyperglycemia after consuming 36 cans of cokes in three days, causing him to start monitoring and controlling consumption of sugary drinks.
3.2.7 Providing Incentives for Desirable Behaviors

Five fathers from three groups reported offering incentives to persuade their children to eat certain foods, such as chocolate, pizza, and opportunities for screen time or to play outside. Similarly, four fathers from three groups offered monetary or material incentives for their child to engage in physical activity, and used screen time to threaten or reward their child for his or her behavior.

3.2.8 Doing Things Together with Their Child

Six fathers from three groups reported eating with their child, which enabled them to teach, monitor or set an example regarding eating behaviors or intake of specific foods. Seven fathers from three groups reported involving their child in food preparation by having the child wash, cut, and peel fruits and vegetables. Nineteen fathers from four groups mentioned spending time with their child in physical activities, such as playing soccer, walking around the park, and completing house projects. Two fathers from two groups indicated they responded positively to children’s requests to play with them, which they regarded as important for motivating their children to be active. Five fathers from two groups also mentioned spending screen time with their children, such as playing video games, and watching movies or TV.

3.3 Factors That May Influence Fathers’ Involvement in Promoting Healthy Lifestyle Behaviors

Fathers’ comments can be organized into a framework of factors that either facilitated or inhibited paternal involvement in promoting healthy food and activity behaviors. Table 3.2 presents these factors categorized according to intrapersonal, interpersonal, and socioenvironmental levels.
Table 3.2 Selected focus group comments from 26 primarily Mexican American fathers regarding factors that may influence their involvement in promoting healthy lifestyle behaviors of their 10- to 14-year-old adolescents.

<table>
<thead>
<tr>
<th>Intrapersonal factors</th>
<th>Fathers’ healthy behavior changes</th>
<th>Fathers’ unhealthy habits</th>
<th>Forcing certain behaviors</th>
<th>Lack of knowledge and information</th>
<th>Lack of time and exhaustion from work</th>
<th>Financial constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eating: “I got used to not having it [soda] and now I only drink pure water” (group 4)</td>
<td>Eating: “I only grab something and make something that is quick [to eat]” (group 3)</td>
<td>Eating: “I make her eat and in a short time she is vomiting because she was forced to eat it” (group 1)</td>
<td>Eating: “I don’t know many recipes or much about cooking” (group 3)</td>
<td>Eating: “I don’t have time. … I take them out to eat. It is easier for me” (group 1)</td>
<td>Eating: “I have a large family so sometimes there isn’t enough to buy everything you want that is healthy” (group 2)</td>
</tr>
<tr>
<td></td>
<td>Screen time: “now I cut the Internet, … he is studying more and I also do other things, like drawing” (group 2)</td>
<td>Screen time: “I spend a lot of time on video games or the Internet” (group 1)</td>
<td>Screen time: “I get home tired, I watch a little TV and I play [games]” (group 2)</td>
<td>Physical activity: “in my case you don’t know where to go or take them” (group 1)</td>
<td>Physical activity: “sometimes I get home very tired and I try to run with her, but so far ... I haven’t managed it” (group 4)</td>
<td>Physical activity: “you have to pay for the activities; … due to our economic situation, we can’t do them” (group 1)</td>
</tr>
<tr>
<td></td>
<td>Being responsive</td>
<td></td>
<td>Physical activity: “as tired as I am, I go and kick the ball around so that he also gets motivated to play sports” (group 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eating: “they tell me that I don’t like this vegetable, but I do like that one. So, I prepare it like that” (group 1)</td>
<td></td>
<td>Physical activity: “make him do something he doesn’t like, and that will never work because they won’t learn” (group 3)</td>
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</tr>
<tr>
<td></td>
<td>Physical activity: “if you organize yourself well, you can do it” (group 2)</td>
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<td></td>
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</tr>
</tbody>
</table>
### Interpersonal factors

<table>
<thead>
<tr>
<th></th>
<th><strong>Eating</strong>: “it was more teamwork … to create healthier eating habits” (group 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P</strong></td>
<td>Mutual support</td>
</tr>
<tr>
<td>Parental conflict and disagreement</td>
<td><strong>Eating</strong>: “In my case my wife spoils them more, …, I am a bit rougher, more imposing, and in the end, she is the one who has, let’s say control, over the child” (group 1)</td>
</tr>
<tr>
<td></td>
<td><strong>Screen time</strong>: “I would take his game away and his mother would come and give it back to him” (group 1)</td>
</tr>
<tr>
<td></td>
<td><strong>Eating</strong>: “They say no, we want food from outside” (group 4)</td>
</tr>
<tr>
<td></td>
<td><strong>Physical activity</strong>: “I can’t make my daughter run even if a truck is chasing her!” (group 1)</td>
</tr>
<tr>
<td></td>
<td><strong>Screen time</strong>: “They get furious and really angry. They get on your nerves, but what can you do?” (group 2)</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>Resistance from early adolescents</td>
</tr>
</tbody>
</table>

### Social-environmental factors

<table>
<thead>
<tr>
<th></th>
<th><strong>Eating</strong>: “I’ll be frank, I really wasn’t into all that about food this and that, because of my culture” (group 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P</strong></td>
<td>Perceived gender role</td>
</tr>
<tr>
<td>Challenging environment</td>
<td><strong>Eating</strong>: “everything is easy here, I tend to eat a hamburger, fast food is easier. And down in Mexico we are more used to something else” (group 3)</td>
</tr>
<tr>
<td></td>
<td><strong>Physical activity</strong>:” Here it’s not so accessible in the sense that you have to have a schedule, which is something that we’re not used to in Mexico” (group 1)</td>
</tr>
</tbody>
</table>

*Exemplary quotes were extracted verbatim from the English translations of transcripts from four focus groups. The selection of exemplary quotes is based on the presentation of all four groups by including different fathers with most relevant and concise comments.*
3.3.1 Intrapersonal Factors

Positive intrapersonal factors included healthy behavior changes that fathers made, being responsive to child preferences, and self-efficacy for engaging in parenting practices. Seven fathers from three groups reported that they previously made healthy behavior changes including eating more fruits and vegetables, drinking fewer sugary drinks and spending less time playing video games. They noticed that these behavior changes positively influenced their child’s eating and screen time behaviors. Six fathers from four groups reported that they were responsive to child preferences in terms of getting their child to eat vegetables based on serving what was liked, accepting their child’s requests to play outside together, and involving children in physical activities they enjoyed. Seven fathers from four groups showed self-efficacy for healthy food and activity parenting practices by expressing confidence in preparing or cooking healthy foods, and engaging in physical activity when these behaviors were difficult, such as in the winter or when tired after work.

Negative intrapersonal factors for fathers included having unhealthy habits, applying pressure regarding expectations, lacking knowledge and information, lacking time, being exhausted after work, and having financial constraints. Six fathers from three groups reported having unhealthy eating habits and three fathers from three groups reported spending a lot of time on video games. Fathers indicated that these unhealthy habits limited their ability to promote healthy behaviors for their child. Nine fathers from three groups reported that expecting certain behaviors regarding children’s eating, physical activity and screen time for this age group “doesn’t lead to anything” because they “rebel”, “clash”, or “get even” at school. Nine fathers from four groups indicated that they lacked nutrition knowledge and cooking skills, and two fathers from two groups reported not knowing how their children could be physically active in the winter. Fathers regarded lack of time or being exhausted from work as a major barrier for healthy food and activity parenting. Nineteen fathers from four groups mentioned that they resorted to “fast, simple, easy, quick and go” foods for themselves and their families due to busy schedules and getting home from work too tired to prepare more complex meals. Fifteen fathers from four groups also reported that lack of time and being tired prevented them from engaging in physical activities with their children. This situation was exacerbated
when both parents had one or more jobs. However, two fathers from two groups mentioned that lack of time and being tired were excuses for not making healthy food and activity parenting a priority. In addition, nine fathers from four groups and three fathers from three groups perceived that financial constraints prevented their families from being able to afford healthy diets and to pay for activities, respectively. Among these fathers, three referred to organic foods as healthy but not affordable.

### 3.3.2 Interpersonal Factors

Mutual support and agreement were positive interpersonal factors identified from fathers’ comments that referred to similarities between parents or primary caregivers regarding attitudes, rules, decisions and communication. Nine fathers from four groups reported that agreements between themselves and their spouses helped promote healthy habits at home, which was important.

Negative interpersonal factors identified from the discussions included parental conflict and disagreement, and child resistance. Parental conflict and disagreement referred to discordance between parents or primary caregivers. Nine fathers from three groups reported that one parent was stricter regarding healthy eating than the other parent. For example, one father disagreed with the mother catering to each child’s food preferences. Four fathers from two groups also mentioned that they had different ideas about restricting children’s access to screen time devices than the mothers of their children. Ten fathers from four groups also reported resistance or negative attitudes from the child related to restricting fast food consumption and screen time, and being active. For example, a father reported his daughter refused his invitation to take a walk together.

### 3.3.3 Social-Environmental Factors

Two negative social-environmental factors identified were perceived gender roles and a challenging environment. Eight fathers from four groups expressed perceived gender roles for women as having primary responsibility in food parenting and child rearing, and for men as lacking interest in nutrition or food preparation. Fathers also perceived that the challenging environment made healthy eating and being active less favorable. Four fathers from two groups stated that fast foods were more affordable and accessible in the U.S. than in Mexico and that people needed to pay more for fresh and natural foods in the U.S. In terms of physical activity, six fathers from three groups
reported that their families had transitioned from active commuting to driving, and that they were not accustomed to a more formal sports culture in the U.S. compared to casual outdoor play in Mexico. In addition, twelve fathers from four groups indicated that cold weather limited opportunities to be active in the winter.

4. Discussion

Focus group participants provided information about their views and experiences, and involvement regarding diet, physical activity and screen time of their early adolescent. The findings have implications for Mexican American fathers as promoters of healthy lifestyle behaviors among early adolescents to curb the disproportionally high rate of obesity.

Fathers’ beliefs and concerns about nutrition and physical activity motivated them to improve their child’s eating, physical activity and screen time behaviors. Thus, these beliefs and concerns should be addressed in childhood obesity prevention programs. Quantitative studies showed that parents with greater awareness or concern were more likely to regulate children’s behaviors (Branch et al., 2017; Moore, Harris, & Bradlyn, 2012). Similar to the beliefs shared by Latino parents with overweight and obese children in a previous focus group study (Flores et al., 2012), fathers in the current study recognized the influence of nutrition, physical activity and screen time on body weight. They also stated the importance of nutrition and physical activity to disease prevention and school performance. They were generally concerned about their child not eating enough vegetables, drinking sugary drinks, eating fast food, and having excessive screen time. Even though physical inactivity was not a common concern, fathers worried about their child’s preferences for playing video games over physical activity. To address their concerns, fathers reported the use of various types of food and activity parenting practices such as setting and enforcing expectations and limits, setting an example, and managing the availability and accessibility of foods and activities. Previous studies reported these parenting practices primarily for female caregivers, (Evans et al., 2011; Flores et al., 2012; Martinez et al., 2015; O’Connor, Cerin, et al., 2013), whereas the current study indicated that fathers were also engaged in food and activity parenting. Several studies showed that a greater level of acculturation predicted a greater percentage of energy
intake from energy-dense foods, lower fiber intake, and overall poorer diet quality (Batis et al., 2011; Fred Wen et al., 2016; Van Hook et al., 2015). Latino immigrants with greater acculturation levels also had increased screen time and decreased active transportation and occupational physical activity (Perez et al., 2016; Shi et al., 2012). These acculturation-related behavior changes contribute to unhealthy weight gain. It is important to understand Latino paternal influence on behavior risk factors of childhood obesity.

In the current study, fathers demonstrated eight major food and activity parenting practices. For setting expectations and limits, fathers focused on eating fruits, vegetables, appropriate portions of foods, and traditional foods, and having physical activity and limited screen time. Similar to previous findings with Latino parents, these fathers reported that they pressured or forced their child to eat, be active and limit screen-time, but also that they allowed children to consume less healthy foods (Cardel et al., 2012; Hughes et al., 2006; Pesch et al., 2011; Turner et al., 2014). Interestingly, Latino parents stated that balance was the key to having a healthy diet in the current and previous studies (Evans et al., 2011; Tiedje et al., 2014). However, the way parents interpret and implement the concept of balance regarding expectations for intake of healthy and less healthy foods is unknown.

Similar to mothers reporting that fathers provided less healthy foods to children in previous studies, (Lora et al., 2016; Rhoads-Baeza & Reis, 2012) several fathers in the current study reported providing sugary drinks, sweets and salty snacks, and fast foods to their child, and using less healthy foods to motivate consumption of healthy foods. The availability and accessibility of foods and activity opportunities was a strong predictor of children’s behaviors in several studies (Couch et al., 2014; Ramirez et al., 2011). However, Latino parents reported a higher rate of having soda at home and having a TV in a child’s bedroom than other racial and ethnic groups (Taveras, Hohman, Price, Gortmaker, & Sonneville, 2009b). Based on the findings from the current study, Mexican American fathers can potentially influence children’s behaviors through modifications to the home food and activity environment.

In the current study, fathers intentionally or unintentionally modeled healthy or unhealthy behaviors to their child. Some fathers stated that they tried to demonstrate
healthy behaviors to their child, whereas others admitted that they were not good role models because of their own unhealthy habits, which reflected mothers’ report in a previous study (Lora et al., 2016). The importance of role modeling is a common parenting belief held by Latino parents, as reported in a number of previous studies (Evans et al., 2011; Tiedje et al., 2014; Tovar et al., 2015). The effect of role modeling on their child’s eating and activity behaviors should be emphasized among Latino fathers.

Factors were identified that either facilitated or inhibited the positive involvement of fathers in food and physical activity parenting. At the intrapersonal level, lack of time and being tired from work were the most frequently mentioned factors that restricted fathers’ involvement in supportive food and activity parenting. Together with financial constraints, these factors often emerged as barriers to healthy lifestyles (Malhotra et al., 2013; Martinez et al., 2015; Snethen et al., 2007). Fathers also showed mixed levels of self-efficacy in food and activity parenting. For example, confidence in food and activity parenting varied with nutrition knowledge and information regarding physical activity resources. Moreover, fathers appeared to be more involved in activity parenting than food parenting, which may be related to perceived gender roles. These fathers stated that they did not generally have control or responsibility for the management of feeding and childrearing activities. In the Latino culture, men and women are characterized by different gender figures of machismo and marianismo, respectively (Skogrand et al., 2005). The former expects men to be the authority figure in the family and to protect and provide for the family; the latter expects women to run the household and raise children (Skogrand et al., 2005). Machismo is also associated with physical strength. Thus, this cultural norm may explain fathers’ involvement in physical activity and a desire to leave food parenting practices and other major childrearing responsibilities to mothers. However, this study did not examine the effect of child gender on fathers’ food and activity practices. No relationships between child gender and fathers’ beliefs, concerns or parenting practices were noted from the transcripts, except that fathers indicated boys were more likely to spend too much time playing video games than girls.

Interpersonal factors identified in the current study included both support and resistance from family members. Fathers reported that their food and activity parenting practices sometimes conflicted with their child’s food preferences and desire to use
electronic devices. Other studies also reported resistance from children as a major barrier to promoting healthy eating and physical activity at home (Pocock, Trivedi, Wills, Bunn, & Magnusson, 2010; Power & et al., 2010; Slater et al., 2010). In addition, fathers valued inter-parental agreement and resolution of disagreements in the absence of the child, and showed appreciation for the agreement and support they received from their spouse. Others showed frustration over conflicts with their spouse regarding food and activity parenting. A previous study found that interparental incongruence attenuated fathers’ efforts to reduce children’s snack intake (Gevers et al., 2015). The discordance between parents may compromise the potential positive influence of healthy food and activity parenting.

To the authors’ knowledge, this was the first focus group study exclusively involving a relatively homogeneous sample of male caregivers with a primarily Mexican American cultural background to identify perspectives and experiences regarding food and activity parenting for adolescents. To avoid bias related to the presence of females and to encourage fathers’ conversation, the focus groups were led and assisted by Latino male research staff. The primary limitation of this qualitative study was the inclusion of a convenient and self-selected sample. Eligibility criteria included those who self-identified as Latino, but the resulting sample were all born in Mexico except for one father. Therefore, focus group findings should be applied with caution to Latino fathers of non-Mexican heritage. Future studies need to compare food- and activity-related parenting practices among various Latino ethnic groups. Because fathers were informed about the topics of the focus groups at recruitment, volunteering for this study indicated that this sample may have greater interest in fostering healthy behaviors of children than a broader group of Mexican American fathers. In addition, all but one father were Mexican Americans and the majority were low-income. Therefore, findings from this study may not apply to Latino fathers with different demographic and socioeconomic backgrounds. Moreover, this qualitative study design was limited to thematic analysis and quantitative comparisons could not be performed.
5. Conclusion

The results of this study identified Mexican American fathers’ perspectives and experiences related to early adolescents’ eating, physical activity, and screen time behaviors based on focus group findings. In general, Mexican American fathers agreed on the importance of nutrition and physical activity and shared concerns about their child’s behaviors. Fathers reported supportive and unsupportive involvement in healthy eating and activity behaviors of their child through various parenting practices such as setting and reinforcing expectations and limits, role modeling, and managing food and activity environments and opportunities. Implications for practice include insights for dietitians or health educators in providing culturally competent counseling or conducting educational interventions involving Mexican American fathers to promote healthy early adolescents’ eating, physical activity, and screen-time behaviors. These efforts should acknowledge shared responsibilities for food and activity parenting between male and female caregivers and address potential inter-parental concordance or discordance. Implications for future research include investigating the effects of child gender on paternal involvement, the effectiveness of involving Mexican American fathers in healthy lifestyle interventions, and strategies to enhance or address facilitators and barriers to positive paternal involvement.

1. Introduction

Latino children and adolescents experience a greater burden of overweight/obesity, compared to other ethnic/racial groups, with nearly half of the population having a BMI at or above the 85th percentile (Skinner et al., 2018). Studies have found that Latino children and adolescents from immigrant families tend to adopt a “western” diet pattern and have less active transport, inadequate leisure-time exercise and increased screen time than those from less acculturated families (Ayala, Baquero, & Klinger, 2008; Echeverría et al., 2015; Gordon-Larsen et al., 2003; Unger et al., 2004). Adverse changes in energy balance-related behaviors (EBRBs) including intake of fruit, vegetables, sweets/salty snacks, sugar-sweetened beverages (SSBs), and fast food; physical activity and screen time increase the risk of excessive weight gain and therefore need to be addressed by effective intervention strategies.

Existing family-based behavioral interventions to prevent pediatric obesity demonstrated only modest effects on improving children’s EBRBs (Brown et al., 2016; Marsh et al., 2014; Schlechter et al., 2016). These programs frequently applied indirect strategies to involve parents as change agents and did not directly address important parenting practices to improve child EBRBs. Based on available studies, three types of parenting practices have shown relatively consistent positive relationships with children’s EBRBs, including setting expectations/limits, behavioral modeling, and managing availability and accessibility (Edwardson & Gorely, 2010; Xu, Wen, & Rissel, 2015; Yee et al., 2017). Incorporating these parenting practices into family-based healthy lifestyle interventions would potentially improve parents’ involvement in promoting healthy EBRBs among children and adolescents.

Fathers have an important and unique influence on children’s health and weight status (Freeman et al., 2012; Yogman & Garfield, 2016), but have been underrepresented in family interventions to prevent childhood obesity (Davison et al., 2018). In Latino families, the cultural values of “familism” and “respeto” along with the gender roles of
“machismo” and “marianismo” have made fathers influential household figures in charge of major decisions (O’Connor, Perez, Garcia, & Gallagher, 2018). Qualitative studies indicated that Latino fathers are less engaged in food parenting practices than mothers, and that fathers’ food preferences and permissiveness regarding children’s diets influence the dietary intake of the family (Davis et al., 2016; Evans et al., 2011; Lora et al., 2016; Mena et al., 2015). Other findings showed that Latino fathers are commonly involved in children’s physical activity and screen time, and some fathers report intentions to support healthy eating among their children (Davis et al., 2016; Lindsay, Wallington, Muñoz, & Greaney, 2018; Lora et al., 2016). The disproportionately high obesity rate among Latino children and adolescents and the potentially important role of fathers indicates a need for further research regarding Latino fathers’ parenting practices around EBRBs.

A number of measures to assess EBRB-related parenting practices are available (Vaughn, Tabak, Bryant, & Ward, 2013); however, these measures have primarily been developed based on research with mothers of younger children (Davison et al., 2016; Vaughn et al., 2013). Therefore, these measures may not be valid for fathers or parents of older children. For example, Latino fathers’ parenting practices have been assessed using the Parenting Strategies for Eating and Activity Scale (PEAS), which was developed based on the findings of focus groups with Latino mothers of 5- to 8-year-old children (Larios et al., 2009; Matthews-Ewald, Posada, Wiesner, & Olvera, 2015). The PEAS scale was not validated against children’s behaviors specified in the survey items.

According to the Contextual Model of Parenting Style, parenting practices are goal-directed behaviors that have direct effects on the development of specific child behaviors (Darling & Steinberg, 1993). This definition indicates that the relationship between parenting practices and specific behavioral outcomes of children is an important criterion of construct validity for assessing parenting practices. This criterion should be applied to validate measures assessing paternal parenting practices specific to children’s EBRBs. In addition, multiple studies have reported discrepancies between parents’ and children’s report of parenting practices, possibly influenced by parent social desirability bias and parent-child relationships (Korelitz & Garber, 2016; Rebholz et al., 2014; Tak, te Velde, de Vries, & Brug, 2006; van Assema, Glanz, Martens, & Brug, 2007). Therefore, including both children’s and fathers’ reports are important for assessing
fathers’ parenting practices. Comparing agreement between children’s and fathers’
reports would shed light on future application and design of measures to assess fathers’
parenting practices.

Tested instruments to assess the influence of Latino fathers’ parenting practices
related to children’s EBRBs are lacking for use in obesity prevention programs. Parenting
practices have been conceptualized differently in various assessment measures and
potential bias has been noted based on fathers’ reports using certain assessment tools.
Therefore, survey development and validation to assess Latino fathers’ parenting
practices related to early adolescents’ EBRBs was a necessary part of a formative process
to develop a program involving Latino fathers to promote healthy adolescent lifestyles.
The present study aimed to examine the criterion validity of the measures against
adolescents’ corresponding EBRBs and the agreement between father-reported and
adolescent-reported paternal parenting practices.

2. Method
2.1 Participants and Study Design

Latino father-adolescent dyads were recruited from community sites serving low-
income Latinos in the Minneapolis/St. Paul metropolitan area and surrounding suburbs
using flyers, word of mouth and social media. Inclusion criteria for adolescents was being
10-14 years of age. Inclusion criteria for fathers was having meals with the early
adolescent at least three times in a week, self-identifying as Latino and speaking Spanish.
A total number of 96 Latino father-adolescent dyads completed the survey about paternal
parenting practices and EBRBs; 71% of the sample (n=68) completed the survey as part
of baseline data collection for a community-based obesity prevention program. Parent
and adolescent participants provided consent and assent, completed the 20-30 minutes
survey in separate groups, and received cash compensation for their participation. The
study was approved by the Institutional Review Board Human Subjects Committee at the
University of Minnesota.

2.2 Survey Development

Survey items to assess the frequency of three key parenting practices (setting
expectations/limits, behavioral modeling, and managing availability and accessibility)
were developed based on existing instruments (Matthews-Ewald et al., 2015; Pinard et al., 2014; Singh et al., 2012) and findings from focus groups with Latino fathers (Zhang, Hurtado, Flores, Alba-Meraz & Reicks, 2018). Level or frequency of parenting practices was assessed with regard to intake of fruit, vegetables, SSBs, sweets/salty snacks and fast food as well as physical activity and screen time. The adolescent and parent versions of the survey addressing parenting around the seven EBRBs were first written in a parallel form in English and then the parent survey was translated into Spanish. Cognitive testing of newly developed survey items was conducted with five Latino fathers and four Latino adolescents using the think-aloud method during individual interviews (Ericsson, 1993). A final version of wordings used for each measure of parenting practices is shown in Figure 4.1.

<table>
<thead>
<tr>
<th>Paternal expectations/limits</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>How many times in a day do you think your father wants you to eat fruits (vegetables)</em>**?</td>
</tr>
<tr>
<td>Responses: 0 times or I don’t know = 0, 1 time = 1, 2 times = 2, 3 times or more = 3.</td>
</tr>
<tr>
<td><em>How often does your father allow you to drink sugary drinks (eat sweets and/or salty snacks, eat fast food)?</em></td>
</tr>
<tr>
<td>Responses: 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.</td>
</tr>
<tr>
<td><em>How many hours in a day do you think your father wants you to be physically active?</em></td>
</tr>
<tr>
<td>Responses: 0 minutes, as much as I want, 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.</td>
</tr>
<tr>
<td><em>How much screen time does your father allow you to have in a day?</em></td>
</tr>
<tr>
<td>Responses: 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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Paternal behavioral modeling</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>How many times in a week ...?</em></td>
</tr>
<tr>
<td>1. <em>do you see your father eating (drinking) fruits (vegetables, sugary drinks, sweets/salty snacks, fast food)</em></td>
</tr>
<tr>
<td>2. <em>does your father eat (drink) fruits (vegetables, sugary drinks, sweets/salty snacks, fast food) with you</em></td>
</tr>
<tr>
<td>1. How active is your father?</td>
</tr>
<tr>
<td>2. <em>How many times in a week is your father physically active with you?</em></td>
</tr>
<tr>
<td><em>How many times in a week ...?</em></td>
</tr>
<tr>
<td>1. <em>do you see your father having screen time</em></td>
</tr>
<tr>
<td>2. <em>does your father have screen time with you</em></td>
</tr>
</tbody>
</table>
Responses: Almost never or never = 1 to once a day or more = 5.
Responses: Not active at all = 1 to very active = 5.

### Availability/accessibility

*How often does your father ...?*

1. buy fruits (vegetables, sugary drinks, sweets/salty snacks, fast food) for you to eat (drink)
2. prepare fruits (vegetables, sugary drinks, sweets/salty snacks, fast food) for you to eat (drink)
3. make sure you have different kinds of fruits (vegetables) to choose from
4. give you money to buy sugary drinks (sweets and/or salty snacks, fast food)

*How often does your father ...?*

1. take you to a place where you can be physically active
2. send you outside to be physically active when the weather is nice
3. provide opportunities for you to be physically active

*How often does your father provide you with screen time opportunities? (Examples are giving you a smartphone, tablet or computer to play, allowing you to use TV or video game.)*

Responses: Almost never or never = 1 to almost always or always = 5.

Figure 4.1 Measures to assess Latino fathers’ parenting practices related to early adolescents’ energy balance-related behaviors (fathers responded to the same set of questions reworded to reflect their perceptions)

### 2.2.1 Paternal Parenting Practices

To examine the relationships between paternal parenting practices and early adolescents’ EBRBs, paternal parenting practices were dichotomized into high and low levels or frequencies based on the nature of the response options and distribution of the data. Participants’ responses were scored to reflect the level or frequency of each type of parenting practice (Figure 4.1). High and low levels of paternal expectations/limits were categorized by a score ≥ 2 and ≤ 1 for fruit, vegetable, and physical activity; ≤ 2 and ≥ 3 for SSBs and sweets/salty snacks; ≤ 1 and ≥ 2 for fast food, and ≤ 3 and ≥ 4 for screen time. High and low frequencies of paternal behavioral modeling were categorized by a mean score of the two questions > 3 and ≤ 3 for fruit, vegetables, SSBs, physical activity, and screen-time; and > 2 and ≤ 2 for sweets/salty snacks and fast food. For paternal availability/accessibility practices, high and low frequencies were categorized by a mean score of the three questions ≥ 4 and < 4 for fruit, vegetable and physical activity; > 2 and ≤ 2 for SSBs, sweets/salty snacks and fast foods; and a single score ≥ 4 and < 4 for screen
time. Cronbach α coefficients of the paternal availability/accessibility scales ranged from 0.62 to 0.84 for adolescent reports, and from 0.54 to 0.86 for father reports.

2.2.2 Dietary Intake

Adolescents’ intake frequencies of fruit, vegetables, SSBs, sweets/salty snacks, and fast food were assessed by asking how often typical food/drinks from each food group were consumed. The list of typical food/drinks in each food group (Figure 4.2) was adapted from the Block Kids food frequency questionnaire (Hunsberger, O’Malley, Block, & Norris, 2012). Response options (never, less than once in a week, 1 - 3 times per week, 4 - 6 times per week, once a day or more) were recoded to 0, 0.11, 0.29, 0.71, and 1 to estimate daily intake frequency. The daily intake frequency score was the sum score of the converted daily intake frequency scores of items in each food group. Outliers were identified as ≥ upper quartile plus 1.5 times the interquartile range (IQR) and were excluded from the analysis involving corresponding variables.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Apple, banana, orange, grapes, melons, berries, other fresh, canned or frozen fruits, 100% fruit juice</th>
</tr>
</thead>
<tbody>
<tr>
<td>(8 items)</td>
<td>Green salad, beans and peas, raw vegetables such as carrots, cucumber, tomato; cooked vegetables not including deep fried vegetables such as French fries.</td>
</tr>
<tr>
<td>Vegetable</td>
<td>Regular soda or pop, sports drinks such as Gatorade®, energy drinks such as Red Bull®, other sweetened beverages such as fruit punch and lemonade, homemade sweetened drinks such as Agua Fresca, coffee drinks such as lattes and Frappuccino</td>
</tr>
<tr>
<td>(4 items)</td>
<td>Candy bars, chocolate, or other candy; cake, donuts, sweet rolls, or pastry; cookies and bars; ice cream, popsicle, or ice cream bars</td>
</tr>
<tr>
<td>Sugar sweetened beverages</td>
<td>Potato chips such as Lay’s, corn chips or tortilla chips such as Takis® and Doritos®, cheese puffs or curls such as Cheetos®, crackers such as Cheez-It®, and Chex Mix®, other salty snacks American fast food restaurants, such as McDonalds® or Burger King®, Mexican fast food restaurants, such as Taco Bell®, sandwich or subs shop, such as Subway®, pizza places, such as Pizza Hut® and Little Caesars®, Asian buffets or restaurants; Deli or food stand on the street or in food markets.</td>
</tr>
<tr>
<td>(6 items)</td>
<td></td>
</tr>
<tr>
<td>Sweets</td>
<td></td>
</tr>
<tr>
<td>(4 items)</td>
<td></td>
</tr>
<tr>
<td>Salty snacks</td>
<td></td>
</tr>
<tr>
<td>(5 items)</td>
<td></td>
</tr>
<tr>
<td>Fast food</td>
<td></td>
</tr>
<tr>
<td>(6 items)</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.2. Food and drink items assessed in the early adolescent-reported Food Frequency Questionnaire.
2.2.3 Physical Activity

Adolescents responded to two survey questions assessing hours spent in a usual week on vigorous and moderate exercises with examples provided for each level (Godin & Shephard, 1985; McGuire, Hannan, Neumark-Sztainer, Cossrow, & Story, 2002). Response options (0, < 30 minutes, 0.5 to 2 hours, 2.5 to 4 hours, 4.5 to 6 hours, and > 6 hours) were recoded to 0, 0.3, 1.3, 3.3, 5.3, and 8, respectively, to estimate hours of physical activity per week. Responses to the two questions were summed to create a score representing total time spent in moderate-to-vigorous physical activity in a usual week.

2.2.4 Screen Time

Adolescents reported screen time in response to questions from Project EAT regarding media use (Utter, Neumark-Sztainer, Jeffery, & Story, 2003). The questions assessed daily hours spent watching TV/DVDs/videos; using a computer (not for homework or work) and playing electronic games while sitting on a typical weekday and weekend day. Adolescents also reported daily hours spent using smartphones and tablets. Seven response categories ranged from 0 hours to > 5 hours for each type of screen time. Hours of total screen time per day were calculated using a weighted sum of weekday and weekend day responses divided by 7 days (Utter et al., 2003). Adolescents who reported > 10 hours of recreational screen time per day were excluded from the analysis. This cut-off point was determined by examining the distribution of participants’ responses as well as consideration of responses indicating implausible reporting and/or multi-tasking.

2.2.5 Demographic Characteristics

Adolescents reported their age and sex. Fathers reported their age, marital status, highest level of education, household income, food security status, years of U.S. residence, and language spoken at home. Food insecurity was determined using a two-item screener (Hager et al., 2010). Fathers were divided into two categories by 15 years of U.S. residence. Several studies have reported that residing in the U.S. for 15 years and longer is associated with obesity-related outcomes among immigrants (Barcenas et al.,
2.3 Statistical Analysis

Statistical analysis was performed using SAS 9.4 (Cary, NC, USA, 2002-2012). The normality of data distribution was examined based on the Kolmogorov-Smirnov test. Internal consistency of scales was determined based on Cronbach α coefficients. Adolescent-reported EBRBs and parenting practices were not normally distributed; therefore between-group comparisons of nonparametric data were conducted using the Wilcoxon rank sum test. Correlations between nonparametric data were examined using Spearman rank correlation analysis. Agreement between adolescent-reported and father-reported paternal expectations/limits, behavioral modeling and availability/accessibility practices was assessed based on percent of agreement and simple kappa statistics of the dichotomized responses. The agreement between adolescent-reported and father-reported paternal availability/accessibility scales was assessed by intraclass correlation coefficient (ICC). Differences between adolescent- and father-reported scores for paternal parenting practices were compared using Student’s t-test.

3. Results

3.1 Participant Characteristics

For the 96 adolescent-father dyads, mean age was 11.7 ± 1.3 for adolescents and 40.2 ± 6.5 for fathers (Table 4.1). About half of the adolescents were boys. Most fathers were married or lived with a partner (91%), reported their highest educational attainment as high school or lower (79%), and reported an annual household income ≤ $49,999 (85%). Nearly half of fathers reported food insecurity in their households. Mean length of U.S. residence for fathers was 18.8 ± 6.2 years. Most fathers primarily (68%) or only spoke (28%) their native language at home.
Table 4.1. Demographic characteristics of Latino adolescent-father dyads (n=96)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n (%) or mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adolescent age</strong></td>
<td>11.7 ± 1.3</td>
</tr>
<tr>
<td>10-12 years</td>
<td>68 (71%)</td>
</tr>
<tr>
<td>13-14 years</td>
<td>28 (29%)</td>
</tr>
<tr>
<td><strong>Adolescent sex</strong></td>
<td></td>
</tr>
<tr>
<td>Boy</td>
<td>50 (52%)</td>
</tr>
<tr>
<td>Girl</td>
<td>46 (48%)</td>
</tr>
<tr>
<td><strong>Fathers’ age</strong></td>
<td>40.2 ± 6.5</td>
</tr>
<tr>
<td>≤ 40 years</td>
<td>45 (47%)</td>
</tr>
<tr>
<td>&gt; 40 years</td>
<td>48 (50%)</td>
</tr>
<tr>
<td>Missing</td>
<td>3 (3%)</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
</tr>
<tr>
<td>Married or with a partner</td>
<td>87 (91%)</td>
</tr>
<tr>
<td>Single</td>
<td>7 (7%)</td>
</tr>
<tr>
<td>Missing</td>
<td>2 (2%)</td>
</tr>
<tr>
<td><strong>Education attainment</strong></td>
<td></td>
</tr>
<tr>
<td>Middle school or less</td>
<td>36 (38%)</td>
</tr>
<tr>
<td>High school or GED</td>
<td>39 (41%)</td>
</tr>
<tr>
<td>Some college or more</td>
<td>19 (20%)</td>
</tr>
<tr>
<td>Missing</td>
<td>2 (2%)</td>
</tr>
<tr>
<td><strong>Household income</strong></td>
<td></td>
</tr>
<tr>
<td>≤ $24, 999</td>
<td>37 (39%)</td>
</tr>
<tr>
<td>$25, 000-$49, 999</td>
<td>45 (47%)</td>
</tr>
<tr>
<td>≥$50, 000</td>
<td>8 (8%)</td>
</tr>
<tr>
<td>Missing</td>
<td>6 (6%)</td>
</tr>
<tr>
<td><strong>Food insecure</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>44 (46%)</td>
</tr>
<tr>
<td>No</td>
<td>51 (53%)</td>
</tr>
<tr>
<td>Missing</td>
<td>1 (1%)</td>
</tr>
<tr>
<td><strong>Years of U.S. residence</strong></td>
<td>18.8 ± 6.2</td>
</tr>
<tr>
<td>&lt;15 years</td>
<td>19 (20%)</td>
</tr>
<tr>
<td>≥ 15 years</td>
<td>69 (72%)</td>
</tr>
<tr>
<td>Missing</td>
<td>8 (8%)</td>
</tr>
<tr>
<td><strong>Language spoken at home</strong></td>
<td></td>
</tr>
<tr>
<td>Primarily native</td>
<td>65 (68%)</td>
</tr>
<tr>
<td>Equally or primarily English</td>
<td>27 (28%)</td>
</tr>
<tr>
<td>Missing</td>
<td>4 (4%)</td>
</tr>
</tbody>
</table>
3.2 Paternal Expectations/Limits on Adolescents’ EBRBs

Adolescents who reported relatively high EBRB-specific paternal expectations and limits had significantly higher intakes of fruit and vegetables, and weekly MVPA and lower intakes of SSBs, sweets/salty snacks and fast food, and less recreational screen time compared to those who reported low or no paternal expectations/limits (Table 4.2). However, adolescent EBRBs were not significantly different based on high and low levels of father-reported expectations and limits except for screen time (median, IQR: 23.5, 14.0 to 33.5 vs. 41.5, 25.5 to 54.0; p = 0.005, data not shown in table).

Table 4.2. Differences in Latino adolescents’ EBRBs by their perceived high or low paternal expectations or limits

<table>
<thead>
<tr>
<th>Adolescents’ EBRBs</th>
<th>Paternal expectations/limits&lt;sup&gt;a&lt;/sup&gt;</th>
<th>P value&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>Median (IQR)</td>
</tr>
<tr>
<td>Fruit (times/day)</td>
<td>47</td>
<td>3.3 (1.8-4.6)</td>
</tr>
<tr>
<td>Vegetables (times/day)</td>
<td>53</td>
<td>1.2 (0.8-1.8)</td>
</tr>
<tr>
<td>SSBs (times/day)</td>
<td>66</td>
<td>0.9 (0.4-1.6)</td>
</tr>
<tr>
<td>Sweets/salty snacks (times/day)</td>
<td>56</td>
<td>0.9 (0.5-1.5)</td>
</tr>
<tr>
<td>Fast food (times/week)</td>
<td>42</td>
<td>0.4 (0.2-0.7)</td>
</tr>
<tr>
<td>MVPA (hours/week)</td>
<td>58</td>
<td>2.6 (1.6-2.6)</td>
</tr>
<tr>
<td>Screen time (hours/week)</td>
<td>47</td>
<td>23.0 (14.0-30.5)</td>
</tr>
</tbody>
</table>

<sup>a</sup>High and low levels of paternal expectation: ≥ 2 and ≤ 1 time per day (fruit and vegetable), ≥ 0.5 hour per day and <0.5 hour per day (physical activity).

<sup>b</sup>High and low levels paternal limits: ≤ 1-3 and ≥ 4-6 times per week (sugary drinks and sweets/salty snacks), ≤ 1 and ≥ 1-3 time per week (fast food), ≤ 2 and > 2 hours per day (screen time).

<sup>b</sup>Wilcoxon rank sum test, p<0.05, two-sided.

EBRB: energy balance-related behavior; SSB: sweets and salty snacks; MVPA: moderate and vigorous physical activity.

3.3 Paternal Behavioral Modeling of EBRBs

Adolescent-reported frequencies of EBRB-specific paternal behavioral modeling were positively correlated with five of the seven EBRBs (Table 4.3). The correlation coefficients ranged from 0.22 (SSB intake) to 0.54 (vegetable intake). Adolescents who perceived high frequency of paternal behavioral modeling of fruit intake, vegetable intake, and SSB intake reported higher intakes than those who perceived low frequency
of paternal behavioral modeling. However, similar effects were not observed for other EBRBs. Father-reported frequencies of behavioral modeling of fast food intake and physical activity were positively correlated with adolescents’ fast food intake ($r = 0.23$, $p = 0.04$) and physical activity ($r = 0.26$, $p = 0.01$). None of the adolescent EBRBs differed by father-reported high or low frequency of the corresponding behavioral modeling (data not shown in table).

3.4 Paternal EBRB-Related Availability/Accessibility Practices

Adolescent-reported frequencies of paternal availability/accessibility practices were correlated with all seven adolescent EBRBs (Table 4.4). The correlation coefficients ranged from 0.29 (MVPA) to 0.44 (screen time). Adolescents who reported high frequency of paternal availability/accessibility practices reported significantly higher scores for all seven EBRBs, respectively, than those who reported low frequency of paternal availability/accessibility practices. Whereas father-reported frequencies of availability/accessibility practices were only correlated with adolescents’ vegetable intake ($r_s = 0.23$, $p = 0.04$), SSB intake ($r_s = 0.23$, $p = 0.03$) and fast food intake ($r_s = 0.33$, $p = 0.003$). Adolescents whose fathers reported high frequency of availability/accessibility practices for SSBs or fast food had higher SSB intake or fast food intake than those whose fathers reported low frequency of these availability/accessibility practices (median, IQR for SSB: 1.4, 0.8 to 2.6 vs. 0.7, 0.4 to 1.5, $p = 0.002$; median, IQR for fast food: 0.7, 0.4 to 1.0 vs. 0.4, 0.2 to 0.7, $p = 0.008$, data not shown in table).

3.5 Congruence Between Adolescent-Reported and Father-Reported Parenting Practices

The percent agreement between adolescent- and father-reported dichotomized responses for paternal expectations/limits ranged from 49% to 68% (Table 4.5), with only one significantly positive but weak kappa coefficient for paternal limits on screen time. In addition, adolescents reported significantly greater paternal allowances for sweets/salty snacks ($2.3 \pm 1.2$ vs. $1.8 \pm 1.1$, $p < 0.001$) and fast food ($1.9 \pm 1.2$ vs. $1.3 \pm 0.9$, $p < 0.001$) than fathers (data not shown in the table). The percent agreement between adolescent- and father-reported dichotomized frequencies for paternal behavioral modeling ranged from 51% to 70%, with only two positive but weak kappa coefficients for paternal behavioral modeling of fruit intake and physical activity. Adolescents
reported significantly higher frequency of paternal behavioral modeling for physical activity (3.0 ± 1.0 vs. 2.6 ± 1.1, p = 0.005) than fathers. The percent agreement between adolescent- and father-reported dichotomized scores for paternal availability/accessibility practices ranged from 52% to 70%, with only one positive but weak kappa coefficient for paternal availability/accessibility practices for physical activity. The scales for paternal availability/accessibility practices also yielded poor intraclass correlation coefficients ranging from -0.06 to 0.40. Adolescents reported significantly lower frequencies of paternal availability/accessibility practices related to fruits (3.1 ± 1.0 vs. 3.8 ± 0.8, p < 0.0001), vegetables (3.0 ± 1.2 vs. 3.6 ± 1.0, p < 0.0001), fast food (2.0 ± 0.7 vs. 2.1 ± 0.7, 0.02) and physical activity (3.4 ± 1.1 vs. 3.6 ± 0.9, p = 0.03) than fathers reported (data not shown in table).
Table 4.3. Differences in Latino adolescents’ EBRBs by their perceptions of the frequency of paternal behavioral modeling

<table>
<thead>
<tr>
<th>Adolescents’ EBRBs</th>
<th>Scale</th>
<th>Paternal behavioral modeling (^a)</th>
<th>P value (^c)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>high (n) Median (IQR)</td>
<td>low (n) Median (IQR)</td>
</tr>
<tr>
<td>Fruit (times/day)</td>
<td>78</td>
<td>0.35**</td>
<td>26  3.0 (1.9-5.7)</td>
</tr>
<tr>
<td>Vegetables (times/day)</td>
<td>87</td>
<td>0.54***</td>
<td>39  1.5 (0.9-2.1)</td>
</tr>
<tr>
<td>SSBs (times/day)</td>
<td>89</td>
<td>0.22*</td>
<td>20  1.5 (0.9-2.7)</td>
</tr>
<tr>
<td>Sweets/salty snacks (times/day)</td>
<td>76</td>
<td>0.17</td>
<td>15  1.4 (0.7-1.8)</td>
</tr>
<tr>
<td>Fast food (times/week)</td>
<td>81</td>
<td>0.27*</td>
<td>22  0.6 (0.4-1.0)</td>
</tr>
<tr>
<td>MVPA (hours/week)</td>
<td>90</td>
<td>0.30**</td>
<td>46  2.6 (1.6-2.6)</td>
</tr>
<tr>
<td>Screen time (hours/week)</td>
<td>78</td>
<td>0.10</td>
<td>29  28.3 (17.0-53.0)</td>
</tr>
</tbody>
</table>

\(^a\)High and low frequencies of paternal behavioral modeling: mean frequency score > 3 and ≤ 3 (fruit, vegetables, SSBs, physical activity, and screen time); mean frequency score >2 and ≤ 2 (sweets/salty snacks and fast food).

\(^b\)\(r_s\) = Spearman rank correlation coefficient, \(*p < 0.05, **p < 0.01, ***p < 0.0001\)

\(^c\)Between-group comparisons by Wilcoxon rank sum test, \(p < 0.05\), two-tailed.

EBRB: energy balance-related behavior; SSB: sweets and salty snacks; MVPA: moderate and vigorous physical activity
Table 4.4 Adolescent-reported paternal availability practice scales and correlations between paternal availability practices and corresponding EBRB.

<table>
<thead>
<tr>
<th>Adolescents’ EBRBs</th>
<th>Scale</th>
<th>Paternal Availability Practice&lt;sup&gt;a&lt;/sup&gt;</th>
<th>P value&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>High Median (IQR)</td>
<td>Low Median (IQR)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>n</td>
<td>Median (IQR)</td>
</tr>
<tr>
<td>Fruit (times/day)</td>
<td>78</td>
<td>0.32**</td>
<td>23</td>
</tr>
<tr>
<td>Vegetables (times/day)</td>
<td>84</td>
<td>0.42***</td>
<td>23</td>
</tr>
<tr>
<td>SSBs (times/day)</td>
<td>85</td>
<td>0.36***</td>
<td>26</td>
</tr>
<tr>
<td>Sweets/salty snacks (times/day)</td>
<td>77</td>
<td>0.29*</td>
<td>28</td>
</tr>
<tr>
<td>Fast food (times/week)</td>
<td>78</td>
<td>0.42***</td>
<td>30</td>
</tr>
<tr>
<td>MVPA (hours/week)</td>
<td>93</td>
<td>0.29**</td>
<td>34</td>
</tr>
<tr>
<td>Screen time (hours/week)</td>
<td>79</td>
<td>0.44***</td>
<td>25</td>
</tr>
</tbody>
</table>

<sup>a</sup>High and low frequencies of paternal availability practice: mean frequency score ≥ 4 and < 4 (fruit, vegetables, physical activity and screen time); mean frequency score >2 and ≤ 2 (SSBs, sweets/salty snacks and fast food)

<sup>b</sup>r<sub>s</sub> = Spearman rank correlation coefficient, *p < 0.05, **p < 0.01, ***p < 0.0001

<sup>c</sup>Between-group comparisons by Wilcoxon rank sum test, p < 0.05, two-tailed.

EBRB: energy balance-related behavior; SSB: sweets and salty snacks; MVPA: moderate and vigorous physical activity
Table 4.5 Agreements between adolescent-reported and father-reported parenting practices

<table>
<thead>
<tr>
<th>EBRBs</th>
<th>Expectation</th>
<th>Behavioral modeling</th>
<th>Availability practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%a</td>
<td>kappa b</td>
</tr>
<tr>
<td>Fruit</td>
<td>94</td>
<td>51</td>
<td>0.01 (-0.19, 0.21)</td>
</tr>
<tr>
<td>Vegetables</td>
<td>92</td>
<td>51</td>
<td>0.01 (-0.19, 0.22)</td>
</tr>
<tr>
<td>SSBs</td>
<td>91</td>
<td>68</td>
<td>0.03 (-0.18, 0.23)</td>
</tr>
<tr>
<td>Sweets/salty snacks</td>
<td>92</td>
<td>55</td>
<td>-0.07 (-0.24, 0.11)</td>
</tr>
<tr>
<td>Fast food</td>
<td>93</td>
<td>49</td>
<td>-0.003 (-0.20, 0.19)</td>
</tr>
<tr>
<td>MVPA c</td>
<td>91</td>
<td>52</td>
<td>-0.03 (-0.23, 0.17)</td>
</tr>
<tr>
<td>Screen time</td>
<td>92</td>
<td>62</td>
<td>0.23 (0.04, 0.42)*</td>
</tr>
</tbody>
</table>

a%: percent of agreement of dichotomized responses from adolescents and fathers.

bKappa statistics compared agreement of dichotomized responses from adolescents and fathers.

cIntraclass correlation coefficients assessed the resemblance of adolescent-reported and father-reported paternal availability practices.

EBRB: energy balance-related behavior; SSB: sweets and salty snacks; MVPA: moderate and vigorous physical activity
4. Discussion

Based on the current sample of Latino adolescents, all measures of fathers’ expectations/limits and availability/accessibility practices and most of the measures of behavioral modeling showed good criterion validity. Similar validation methods have been applied in previous studies testing measures of parenting practices (Cullen et al., 2001; De Bourdeaudhuij et al., 2005; Pinard et al., 2014). In the present study, the valid measures of Latino fathers’ parenting practices related to EBRBs were developed with clear conceptualization and consistent operationalization based on the Contextual Model of Parenting Style (Darling & Steinberg, 1993). A systematic review conducted by Vaughn et al. (2013) found that less than half of the existing measures of food-related parenting practices defined constructs or used theory to guide instrument development. The application of theory-based measures contributes to the ability to evaluate the influence of food- and activity-related parenting practices on adolescent behaviors.

Furthermore, the current study demonstrated consistent validity across seven specific EBRBs for parental expectations/limits and availability/accessibility practices. In comparison, previous studies have tended to assess parenting practices generally and not for specific EBRBs and therefore could not show validity against specific EBRBs. For example, the “food policies” and “media policies” measures in the Comprehensive Home Environment Survey assessed parental expectations and limits with several items related to a variety of food and activity behaviors (Pinard et al., 2014). However, these measures only showed validity with children’s SSB intake and screen time and not with fruit and vegetable intake and physical activity. Therefore, specificity in the operationalization and validation of parenting practices is important.

Adolescent-reported paternal behavioral modeling of intake of sweets/salty snacks and screen time were not correlated with adolescents’ behaviors in the current study. In this sample, only 15 early adolescents reported a relatively high frequency of paternal behavioral modeling of sweets/salty snacks intake, indicating that few adolescents were exposed to their fathers’ modeling influence regarding these foods and therefore the opportunity to observe correlations was limited. The lack of correlation between adolescent-reported paternal behavioral modeling of screen time and adolescents’ daily screen time hours was unexpected because qualitative studies have reported Latino
fathers’ involvement in children’s screen-time activities, and correlations have been
found between fathers’ and children’s screen time in other studies (Davis et al., 2016;
Davison et al., 2005; Fuemmeler et al., 2011; Lindsay, Salkeld, Greaney, & Sands, 2015).
The lack of validity for these two measures calls for more testing and more sensitive
measures of Latino fathers’ behavioral modeling of intake of sweets/salty snack and
screen time.

The current study developed and tested measures of father-reported parenting
practices in parallel with adolescent-reported measures and compared the congruence
between adolescent and father reports. The results indicated limited criterion validity of
father-reported parenting practices and substantial discrepancies between adolescents’
and fathers’ reports of parenting practices. This phenomenon has been reported in
previous studies (Rebholz et al., 2014; Tak et al., 2006; Taylor et al., 2011; van Assema
et al., 2007) with the suggestion that parents were more likely than adolescents to respond
to parenting-related questions in a socially desirable direction (Rebholz et al., 2014;
Taylor et al., 2011). Findings from the current study indicated that adolescents reported
significantly lower frequency of fathers making fruits, vegetables, and physical activity
available than the more favorable higher frequency reported by fathers. Others have
suggested that the congruence between adolescents’ and fathers’ reports of parenting
practices may be influenced by child-parent relationships (Korelitz & Garber, 2016). In
the current study, results regarding the incongruence of adolescents’ and fathers’ reports
of paternal expectations/limits indicated that fathers may not adequately communicate
their expectations/limits on EBRBs to their adolescents except for screen time. These
findings support the importance of including adolescents’ reports in the assessment of
parenting practices. Examining changes in agreement between adolescents’ and fathers’
reports of parenting practices would also serve as an indicator of effectiveness of
programs designed to improve adolescent-father communication.

This study has several limitations. The instrument validation was conducted
among a small sample of Latino father-early adolescent dyads primarily in two-parent
families with about two-thirds indicating interest in participating in a childhood obesity
prevention program. Therefore, due to the potential for self-selection bias, caution should
be used in generalizing the study results to other groups of Latino fathers of early
adolescents. In addition, the current study did not examine test-retest reliability and responsiveness to change. A controlled study design with intention-to-treat analysis should be applied to eliminate potential biases if these measures are to be used as outcome evaluation instruments for intervention programs. This study focused on a selected set of EBRB-related parenting practices that relevant to the design of an on-going family-centered healthy lifestyle intervention program. There may be other important parenting practices that need to be measured.
Chapter 5. Padres Preparados, Jóvenes Saludables, A Family-Based Program to Prevent Obesity Among Latino Early Adolescents: Development and Pilot Testing

1. Introduction

Latino children and adolescents are an important and fast growing ethnic group in the United States. In 2016, 25% of U.S. children and adolescents were of Hispanic origin and this proportion is projected to 32% by 2050 (U.S. Census Bureau, 2017). The well-being of Latino children and adolescents is challenged by overweight and obesity. In 2015-2016, 46% of Latino children and adolescents were overweight or obese, which was the highest compared to other major racial and ethnic groups (Skinner, Ravanbakht, Skelton, Perrin, & Armstrong, 2018). This may be affected by the acculturation challenges and socioeconomic disadvantages of Latino immigrant families (Perez-Escamilla, 2009). Studies found that greater acculturation was associated with poorer dietary quality and sedentary lifestyle among Latinos (Ayala, Baquero, & Klinger, 2008; Murillo, Albrecht, Davigluis, & Kershaw, 2015). Latino households also experienced disparities of poverty, food insecurity and lack of access to health-care resources (Berchick, Hood, & Barnett, 2018; Coleman-Jensen, Rabbitt, Gregory, & Singh, 2018; Fontenot, Semega, & Kollar, 2018). National data showed that Latino children and adolescents generally had inadequate fruit and vegetable intake and physical activity, and excessive consumption of foods high in solid fat and added sugars and excessive screen time (Dunford & Popkin, 2018; Kann et al., 2018; Moore, Thompson, & Demissie, 2017; Rosiner, Herrick, Gahche, & Park, 2017). These energy balance-related behaviors are related to obesity risk, which indicates a need for public health efforts to promote healthy lifestyle behaviors for obesity prevention among Latino children and adolescents.

Parents are key players in shaping the physical and social/emotional environments that guide eating and exercise behaviors and consequently influence children and adolescents’ weight status. Common behavior change techniques to engage parents in promoting healthy lifestyle behaviors have included providing general information regarding lifestyle-health relationships and teaching skills around healthy eating and activity (Golley, Hendrie, Slater, & Corsini, 2011). Several meta-analyses concluded that
existing programs had promising but limited effects to address the epidemic of childhood obesity (Biddle, Petrolini, & Pearson, 2014; Brown et al., 2014; Diep, Chen, Davies, Baranowski, & Baranowski, 2014; Kobes, Kretschmer, Timmerman, & Schreuder, 2018; Owen, Curry, Kerner, Newson, & Fairclough, 2017). Therefore, further research on effective intervention strategies is warranted.

Parenting style and parenting practices are associated with children’s and adolescents’ energy balance-related behaviors (Patrick, Hennessy, McSpadden, & Oh, 2013). Parenting style, which is commonly categorized by dimensions of responsiveness and demandingness, determines the emotional climate through general parent-child interactions (Maccoby & Martin, 1983). Findings from a recent systematic review supported the protective nature of an authoritative parenting style (high responsiveness and high demandingness) toward childhood obesity (Sokol, Qin, & Poti, 2017) and its associations with children’s and adolescents’ positive behavioral outcomes related to dietary intake, physical activity and screen time (Pearson, Biddle, & Gorely, 2009; Rodenburg, Oenema, Kremers, & van de Mheen, 2012; Van Der Horst et al., 2007). In addition, parenting practices, such as setting rules and expectations, role modeling and managing availability and accessibility, have also been associated with children’s and adolescents’ dietary intake, physical activity and screen time (Aftosmes-Tobio et al., 2016; Sleddens et al., 2012; Yee, Lwin, & Ho, 2017). Therefore, parenting styles and parenting practices specific to children’s and adolescents’ dietary intake and activity can be important constructs of family-based healthy lifestyle interventions.

Several studies have documented parenting style and food- and activity-related parenting practices among Latino families. Some studies showed that Latino parents tended to indulge children’s unhealthy food preferences and not restrict the availability and accessibility of unhealthy foods and screen-time opportunities at home (Gallagher, 2010; Skala et al., 2012; Taveras, Hohman, Price, Gortmaker, & Sonneville, 2009). One large sample survey among parents of middle and high school students found that Latino parents tended to exert efforts to control their children’s dietary intake and use authoritarian approaches such as expecting the child to clean his/her plate and forcing the child to eat regardless of hunger/fullness cues (Loth, MacLehose, Fulkerson, Crow, & Neumark-Sztainer, 2013). Therefore, intervention programs to improve Latino parents’
general parenting skills as well as food- and activity-related parenting practices would enhance parental influences on promoting healthy lifestyle behaviors among children and adolescents.

Improving paternal engagement may benefit the efficacy of childhood obesity prevention initiatives among Latino families. In the U.S., 71% Latino children and adolescents have fathers present in the household (Federal Interagency Forum on Child and Family Statistics, 2017). Latino culture highly values familism and respect, which usually considers the father as the head of the household and responsible for providing leadership and making major decisions (Saracho & Spodek, 2008). Latino mothers have indicated that fathers’ dietary preferences significantly influenced dietary choices of the family (Lora, Cheney, & Branscum, 2016; Mena, Gorman, Dickin, Greene, & Tovar, 2015). Latino fathers may also influence their children and adolescents’ physical activity and screen time through supporting/encouraging children being active, setting limits on screen time, or spending screen time with their children (Davis, Cole, Blake, McKenney-Shubert, & Peterson, 2016; Lindsay, Wallington, Muñoz, & Greaney, 2018; Lora et al., 2016; Turner, Navuluri, Winkler, Vale, & Finley, 2014). Therefore, paternal involvement would be a potential strategy to enhance the efficacy of childhood obesity prevention among Latinos.

Community-based, parent-focused, healthy lifestyle intervention programs for adolescents may make unique contributions to the prevention of childhood obesity. National data showed that adolescents not only had the highest obesity rate but also the most apparent positive linear trend compared to other pediatric age groups (Skinner et al., 2018). Even though adolescents gain greater autonomy and are exposed to more potential influences on intake and activity outside of the home than younger children, parents still play important roles in the weight and weight-related behaviors of adolescents (Dickens & Ogden, 2014; Jago et al., 2011; Loth, MacLehose, Larson, Berge, & Neumark-Sztainer, 2016; Vereecken & Maes, 2010). This is especially true for young adolescents who are at the early stages of pubertal, social and intellectual development (Irwin, Burg, & Uhler Cart, 2002). However, existing intervention programs for older children and adolescents were primarily school-based and tended to use fewer and/or passive strategies (e.g., sent-home materials) to engage parents (Kader, Sundblom, & Elinder,
Community-based intervention programs have the advantages of being able to accommodate family schedules beyond school hours and address neighborhood environmental factors. Therefore, community-based, family-focused, healthy lifestyle intervention programs could be a feasible strategy to actively engage Latino parents in promoting positive behavioral outcomes among early adolescents.

A previous community-based parenting skill education program was developed for substance use prevention among Latino adolescents (Allen et al., 2012). This program was well-received by community partners and Latino parents, especially mothers (Allen et al., 2013). In response to community agencies’ request and the need for obesity prevention among Latino early adolescents, this parenting skill education program was adapted to promote healthy lifestyle behaviors using a community-based participatory research approach. Latino fathers were actively engaged in the curriculum development through father advisory board meetings and focus group discussions (Zhang, Hurtado, Flores, Alba-Meraz & Reicks, 2018). Their beliefs, parenting experiences and program preferences contributed to the design of Padres Preparados, Jóvenes Saludables program in terms of format, length, session structure and content. Best practices for behavior-based interventions indicate that program feasibility and potential effectiveness should be assessed (Horodyska et al., 2015). Therefore, the purpose of the current study was to pilot test the curriculum to assess feasibility and preliminary effectiveness based on acceptability and behavioral change outcomes. The primary behavioral outcomes included dietary intake, physical activity and screen time among early adolescents and their parents. The secondary behavioral outcomes included Latino parents’ parenting styles and food- and activity-related parenting practices.

2. Methods

2.1 Program Description

The theoretical framework for the Padres Preparados, Jóvenes Saludables program was based on the social cognitive theory (Cullen et al., 2001; Glanz, Rimer, & Viswanath, 2008). This theory emphasizes the reciprocal determinism of interactions
between the behavior, and individual and environmental factors that influence individuals’ behaviors. In the application to energy balance related behaviors addressed in the Padres Preparados, Jóvenes Saludables program, the behavior, and individual and environmental factors are shown in figure 5.1.

![Figure 5.1 A social cognitive/reciprocal determinism framework of the behavior, and individual and environmental factors related to behavioral outcomes of the Padres Preparados, Jóvenes Saludables program](image)

The pilot version of the Padres Preparados, Jóvenes Saludables curriculum consisted of eight 2.5-hour weekly sessions. An overview of the eight sessions including primary topics and session activities are summarized in Tables 5.1 and 5.2. At each session, parents and adolescents participated in joint and separate skill-building activities. The joint activities included food preparation using culturally-tailored, simple recipes modified to increase fruit, vegetable and whole grain consumption and reduce solid fat and added sugar consumption; and physical activities that could be done easily indoors or outdoors regardless of time and resource constraints. In separate skill-building activities,
parents and adolescents reflected on their experiences, learned basic concepts, and participated in hands-on practice and discussion related to healthy eating, physical activity and screen time in formats tailored to adults and adolescents. In addition, parent activities included parenting skill education related to parent-child interactions and food- and activity-related parenting practices. Adolescent activities included an exploration of topics to build strong family communication and connections. Instead of weight loss and maintenance, the curriculum emphasized overall health and its relationship to healthy eating and physical activity.
Table 5.1 Primary content and structure of sessions 1-4 of the Padres Preparados, Jóvenes Saludables program

<table>
<thead>
<tr>
<th>Contents</th>
<th>Session 1</th>
<th>Session 2</th>
<th>Session 3</th>
<th>Session 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topics</strong></td>
<td>Positive parenting and healthy habits</td>
<td>Multiple cultures and active lifestyles</td>
<td>Adolescent development and healthy eating</td>
<td>Communication and limiting screen time</td>
</tr>
<tr>
<td><strong>Food Prep</strong></td>
<td>P+C: fruit yogurt parfait</td>
<td>P+C: veggie mix</td>
<td>P+C: mango salsa</td>
<td>P+C: guacamole</td>
</tr>
<tr>
<td><strong>(30 min)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Intro</strong></td>
<td>P+C: intro to the program</td>
<td>P, C: review last session</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>(10 min)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interactive</strong></td>
<td>P: hopes and dreams for child, lifestyle assessment, energy balance</td>
<td>P: cultural values, acculturation, culture and health</td>
<td>P: adolescent development, parent’s role</td>
<td>P, C: communication basics, active listening, “I” messages</td>
</tr>
<tr>
<td><strong>segment part I</strong></td>
<td>C: goals and dreams, lifestyle assessment</td>
<td>C: cultural values</td>
<td>C: decision making</td>
<td>P: PP</td>
</tr>
<tr>
<td><strong>(45 min)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Physical Activity</strong></td>
<td>P+C: group dance</td>
<td>P+C: indoor cardio</td>
<td>P+C: chair yoga</td>
<td>P+C: house chore relay</td>
</tr>
<tr>
<td><strong>(15 min)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interactive</strong></td>
<td>P: parenting styles, PP C: energy balance, healthy recommendations</td>
<td>P, C: benefits and barriers to physical activity</td>
<td>P, C: nutrition for growth, portion size, MyPlate FV messages</td>
<td>P, C: screen time assessment and consequences, family media plan, P: PP</td>
</tr>
<tr>
<td><strong>segment part II</strong></td>
<td>(45 min)</td>
<td>(45 min)</td>
<td>(45 min)</td>
<td></td>
</tr>
<tr>
<td><strong>Review</strong></td>
<td>P: key messages, post session evaluation, setting weekly goals</td>
<td></td>
<td>P: PP</td>
<td>P, C: screen time assessment and consequences, family media plan, P: PP</td>
</tr>
<tr>
<td><strong>(10 min)</strong></td>
<td>C: key messages, feedback</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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; FV: fruits and vegetables.
Table 5.2 Primary content and structure of sessions 5-8 of the Padres Preparados, Jóvenes Saludables program

<table>
<thead>
<tr>
<th>Contents</th>
<th>Session 5</th>
<th>Session 6</th>
<th>Session 7</th>
<th>Session 8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topic</strong></td>
<td>Family rules and healthy beverages</td>
<td>Managing conflicts and healthy snacks</td>
<td>Supervision and fast food</td>
<td>Family connection and family meals</td>
</tr>
<tr>
<td><strong>Food Prep</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(30 min)</td>
<td>P+C: fruit infused water</td>
<td>P+C: fruit kebabs</td>
<td>P+C: sweet potato with yogurt dip</td>
<td>P+C: veggie mix</td>
</tr>
<tr>
<td><strong>Intro (10 min)</strong></td>
<td>P, C: review last session</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interactive segment part I</strong></td>
<td>P: discipline strategies, negotiable vs. non-negotiable rules</td>
<td>P: problem solving, managing conflict</td>
<td>P: supervision and monitoring, parents as coaches</td>
<td>P: family connection and priorities, time management</td>
</tr>
<tr>
<td>(45 min)</td>
<td>C: family rules, natural vs. logical consequences</td>
<td>C: 5 steps of conflict resolution</td>
<td>C: types of friends, peer influence</td>
<td>C: family connection and support</td>
</tr>
<tr>
<td><strong>Physical Activity</strong></td>
<td>P+C: agility ladder</td>
<td>P+C: Zumba</td>
<td>P+C: indoor cardio</td>
<td>P+C: agility ladder</td>
</tr>
<tr>
<td>(15 min)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interactive segment part II</strong></td>
<td>P: label reading, sugar and calories in SSBs, PP</td>
<td>P: label reading, portion sizes for sweets and salty snacks, healthy alternatives, PP</td>
<td>P: fast food culture, peer pressure, PP</td>
<td>P, C: benefits and barriers to family meals, MyPlate</td>
</tr>
<tr>
<td>(45 min)</td>
<td>C: traffic light drinks, label reading, sugar and calories in SSBs</td>
<td>C: label reading, healthy alternatives, emotional vs. mindful eating</td>
<td>C: calorie balance and fast food, fast food marketing, making healthier decisions</td>
<td>P: PP, P+C: program completion celebration</td>
</tr>
<tr>
<td><strong>Review</strong></td>
<td>P: key messages, post session evaluation, setting weekly goals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(10 min)</td>
<td>C: key messages, feedback</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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
2.2 Study Design

This study used a one-group, pretest-posttest, quasi-experimental design with a small convenience sample. This study design has shown adequacy in generating preliminary findings related to program feasibility and potential effectiveness of family-focused childhood obesity prevention programs among Latinos (Arredondo, Morello, Holub, & Haughton, 2014; Weaver, Kelley, Griggs, Weems, & Umstattd Meyer, 2014). The study location was a Christian church, which primarily served Latino families. The church had the capacity to host adolescents and parents in separate rooms, and provided a kitchen for food preparation and an open space for physical activity. Participants were recruited using flyers, word of mouth, and social media. Eligibility criteria included 1) having a Latino early adolescent (10 - 14 years); 2) being a Latino male caregiver who speaks Spanish and has meals with the child at least three times in a week; and 3) both the child and male caregiver being able to attend the program together. In addition, female caregivers were welcome to participate if the family met the eligibility criteria. The parent group was co-facilitated by an Extension nutrition educator and a parenting educator. The adolescent group was co-facilitated by an Extension nutrition educator and a graduate research assistant. One week before and after implementing the curriculum, families attended data collection sessions where research assistants collected demographic and anthropometric information, and assessed frequency of parenting practices, dietary intake, physical activity and screen time through administration of questionnaires. Parents received $35 and adolescents received $25 for participating in each data collection session. The intervention was conducted during eight Friday evenings between March and May 2017. The study was approved by the University of Minnesota Institutional Review Board.

2.3 Assessment Instruments

For this pilot test, program feasibility was based on acceptability and assessment of preliminary effectiveness regarding behavioral outcomes. Therefore, attendance information and post-session evaluation surveys were collected. Behavioral outcomes were evaluated based on pre- and post-intervention comparisons of dietary intake, physical activity and screen time, food- and activity-related parenting practices and parenting styles. Assessment instruments are summarized in Table 5.3.
Table 5.3 Summary of assessment instruments

<table>
<thead>
<tr>
<th>Assessment method</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographic and anthropometric measurements</strong></td>
<td></td>
</tr>
<tr>
<td>Height, weight measurements</td>
<td>Adolescents/parents</td>
</tr>
<tr>
<td>Demographic survey</td>
<td>Parents</td>
</tr>
<tr>
<td><strong>Program acceptability</strong></td>
<td></td>
</tr>
<tr>
<td>Participant attendance</td>
<td>Program coordinator</td>
</tr>
<tr>
<td>Post-session evaluation</td>
<td>Parents</td>
</tr>
<tr>
<td><strong>Dietary behavioral outcomes</strong></td>
<td></td>
</tr>
<tr>
<td>NDSR 24-hour dietary recall</td>
<td>Adolescents</td>
</tr>
<tr>
<td>Food Behavior Checklist</td>
<td>Parents</td>
</tr>
<tr>
<td><strong>Physical activity and screen time-related behavioral outcomes</strong></td>
<td></td>
</tr>
<tr>
<td>Project EAT physical activity questions adapted from Godin-Shepherd Leisure-Time Exercise Questionnaire</td>
<td>Adolescents</td>
</tr>
<tr>
<td>International Physical Activity Questionnaire short form</td>
<td>Parents</td>
</tr>
<tr>
<td>Project EAT screen time questions</td>
<td>Adolescent/parents</td>
</tr>
<tr>
<td><strong>Parenting behavioral outcomes</strong></td>
<td></td>
</tr>
<tr>
<td>Parenting Style &amp; Dimension Questionnaire</td>
<td>Parents</td>
</tr>
<tr>
<td>Parenting practices measures adapted from the Parenting Strategies for Eating and Activity Scale</td>
<td>Adolescents/parents</td>
</tr>
<tr>
<td>Project EAT home food availability and accessibility questions</td>
<td>Adolescents/parents</td>
</tr>
</tbody>
</table>

NDSR: Nutrition Data System for Research; Project EAT: Project Eating Among Teens

Demographic and anthropometric measurements. Parents reported their age, country of origin, number of years they lived in the U.S., preferred language spoken at home, educational attainment, and household income. Research assistants measured height and weight of parents and early adolescents according to standard procedures (Centers for Disease Control and Prevention, 2017). Body mass index (BMI) of parents was calculated using weight (kg) divided by height squared (kg²). BMI categories and z-scores of early adolescents were determined using a SAS Program for the 2000 CDC Growth Charts (Centers for Disease Control and Prevention, 2016).

Post-session evaluation. The post-session evaluation survey was completed by parents at the end of each of the eight sessions. The survey consisted of five satisfaction questions, three true-or-false questions related to key session content and two open-ended commentary questions. The five satisfaction questions asked participants to what extent
they felt that the session 1) was helpful for them as a parent, 2) made them feel comfortable sharing opinions, 3) held their interest, 4) the facilitator supported their learning, and 5) the facilitator addressed their needs and interests. The response options were on a 4-point Likert scale ranged from “not at all” to “a lot”. The true-or-false questions addressed the main content of each session. The two commentary questions were “What are the most important things you learned during today’s session?” and “What could have made today’s session better?”

**Adolescents’ behavioral outcomes.** Adolescents’ dietary intake was assessed using 24-hour dietary recalls from three non-consecutive days collected during a one-week period using NDSR software (Nutrition Data System for Research 2016, Nutrition Coordinating Center, University of Minnesota, Minneapolis, MN). The NDSR-assisted 24-hour dietary recall procedure has shown adequate validity for assessing dietary intake among children (Lytle et al., 1993). A previous study found that reducing the retention interval increased recall accuracy among 4th graders (Baxter et al., 2009). Therefore, the present study asked early adolescents to report their dietary intake within the immediate 24-hour timeframe starting from the day of the interview to the day before the interview. Fruit and vegetable consumption and consumption of sugar-sweetened beverages were calculated from a three-day average using the NDSR 2016 food and nutrient database.

Adolescents’ physical activity was assessed using three questions from the Project EAT 2010 survey which were originally adapted from the Godin-Shepherd Leisure-Time Exercise Questionnaire (Berge et al., 2014; Godin & Shephard, 1985). Early adolescents reported weekly hours spent in mild, moderate, and vigorous physical activities with response options ranging from zero to six or more hours. The response options were converted to 0, 0.3, 1.3, 3.3, 5.3, and 8 hours to estimate hours per week that adolescents participate in each type of activities. This method has shown good test-retest reliability ($r = 0.73-0.84$, $p < 0.05$) among adolescents (Berge et al., 2014). Early adolescents also reported the time spent on four types of screen time activities (watching TV/DVD/videos, using a computer, playing electronic games while sitting, and using smart phones and tablets) on an average weekday and weekend day with response options ranging from zero to five or more hours. This method showed good test-retest reliability among adolescents in the Project EAT study ($r = 0.77-0.84$, $p<0.05$) (Berge et al., 2014). Daily
averages for screen time were calculated by weighted weekday and weekend day screen time.

Parents’ behavioral outcomes. Parents’ dietary intake was assessed using a Food Behavior checklist (Blackburn et al., 2008). This checklist included six questions regarding the frequency of eating more than one kind of fruit or vegetable daily, eating two or more servings of vegetables at the main meal, eating fruits or vegetables as snacks, and daily servings of fruit intake and vegetable intake. The checklist also included two questions assessing the frequency of fruit, sport drink and regular soda intakes. The response options for frequency-type questions included “no”, “yes, sometimes”, “yes, often”, and “yes, always”. The Food Behavior checklist has demonstrated acceptable test-retest reliability (r = 0.35-0.83, p<0.05), convergent validity with serum carotenoids and dietary recalls (r = 0.20-0.39, p<0.05), and sensitivity to change (p<0.05) among low-income nutrition education program participants (Blackburn et al., 2008).

Physical activity of parents was assessed using the International Physical Activity Questionnaire (IPAQ) short form (Craig et al., 2003). The IPAQ short form showed good test-retest reliability (r = 0.66-0.88, p<0.05) and acceptable criterion validity (>150 min/week: rho = 0.5, p<0.05) among U.S. adults (Craig et al., 2003).

Parenting styles were assessed using a 32-item Parenting Style & Dimension Questionnaire (Olivari, Tagliabue, & Confalonieri, 2013). This questionnaire assessed three parenting styles and corresponding sub-factorial dimensions. They included the authoritative parenting style (Cronbach α = 0.86) with three dimensions of warmth (5 items), reasoning (5 items), and autonomy granting (5 items); the authoritarian style (Cronbach α = 0.82) with three dimensions of physical coercion (4 items), verbal hostility dimension (4 items), and non-reasoning (4 items); and the permissive style (Cronbach α = 0.64) with an indulgent dimension (5 items) (Olivari et al., 2013). The response for each item was based on a 5-point Likert scale ranging from never to always. A summed score was calculated from each dimension of the corresponding parenting style.

Parenting practices were assessed using a scale adapted from the Parenting Strategies for Eating and Activity Scale (Larios, Ayala, Arredondo, Baquero, & Elder, 2009). Both parents and adolescents reported frequencies of food- and activity-related
parenting practices based on a five-point scale ranging from almost never/never to almost always/always. Food- and activity-related parenting practices included setting goals or limits, role modeling, managing availability and opportunities, teaching, encouraging/discouraging, reminding, monitoring, and rewarding early adolescents’ energy balance-related behaviors. Parental role modeling was measured according to parents’ report regarding the frequency of engaging in certain energy balance-related behaviors in front of and with their child, respectively (Draxten, Fulkerson, Friend, Flattum, & Schow, 2014). Parent and early adolescents also reported home food availability and accessibility using a 7-item home food environment questionnaire from Project EAT ($r = 0.65-0.76$, $p<0.05$) (Robinson-O’Brien, Neumark-Sztainer, Hannan, Burgess-Champoux, & Haines, 2009). Four items assessed the home availability and accessibility of fruits and vegetables and three assessed the home availability of unhealthy food items including sugary drinks, sweets, and salty chips with four response options ranging from hardly ever to almost always. Mean scores of these items were calculated to indicate home healthy and unhealthy food availability.

### 2.4 Statistical Analysis

Analysis was performed using SAS 9.4 for Windows (Cary NC, USA). Descriptive analyses were performed on sample characteristics and outcome variables. Pre- and post-intervention comparisons were conducted using paired sample t-tests. Statistical significance was set at $p<0.05$. The use of t-tests with small sample sizes was shown to be valid by Winter (2013). However, the statistical power for detecting significant differences may not be adequate with small sample sizes depending on effect sizes. Participant satisfaction was calculated based on percentages of affirmative responses. Themes based on parents’ suggestions were extracted from compiled comments.

### 3. Results

#### 3.1 Participant Characteristics

Fourteen families indicated interest in participating in the program and thirteen families completed baseline data collection. These thirteen families included 13 fathers,
10 mothers, and 13 early adolescents (8 boys, 5 girls). Fathers were 41 ± 7 years, mothers were 39 ± 7 years, and early adolescents were 12 ± 1 years. Eleven fathers, nine mothers and eight early adolescents were either overweight or obese. The majority of parents had obtained high school or less education and reported annual household income of ≤ $35,000 to $49,999. All parents were born in Mexico and had lived in the U.S. for an average of 20 ± 10 years. Twenty parents reported speaking Spanish or primarily Spanish at home. Nine families (9 fathers, 4 mothers, and 8 early adolescents) completed the post-intervention data collection session. No sociodemographic differences were observed between families that completed the program or withdrew from the program. Weight status did not differ between parents who completed or withdrew from the program. However, the mean BMI-z score of adolescents who completed the program was 0.6 versus 1.9 for those who withdrew from the program (p = 0.06).

3.2 Participant Attendance and Post-Session Evaluation

One family dropped out after completing the baseline data collection, and twelve families attended at least two class sessions. Nine of these twelve families completed five to eight sessions. Post-session evaluation surveys were collected from each parent after attending each class session (n = 109 surveys). Results based on the satisfaction survey questions indicated that about 90% rated class sessions as interesting and helpful for them as a parent, and that the sessions allowed them to feel comfortable sharing opinions. Most parents (94%) indicated that the session facilitators supported their learning and addressed their needs and interests. The overall rate of correct responses to the true-or-false questions was 88%. Two common themes were identified from the two open-ended commentary sections. One was to start and finish the class on time, and the other was to include more interactive activities with their adolescents.

3.3 Adolescents’ Behavioral Outcomes

Eight adolescents participated in pre- and post-intervention evaluation activities including 24-hour dietary recalls to assess changes in dietary behaviors. Table 5.4 presents group means of adolescents’ behavioral outcomes collected at pre- and post-intervention. Adolescents’ vegetable intake, SSB intake, moderate activities, mild activities and screen time behaviors showed changes in the desired direction.
Table 5.4 Pre- and post-intervention comparisons of adolescents’ behavioral outcomes (n = 8)

<table>
<thead>
<tr>
<th>Behavioral outcomes</th>
<th>Pre (mean ± SD)</th>
<th>Post (mean ± SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dietary intake (servings per day)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit</td>
<td>1.4 ± 1.2</td>
<td>1.0 ± 1.1</td>
</tr>
<tr>
<td>Vegetable</td>
<td>1.0 ± 0.4</td>
<td>1.1 ± 0.7</td>
</tr>
<tr>
<td>Sugar sweetened beverages</td>
<td>0.7 ± 0.9</td>
<td>0.3 ± 0.4</td>
</tr>
<tr>
<td><strong>Physical activity (hours per week)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vigorous activities</td>
<td>3.1 ± 1.2</td>
<td>3.0 ± 0.9</td>
</tr>
<tr>
<td>Moderate activities</td>
<td>2.5 ± 1.2</td>
<td>2.6 ± 1.2</td>
</tr>
<tr>
<td>Mild activities</td>
<td>2.4 ± 1.3</td>
<td>3.2 ± 1.4</td>
</tr>
<tr>
<td><strong>Screen time (hours per day)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TV/DVD</td>
<td>1.5 ± 1.1</td>
<td>1.3 ± 0.9</td>
</tr>
<tr>
<td>Computer</td>
<td>1.3 ± 1.8</td>
<td>0.8 ± 1.2</td>
</tr>
<tr>
<td>Video games</td>
<td>1.4 ± 1.5</td>
<td>0.6 ± 0.8</td>
</tr>
<tr>
<td>Phones/tablets</td>
<td>2.0 ± 1.1</td>
<td>1.7 ± 1.4</td>
</tr>
</tbody>
</table>

3.4 Parents’ Behavioral Outcomes Related to Dietary Intake and Physical Activity

According to the parent-reported Food Behavior Checklist, parents (n=14) reported significantly higher daily servings of fruit and lower frequency of regular soda consumption at post- compared to pre-intervention (Table 5.5). Even though the IPAQ showed validity among multiple populations, participants in the current study had difficulties completing the questionnaire as indicated by six parents at both pre- and post-intervention who had missing responses to one or more questions. Therefore, data related to parents’ physical activity and sedentary time were not shown.
Table 5.5 Pre- and post-intervention comparisons of parents' responses to the Food Behavior Checklist (n=14)

<table>
<thead>
<tr>
<th>Measures</th>
<th>Pre-intervention (mean ± SD)</th>
<th>Post-intervention (mean ± SD)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit intake frequency (1-4)(^a)</td>
<td>2.7 ± 0.8</td>
<td>2.7 ± 0.7</td>
<td>1.00</td>
</tr>
<tr>
<td>Daily fruit servings(^b)</td>
<td>2.2 ± 0.9</td>
<td>3.2 ± 1.2</td>
<td>0.00</td>
</tr>
<tr>
<td>Fruit or vegetable snacks (1-4)(^a)</td>
<td>2.7 ± 0.8</td>
<td>2.4 ± 0.8</td>
<td>0.10</td>
</tr>
<tr>
<td>Vegetable variety (2-8)(^c)</td>
<td>4.6 ± 1.2</td>
<td>5.1 ± 1.5</td>
<td>0.39</td>
</tr>
<tr>
<td>Daily vegetable servings(^b)</td>
<td>2.0 ± 1.0</td>
<td>2.6 ± 1.0</td>
<td>0.09</td>
</tr>
<tr>
<td>Fruit/sports drink intake frequency (1-4)(^a)</td>
<td>1.8 ± 0.8</td>
<td>1.7 ± 0.6</td>
<td>0.80</td>
</tr>
<tr>
<td>Regular soda intake frequency (1-4)(^a)</td>
<td>2.2 ± 0.8</td>
<td>1.8 ± 0.6</td>
<td>0.03</td>
</tr>
</tbody>
</table>

\(^a\)A range of intake frequencies in response to “do you eat/drink …?” 1 = no; 2 = yes, sometimes; 3 = yes, often; 4 = yes, always.
\(^b\)Self-reported daily intake servings.
\(^c\)A summed score of intake frequencies of eating one or more kind of vegetable each day and eating two or more vegetables at main meals.

Pre- and post-values were compared using paired sample t-tests, \(p < 0.05\).

3.5 Parents’ Behavioral Outcomes Related to Parenting Styles and Practices.

The pre- and post-intervention scores and comparisons of the seven parenting dimensions of the three parenting styles are shown in Table 5.6. Parents reported significantly lower non-reasoning scores of the authoritarian parenting style and a marginal increase in the reasoning score of the authoritative parenting style at post-compared to pre-intervention based on the Parenting Style and Dimension Scale.
Table 5.6 Pre- and post-intervention comparison of parents’ responses to the Parenting Style and Dimension Scale (n=14)\(^a\)

<table>
<thead>
<tr>
<th>Parenting styles</th>
<th>Dimensions (scale range)</th>
<th>Pre-intervention (mean ± SD)</th>
<th>Post-intervention (mean ± SD)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authoritative</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Warmth (5-25)(^b)</td>
<td>17.5 ± 3.1</td>
<td>17.1 ± 2.3</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td>Reasoning (5-25)(^b)</td>
<td>17.1 ± 3.1</td>
<td>17.6 ± 1.9</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>Autonomy granting (5-25)(^b)</td>
<td>15.7 ± 3.7</td>
<td>16.2 ± 2.8</td>
<td>0.62</td>
</tr>
<tr>
<td><strong>Authoritarian</strong></td>
<td>Physical coercion (4-20)(^c)</td>
<td>5.7 ± 1.8</td>
<td>5.3 ± 1.4</td>
<td>0.29</td>
</tr>
<tr>
<td></td>
<td>Verbal hostility (4-20)(^c)</td>
<td>9.7 ± 2.3</td>
<td>9.6 ± 1.9</td>
<td>0.92</td>
</tr>
<tr>
<td></td>
<td>Non-reasoning (4-20)(^c)</td>
<td>8.3 ± 2.3</td>
<td>6.6 ± 2.2</td>
<td><strong>0.00</strong></td>
</tr>
<tr>
<td><strong>Permissive</strong></td>
<td>Indulgent (5-25)(^b)</td>
<td>11.2 ± 2.3</td>
<td>11.6 ± 2.6</td>
<td>0.13</td>
</tr>
</tbody>
</table>

\(^a\)Response options were 1 = never, 2 = once in a while, 3 = about half of the time, 4 = often, and 5 = always.
\(^b\)Summed score of five items measuring the parenting dimension.
\(^c\)Summed score of four items measuring the parenting dimension.

Pre- and post-values were compared using paired t-tests, \(p < 0.05\).

Frequencies of 41 types of adolescent-reported paternal and maternal food- and activity-related parenting practices based on energy balance related behaviors (FV, SSB, sweets/salty snacks, fast food, PA, screen time) and availability were compared between pre- and post-intervention. Numbers of adolescents who reported positive changes were tallied. Eight paternal food- and activity-related parenting practices showed positive changes reported by four or more adolescents. They were reminding the adolescent regarding FV intake, modeling SSB intake and sweets/salty snacks intake (reversed), making SSB available (reversed), discouraging SSB intake, monitoring sweets/salty snacks intake, and modeling and teaching about PA. Thirteen maternal food- and activity-related parenting practices showed positive changes reported by four or more adolescents. They were modeling and reminding the adolescent regarding FV intake, modeling SSB and sweets/salty snacks intake (reversed), making SSB and fast food available (reversed), discouraging SSB, sweets/salty snacks, and fast food intake, modeling and reminding the adolescent about PA, and modeling and making ST opportunities available (reversed).
In response to questionnaire items regarding parenting practices related to their child’s food intake, physical activity and screen time, parents reported increased frequency for six practices from pre- to post intervention (Table 5.7). These included modeling vegetable intake, making vegetables available, teaching children to eat fruits and vegetables, modeling physical activity, making physical activity opportunities available, and setting goals for physical activity. Parents also reported having fewer unhealthy foods at home from pre- to post-intervention (p = 0.01).

Table. 5.7 Pre- and post-intervention comparisons of parent-reported food- and activity-related parenting practices (n=14)

<table>
<thead>
<tr>
<th>Parenting practices</th>
<th>Pre-intervention (mean ± SD)</th>
<th>Post-intervention (mean ± SD)</th>
<th>p-value³</th>
</tr>
</thead>
<tbody>
<tr>
<td>FV¹-related parenting practices</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model fruit intake</td>
<td>3.3 ± 0.7</td>
<td>3.7 ± 0.6</td>
<td>0.09</td>
</tr>
<tr>
<td>Model vegetable intake</td>
<td>3.0 ± 0.8</td>
<td>3.5 ± 0.6</td>
<td><strong>0.04</strong></td>
</tr>
<tr>
<td>Make fruit available</td>
<td>3.8 ± 0.5</td>
<td>4.0 ± 0.5</td>
<td>0.12</td>
</tr>
<tr>
<td>Make vegetables available</td>
<td>3.2 ± 0.8</td>
<td>3.9 ± 0.7</td>
<td><strong>0.02</strong></td>
</tr>
<tr>
<td>Encourage FV intake</td>
<td>3.9 ± 0.9</td>
<td>4.0 ± 1.0</td>
<td>0.50</td>
</tr>
<tr>
<td>Set goals for child to eat FV</td>
<td>3.1 ± 1.0</td>
<td>3.3 ± 0.8</td>
<td>0.33</td>
</tr>
<tr>
<td>Teach child to eat FV</td>
<td>3.5 ± 0.9</td>
<td>4.1 ± 0.8</td>
<td><strong>0.01</strong></td>
</tr>
<tr>
<td>Remind child to eat FV</td>
<td>3.6 ± 0.9</td>
<td>3.7 ± 1.0</td>
<td>0.84</td>
</tr>
<tr>
<td>Praise child for eating FV</td>
<td>3.4 ± 1.2</td>
<td>4.2 ± 0.8</td>
<td>0.03</td>
</tr>
<tr>
<td>Monitor child FV intake</td>
<td>2.5 ± 0.7</td>
<td>2.8 ± 1.0</td>
<td>0.21</td>
</tr>
<tr>
<td>SSBs¹, sweets/salty snacks, fast food-related parenting practices</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model SSB intake</td>
<td>2.4 ± 0.8</td>
<td>2.3 ± 0.5</td>
<td>0.33</td>
</tr>
<tr>
<td>Model sweets/salty snacks intake</td>
<td>2.1 ± 0.4</td>
<td>2.1 ± 0.5</td>
<td>1.00</td>
</tr>
<tr>
<td>Model fast food intake</td>
<td>2.5 ± 0.6</td>
<td>2.4 ± 0.5</td>
<td>0.55</td>
</tr>
<tr>
<td>Make SSBs available</td>
<td>2.1 ± 0.7</td>
<td>2.0 ± 0.7</td>
<td>0.33</td>
</tr>
<tr>
<td>Make sweets/salty snacks available</td>
<td>2.1 ± 0.9</td>
<td>1.9 ± 0.8</td>
<td>1.00</td>
</tr>
<tr>
<td>Make fast food available</td>
<td>2.4 ± 0.8</td>
<td>2.4 ± 0.9</td>
<td>0.77</td>
</tr>
<tr>
<td>Limit SSB intake</td>
<td>3.6 ± 1.3</td>
<td>3.2 ± 1.2</td>
<td>0.24</td>
</tr>
<tr>
<td>Limit intake of sweets/salty snacks</td>
<td>3.4 ± 1.1</td>
<td>3.3 ± 1.1</td>
<td>0.58</td>
</tr>
<tr>
<td>Limit fast food intake</td>
<td>3.4 ± 0.8</td>
<td>3.4 ± 1.2</td>
<td>0.88</td>
</tr>
<tr>
<td>Discourage SSB intake</td>
<td>2.8 ± 1.0</td>
<td>3.4 ± 0.9</td>
<td>0.27</td>
</tr>
</tbody>
</table>
Discourage intake of sweets/salty snacks  
3.1 ± 0.8  
3.0 ± 1.1  
0.82
Discourage fast food intake  
2.9 ± 0.9  
2.8 ± 1.1  
0.63
Monitor SSB intake  
3.0 ± 1.0  
3.2 ± 1.1  
0.46
Monitor intake of sweets/salty snacks  
3.1 ± 1.1  
3.2 ± 1.3  
0.55
Monitor fast food intake  
2.8 ± 1.1  
2.7 ± 1.3  
0.81
Reward child with SSB  
1.7 ± 1.2  
1.5 ± 0.8  
0.66
Reward child with sweets/salty snacks  
1.5 ± 0.9  
1.4 ± 0.5  
0.43
Reward child with fast food  
1.8 ± 0.7  
1.6 ± 0.7  
0.43

**PA¹-related parenting practices**

Model PA  
2.9 ± 0.7  
3.6 ± 0.9  
0.02
Make PA opportunities available  
3.6 ± 0.8  
4.2 ± 0.8  
0.01
Encourage PA  
3.8 ± 0.8  
4.1 ± 0.9  
0.26
Set PA goals for child  
3.3 ± 0.9  
3.9 ± 0.8  
0.01
Teach child about PA  
3.4 ± 1.0  
3.9 ± 0.9  
0.08
Remind child about PA  
3.8 ± 1.1  
3.7 ± 1.1  
0.81
Praise child for PA  
3.7 ± 1.0  
3.9 ± 1.1  
0.39
Monitor child PA  
3.3 ± 1.0  
3.7 ± 1.1  
0.25

**ST-related parenting practices**

Model ST  
2.6 ± 0.6  
2.3 ± 0.6  
0.06
Make ST opportunities available  
2.7 ± 1.1  
3.0 ± 0.8  
0.40
Limit ST  
3.0 ± 1.4  
3.3 ± 1.1  
0.57
Monitor ST  
3.5 ± 0.9  
3.6 ± 0.9  
1.00
Reward child with ST  
2.0 ± 1.0  
1.9 ± 0.9  
0.55

**Home availability²**

Healthy foods  
2.8 ± 0.5  
3.1 ± 0.3  
0.06
Unhealthy foods  
1.9 ± 0.4  
1.7 ± 0.3  
0.01

¹FV: fruit and vegetable; SSB: sugar sweetened beverage; PA: physical activity; ST: screen time.

Responses for all items were based on a 5-point frequency scale: 1 = never, 2 = seldom, 3 = sometimes, 4 = often, 5 = always.

²Home availability response options: 1 = hardly ever, 2 = sometimes, 3 = often, 4 = almost always.

³Pre- and post-values were compared using paired t-tests, p < 0.05.

**4. Discussion**

In this pilot test, the Padres Preparados, Jóvenes Saludables program demonstrated feasibility based on acceptability and preliminary effectiveness regarding
behavioral outcomes. Participants rated the program favorably in terms of perceived benefits. Attendance among fathers and adolescents was high. Improvements were observed regarding parent fruit and soda intake and parenting practices specific to adolescents’ FV intake and physical activity. However, findings regarding behavioral outcomes need to be interpreted with caution given the small sample size.

A previous study reported that attendance in community-based parenting education among Latino fathers has been problematic in the past for several reasons (Garcia-Huidobro et al., 2015). Latino fathers may refuse to participate because they consider parenting to be the responsibility of the mother. Employment can also present challenges to program participation among fathers. The majority of fathers (92.8%) with children age under 18 in the U.S. are employed and are more likely to work full time than mothers (Bureau of Labor Statistics, 2018). However, the high attendance by Latino fathers in the current study indicated a commitment to childhood obesity prevention. Three quarters of families attended most of the eight 2.5-hour sessions with no fathers missing program sessions when adolescents were present. The Padres Preparados, Jóvenes Saludables program successfully engaged Latino fathers in this community-based, healthy lifestyle intervention program indicating that the program structure was feasible and program content was of interest.

This pilot study found significant increases in parent-reported daily servings of fruit and decreased SSB intakes and potential improvement in adolescent-reported SSB intake and weekday screen time. More dietary changes were reported by parents than children, which may be partially explained by the small sample size. Changes in parents’ dietary intake suggested a potential positive influence on dietary practices of families. The lack of positive changes regarding intake of sweets/salty snacks and fast food, and physical activity may be attributed to the limitation of the assessment methods. Nearly half of the parents were not able to provide valid responses to the IPAQ, which made the estimation of parents’ weekly active and sedentary hours impossible, thereby limiting the ability to test all behavioral outcomes for changes from pre- to post-intervention (Skender et al., 2016).

This program focused on parenting skill training and the development of positive parent-adolescent relationships related to topics of healthy eating, physical activity and
screen time. After completing the program, parents reported more reasoning than non-reasoning/punishment in their interactions with adolescents. This change was in accordance with the enhancement of food- and activity-related parenting practices such as setting expectations/limits, teaching, and modeling fruit and vegetable consumption and physical activity. Parenting practices have been found to be mediating factors for children’s behavior change (Crespo et al., 2012; Lloyd, Lubans, Plotnikoff, & Morgan, 2015). For example, the Aventuras Para Niños program showed that parental monitoring and support of children’s physical activity significantly mediated the increase in child physical activity after a school-based childhood obesity intervention program among 5- to 8-year-olds (Crespo et al., 2012). Results from the Healthy Dads, Healthy Kids program for Australian school-aged children showed that paternal involvement and role modeling significantly mediated children’s physical activity (Lloyd, Lubans, Plotnikoff, & Morgan, 2015). Findings from these studies and the current study indicated that improvements in food- and activity-related parenting practices may promote positive changes in children and adolescents’ dietary intake and physical activity.

This study has several limitations. First, the quasi-experimental design compromised the internal validity and ability to determine causality between program exposure and measured outcomes. Second, the small sample size contributed to lack of power to detect significant changes from pre- and post-intervention. Third, the program outcome assessment largely relied on participants’ self-report which was subject to social desirability. These limitations together with the preliminary findings regarding program feasibility suggests that further implementation with a larger sample in a controlled trial is warranted.

5. Conclusion and Implications

Results from the pilot test of the Padres Preparados, Jóvenes Saludables program with Latino fathers and early adolescents demonstrated feasibility based on acceptability and preliminary results regarding effectiveness in promoting healthy lifestyle behaviors among early adolescents through improvements in parenting styles and food- and activity-related parenting practices. Participant feedback from the pilot test indicated that several improvements should be made before further implementation, which included
having parents and adolescents learn about nutrition and physical activity concepts together, providing take home activities, using a gift card drawing at the beginning of each session to motivate families to arrive on time, and using a valid measure of parents’ physical activity to improve the outcome evaluation survey.

The Padres Preparados, Jóvenes Saludables program focused on Latino fathers’ involvement in promoting healthy eating, physical activity and screen-time behaviors for adolescents aged 10 - 14. This pilot study confirmed that Latino fathers were committed to childhood obesity prevention through their attendance, ratings of satisfaction, and positive changes in healthy lifestyle behaviors and related parenting practices. Additional intervention studies and efforts are needed for Latino fathers or male caregivers in general, as they are less likely to participate in obesity prevention programs than mothers (Davison et al., 2018).
Chapter 6. Overall Discussion and Future Directions

This dissertation addressed critical research-based components of interventions to prevent pediatric obesity among adolescents. A diagram at the end of the introduction section described the overall layout and connections between the major components of four research studies presented in Chapters 2 – 5. Examination of the influence of parenting styles on adolescents’ EBRBs (Chapter 2) provided theoretical support for including parenting skills education in family-based obesity intervention programs for adolescents. As a part of the CBPR approach, focus group findings (Chapter 3) identified pertinent content for involving Latino fathers in promoting healthy eating and activity behaviors among their early adolescents. Based on the literature review and focus group findings, measures to assess paternal parenting practices were developed and tested for psychometric properties (Chapter 4). This work resulted in a valid instrument for evaluating program effectiveness for improving Latino fathers’ parenting practices. Pilot testing of the family-based obesity prevention program for Latino fathers and their early adolescents (Chapter 5) ensured program feasibility based on acceptability and potential effectiveness. Thus, the studies reported in this dissertation reinforced the theoretical support for incorporating parenting skills education related to parenting styles and parenting practices in adolescents’ healthy lifestyle interventions; and provided empirical evidence for applying this approach to a vulnerable population of low-income, immigrant Latino fathers and their early adolescents. Major findings, implications, and future research directions are described below.

Major findings from Chapter 2: Parenting dimensions and styles moderated the effects of parenting practices on adolescents’ junk food and sugary drink (JF/SD) intake and/or physical activity (PA). Parenting dimensions and styles had direct associations with adolescents’ EBRBs after adjusting for the mediating effects of corresponding parenting practices.

In addition to confirming the influence of parenting styles in the context of adolescents’ EBRBs, the comparison of findings from parenting dimensions and styles indicated that parenting styles may be more important than a single parenting dimension. The moderating analysis showed that JF/SD Parenting Practices were negatively
associated with adolescents’ JF/SD intake among those who reported higher quartiles of either parental demandingness or responsiveness. Authoritarian parenting style are characterized by high parental demandingness. However, this association was not observed among those parents identified as having an authoritarian parenting style. Parenting styles also showed moderating effects on the positive association between adolescents’ PA and PA Parenting Practices. But similar moderating effects were not found for parenting dimensions. In addition, mediation analyses also showed more significant direct associations between adolescents’ EBRBs and parenting styles but not parenting dimensions. These differences indicated that the combined effects of parental demandingness and responsiveness were more important than any single parenting dimension for influencing adolescent EBRBs. In the past, a number of studies only reported the potential influence of parenting dimensions on adolescents’ EBRBs (Boots et al., 2015; Kim et al., 2008; McPhie et al., 2012; Taylor et al., 2011; Wang et al., 2017; Xu et al., 2013). Future studies may need to prioritize parenting styles over parenting dimensions. In addition, future study could examine how adolescents’ acceptance interacts the influence of parenting styles and practices on their behavioral outcomes.

This study found significant effects from some but not all interactions examined. Prominent null findings were that the associations between adolescents’ FV intake or ST and corresponding parenting practices were neither moderated by parenting dimensions nor parenting styles; and authoritarian parenting styles were not associated with any adolescents’ EBRBs. These null findings may result from simplified measures used in FLASHE survey which had low resolution for assessing parenting dimensions and parenting practices. In addition, Power, Sleddens and Berg (2013) criticized the use of the median split approach to divide parenting dimensions to categorize parenting styles (Page 63). They pointed out that this method appeared to be arbitrary from separating individuals close to median scores and suggested using cluster analysis to determine parenting styles. Currently, most instruments that categorized parenting styles used the median-split or scale-based approaches (Kremers et al., 2013). More robust measures of parenting styles are needed in future studies.

In spite of several limitations, results from Chapter 2 supported the inclusion of parenting skills education related to parenting styles and EBRB-related parenting
practices in parent-focused healthy lifestyle interventions for adolescent obesity prevention. In pediatric obesity interventions that targeted parents as agents of change, parenting skills education related to food and activity were common program components. However, parenting skills education related to parenting styles which influence conflict management, appropriate discipline, and parent-child communication, have rarely been incorporated in these interventions. Therefore, the program described in Chapter 5 took the initiative of combining education about parenting style and EBRB-related parenting practices in a healthy lifestyle intervention curriculum for Latino fathers of early adolescents.

Major findings from Chapter 3: Latino fathers acknowledged the importance of nutrition and physical activity for their early adolescents. They generally expressed concerns about their children’s eating and activity behaviors. Several supportive and unsupportive parenting practices and their facilitating factors and barriers were identified from Latino fathers’ involvement in their early adolescents’ eating behaviors, physical activity and screen time.

Perceptions of the general roles of Latino parents’ in child rearing tend to underestimate the influence of Latino fathers on eating behaviors and activity among their children and adolescents (O’Connor et al., 2018). Previous qualitative studies showed that Latino mothers commonly viewed fathers as indifferent or unhelpful regarding food parenting but relatively more engaged in their children’s physical activities (Lora et al., 2016; Mena et al., 2015; Rhoads-Baeza & Reis, 2012; Tovar et al., 2015). Findings from the current focus group study were generated directly from Latino fathers of early adolescents. These fathers generally acknowledged the importance of good nutrition and physical activity and reported their involvement in their early adolescents’ eating, physical activity and screen time. The focus group findings not only indicated the needs but also identified culturally- and age-appropriate content to be included in parenting education for Latino fathers to promote healthy eating and activity among their early adolescents.

Father-child interactions may differ by the gender of the child, marital status and marriage quality, and the number of children in the households (May, Chai, & Burrows,
2017). Examining how these characteristics influence the parenting practices identified in the focus group study deserves further investigation. Focus group studies are subject to influences of group dynamics and homogeneity, which could contribute to potential bias (Krueger & Casey, 2015). For example, a few fathers in the focus group study verbalized their struggles with spouses regarding food and activity parenting, while others indicated that they had harmonious support from their spouses. These different experiences may discourage conversations about these issues in a group format. Instead, individual interviews can offer in-depth views and comparisons of Latino fathers’ food and activity parenting practices by their family characteristics.

In addition, there may be differences between Latino early adolescents’ perceptions and their fathers’ reports of paternal food and activity parenting practices (Korelitz & Garber, 2016; Rebholz et al., 2014). These differences need to be considered in further studies. Therefore, the study presented in Chapter 4 included measures of paternal parenting practices of early adolescents’ EBRBs from both adolescents’ and fathers’ reports.

**Major findings from Chapter 4:** Adequate convergent validity was found for measures of adolescent-reported paternal parenting practices for three key parenting practices specific to seven adolescents’ EBRBs. However, measures of father-reported parenting practices showed poor validity against adolescents’ EBRBs and lack of agreement with their early adolescents’ reports.

This study offered a complete set of valid measures of paternal food and activity parenting practices related to all seven adolescent EBRBs. The successful development of these valid measures was based on using a theoretical framework as the basis for the measures, that the measures were specific to each EBRB, and that both adolescents and fathers’ reports were included. These measures have been applied in the outcome assessment of the parenting skills education among Latino fathers in a healthy lifestyle intervention program for Latino early adolescents.

Social desirability may lead fathers to provide information about the frequency of parenting practices which is incongruent with their adolescents’ reports. Incongruent perceptions of paternal parenting practices between fathers and early adolescents can also result from inadequate father-adolescent communication and interaction (Korelitz &
Garber, 2016). Under the condition where objective measures of paternal parenting practices were lacking, the study findings favored the use of adolescent-reported parenting practices of paternal food and activity parenting practices over fathers’ reported practices. However, including both adolescents’ and fathers’ reports in the program outcome evaluation surveys is advisable because improvements in congruency could serve as an indicator of program effectiveness in improving father-adolescent interactions and communications.

**Major findings from Chapter 5:** Participant attendance, ratings of satisfaction, and positive changes in parenting practices and relevant healthy lifestyle behaviors were indications of the feasibility and potential effectiveness of the Padres Preparados, Jóvenes Saludables program for involving Latino fathers in the promotion of healthy EBRBs for their early adolescent children.

The Padres Preparados, Jóvenes Saludables program is novel because it incorporates parenting skills education regarding parenting styles and EBRB-related parenting practices for Latino fathers to promote healthy lifestyle behaviors among early adolescents. The pilot study results were used to refine the curriculum contents and examine program feasibility. For example, parents stated their interests in learning with their children in addition to joint food preparation and physical activity. Therefore, the curriculum was revised to enable parents and early adolescents to learn about healthy lifestyles and skills together. The revised curriculum also provided take-home activity handouts to encourage parents and their early adolescents to apply what they learned from each session in the home.

Currently, the Padres Preparados, Jóvenes Saludables program is being conducted in a three-year randomized controlled trial with a waitlist control group. The estimated sample size is 200 father-early adolescent dyads. A previous healthy eating intervention with Latino mothers as change agents for their 7- to 13-year-old children found that changes in parenting practices to increase fiber and lower fat intake mediated the program effectiveness for improving children’s vegetable intake (Arredondo et al., 2018). Similarly, mediating effects of parenting practices are expected in the Padres Preparados, Jóvenes Saludables program. These effects can be examined based on the data collected
using the measures of paternal food and activity parenting practices described in Chapter 4. Measures of parenting dimensions and styles are also included in the outcome evaluation surveys. In addition to being an indicator of program effectiveness, the baseline and post-intervention parenting styles are expected to moderate the intervention effectiveness for improving early adolescents’ EBRBs. Mediation analysis of parenting practices and moderation analysis of parenting styles in the program outcome evaluation analyses would provide empirical support for the potential importance of incorporating parenting skills education regarding parenting styles and EBRB-specific parenting practices for Latino fathers in interventions to promote healthy lifestyles among adolescents.

**Strengths and Limitations**

A common strength of the studies in this dissertation is the inclusion of a relatively complete profile of adolescent EBRBs regarding intake of FV and less healthy food and beverages, physical activity and screen time together with the theoretical application of the influence of parenting styles. In addition to examining the theoretical framework relative to the population-based dataset, the studies in this dissertation focused on Latino early-adolescents and parents from low-income immigrant families, which was an important group with socioeconomic disadvantages and high obesity risk. Based on the CBPR approach, the studies completed for this dissertation supported the development of Padres Preparados, Jóvenes Saludables which was culturally and developmentally tailored to the needs of Latino early adolescents and their parents. In addition, the program was innovative in emphasizing engagement of Latino fathers.

Findings from the studies in this dissertation are limited by potential response biases and recall errors from participants’ subjective reports. Strategies that were applied to address response biases included having male moderators in fathers’ focus group interviews, cognitive testing of survey measures, and having both adolescents and fathers report parenting practices. However, the lack of objective measures to address recall errors for EBRBs remained a major limitation. In the pilot testing, Fitbit devices were used to collect Latino early adolescents’ step counts, but the low compliance rate led to inadequate data that met the standard of ≥ 4 days of ≥ 8 valid hours/day of step counts. In addition, data related to the Padres Preparados, Jóvenes Saludables program were
collected based on voluntary participation of Latino families in the Minneapolis/St. Paul area. The generalizability of study findings to a broad population of Latino families with early adolescents or to those who may not be interested in healthy lifestyle interventions remains unknown.

In summary, this dissertation research demonstrated the potential influence of parenting styles and practices on adolescents’ weight-related lifestyle behaviors based on an adapted theoretical model. As an empirical application of this model, this dissertation research supported the development of a healthy lifestyle intervention program for Latino early adolescents and their parents featuring parenting skill education and paternal involvement. Further studies are needed to advance knowledge regarding enhancing parental involvement in adolescent obesity prevention with a special emphasis on fathers. Relevant future research studies should provide valid and efficient instruments to assess parenting styles. Studies should also determine how baseline parenting styles and changes in parenting style and practices influence intervention effectiveness regarding adolescents’ behavioral outcomes. Studies should also be conducted to expand the theoretical model with other intrapersonal, interpersonal and environmental factors.
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Appendix A. Construction of Scales of EBRB-Related Parenting Practices in The Chapter 2

This appendix illustrates the steps and results of scale constructions of EBRB-related parenting practices using survey items from the FLASHE study.

Step 1: Examine the correlations between each parenting practice and corresponding adolescents’ EBRB. Keep measures of parenting practices with significant correlations.

Step 2. Examine inter-item correlations of parenting practices related to each EBRB. Correlation coefficient r ≥ 0.95 was considered to cause collinearity.

Step 3: Conduct exploratory factor analysis of parenting practices that significantly correlated with adolescents’ EBRBs. Factors were extracted using the principal axis method with promax rotation. Prior communality estimates were specified using squared multiple correlations. Factor loadings ≥ 0.4 were kept for later integration of scales (O’Rourke, 2014).

Step 4. Examine the internal consistency of items loaded on each factor of EBRB-specific parenting practices by Cronbach’s alpha coefficient ≥ 0.70 (Nunnally, 1994).

Step 5. Create scales of EBRB-related parenting practices using average scores of summed items loaded on each factor.

Step 6. Examine correlations between scales of parenting practices and adolescents’ EBRBs.

Table A1. Fruit and vegetable-related parenting practices: correlations with adolescents’ fruit and vegetable intake and factor loadings of exploratory factor analysis.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Survey itemsa</th>
<th>rs</th>
<th>Factor loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDPFVBUY</td>
<td>My parent(s) buy fruits and vegetables for me.</td>
<td>0.39***</td>
<td>0.81</td>
</tr>
<tr>
<td>TDPFVTRYEAT</td>
<td>My parent(s) try to eat fruits and vegetables when I’m around</td>
<td>0.29***</td>
<td>0.73</td>
</tr>
<tr>
<td>TDPFVTRYVAR</td>
<td>My parent(s) encourage me to try different kinds of fruits and vegetables</td>
<td>0.27***</td>
<td>0.61</td>
</tr>
<tr>
<td>TDPFVDECIDE</td>
<td>My parent(s) and I decide together how many fruits and vegetables I have to eat</td>
<td>0.25***</td>
<td>0.05</td>
</tr>
<tr>
<td>TDPVENOUGH</td>
<td>My parent(s) have to make sure that I eat enough fruits and vegetables</td>
<td>0.21***</td>
<td>-0.05</td>
</tr>
<tr>
<td>TDPFVMKEAT</td>
<td>My parent(s) make me eat fruits and vegetables</td>
<td>0.17***</td>
<td>0.12</td>
</tr>
</tbody>
</table>

a. How much do you disagree or agree with each of the statements listed below regarding what your parent(s) say and do when it comes to eating fruits and vegetables? Response options: strongly disagree (1), somewhat disagree (2), neither disagree nor agree (3), somewhat agree (4), strongly agree (5).
b. Spearman correlation coefficient with adolescents’ FV intake.
Bolded to highlight ≥ 0.40.
*** p < 0.0001

Table A2. Junk food and sugary drink-related parenting practices: correlations with adolescents’ intake of junk food and sugary drink and factor loadings of exploratory factor analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Survey itemsa</th>
<th>rb</th>
<th>Factor loadings JF/SD Parenting Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDPFBBADDAY</td>
<td>If I’ve had a bad day, my parent(s) let me have junk food or sugary drinks to make me feel better</td>
<td>0.25***</td>
<td>0.09 (reverse coded)</td>
</tr>
<tr>
<td>TDPFBNOTBUY</td>
<td>My parent(s) don’t buy a lot of junk food or sugary drinks for me</td>
<td>-0.24***</td>
<td>0.68*</td>
</tr>
<tr>
<td>TDPFBAVOID</td>
<td>My parent(s) try to avoid eating junk food or sugary drinks when I’m around</td>
<td>-0.20***</td>
<td>0.74*</td>
</tr>
<tr>
<td>TDPFBDUCE</td>
<td>My parent(s) and I decide together how much junk food or sugary drinks I can have</td>
<td>-0.06*</td>
<td>0.47*</td>
</tr>
<tr>
<td>TDPFBNOTEAT</td>
<td>My parent(s) have to make sure that I don’t eat too much junk food or drink too many sugary drinks</td>
<td>0.08**</td>
<td>n.a</td>
</tr>
<tr>
<td>TDPFBPARDEC</td>
<td>My parent(s) decide how much junk food or sugary drinks I can have</td>
<td>-0.02</td>
<td>n.a</td>
</tr>
</tbody>
</table>

a. How much do you disagree or agree with each of the statements listed below regarding what your parent(s) say and do when it comes to eating junk food or drinking sugary drinks? Response options: strongly disagree (1), somewhat disagree (2), neither disagree nor agree (3), somewhat agree (4), strongly agree (5).
b. Spearman correlation coefficient with adolescents’ JF/SD intake.
c. deleted because of a significant correlation at the opposite direction.
d. deleted because of a non-significant correlation.
n.a.: not loaded in the exploratory factor analysis.
Bolded to highlight ≥0.40.
* p < 0.05, ** p < 0.01, *** p < 0.0001
Table A3 Physical activity-related parenting practices: correlations with adolescents’ physical activity and factor loadings of exploratory factor analysis.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Survey itemsa</th>
<th>r^b</th>
<th>Factor loading PA Parenting Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPPPAENOUGH</td>
<td>My parent(s) have to make sure that I get enough physical activity</td>
<td>.19***</td>
<td>.64</td>
</tr>
<tr>
<td>TPPPATKPLCS</td>
<td>My parent(s) take me places where I can be physically active</td>
<td>.27***</td>
<td>.60</td>
</tr>
<tr>
<td>TPPPADECIDE</td>
<td>My parent(s) and I decide together how much physical activity I have to do</td>
<td>.22***</td>
<td>.77</td>
</tr>
<tr>
<td>TPPPAMKEXRC</td>
<td>My parent(s) make me exercise or go out and play</td>
<td>.23***</td>
<td>.74</td>
</tr>
<tr>
<td>TPPPABEACTV</td>
<td>My parent(s) try to be physically active when I'm around</td>
<td>.16***</td>
<td>.65</td>
</tr>
</tbody>
</table>

a. Please select how much you disagree or agree with each of the statements listed below regarding what your parent(s) say and do when it comes to being physically active. Response options: strongly disagree (1), somewhat disagree (2), neither disagree nor agree (3), somewhat agree (4), strongly agree (5).

b. Spearman correlation coefficient with adolescents’ PA. Bolded to highlight > 0.40.

*** p < 0.0001

Table A4 Screen time-related parenting practices: correlations with adolescents’ screen time and factor loadings of exploratory factor analysis.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Survey itemsa</th>
<th>r^b</th>
<th>Factor loading ST Parenting Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPPEDBADDAY</td>
<td>If I've had a bad day, my parent(s) let me have screen time to make me feel better</td>
<td>0.20***</td>
<td>-0.31 (reverse coded)</td>
</tr>
<tr>
<td>TPPEDDECIDE</td>
<td>My parent(s) and I decide together how much screen time I can have</td>
<td>-0.08**</td>
<td>0.75</td>
</tr>
<tr>
<td>TPPEDTKPLCS</td>
<td>My parent(s) take me places where I can play video games, watch movies, etc.</td>
<td>0.19***</td>
<td>-0.41 (reverse coded)</td>
</tr>
<tr>
<td>TPPEDPARDEC</td>
<td>My parent(s) decide how much screen time I can have</td>
<td>-0.11***</td>
<td>0.82</td>
</tr>
<tr>
<td>TPPEDPARREG</td>
<td>My parent(s) have to make sure that I do not have too much screen time</td>
<td>-0.05*</td>
<td>0.77</td>
</tr>
<tr>
<td>TPPEDTRYLIM</td>
<td>My parent(s) try to limit their screen time when I'm around</td>
<td>-0.07**</td>
<td>0.68</td>
</tr>
</tbody>
</table>

a. Please select how much you disagree or agree with each of the statements listed below regarding what your parent(s) say and do when it comes to screen time. Response
options: strongly disagree (1), somewhat disagree (2), neither disagree nor agree (3), somewhat agree (4), strongly agree (5).

b. Spearman correlation coefficient with adolescents’ ST.
c. Items with loadings ≥ 0.40 were bolded and used to construct ST Parenting Practices scale 1. Items with reverse loading were not dropped because of their significant positive correlations with adolescents’ ST. These two items were used to construct ST Parenting Practices scale 2.

* p < 0.05, ** p < 0.01, *** p < 0.0001
Table a5. Scales of EBRB-related parenting practices: internal consistency and correlations with corresponding EBRB.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Variables</th>
<th>Cronbach’s α</th>
<th>r&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>FV Parenting Practices 1</td>
<td>TDPFVBUTY TDPFVTREYET TDPFVTRYVAR</td>
<td>0.78</td>
<td>0.32***</td>
</tr>
<tr>
<td>FV Parenting Practices 2</td>
<td>TDPFVDECIDE TDPFVENOUGH TDPFVMKEAT</td>
<td>0.80</td>
<td>0.25***</td>
</tr>
<tr>
<td>JF Parenting Practices</td>
<td>TDPFBNOTBUY TDPFBAVOID TDPFBDECIDE</td>
<td>0.70</td>
<td>-0.19***</td>
</tr>
<tr>
<td>PA Parenting Practices</td>
<td>TPPPAENOUGH TPPPATKPLCS TPPPADECIDE TPPPAMKEXRC TPPPABEACTV</td>
<td>0.82</td>
<td>0.29***</td>
</tr>
<tr>
<td>ST Parenting Practices 1</td>
<td>TPPEDDECIDE TPPEDPARDEC TPPEDTKPLCS</td>
<td>0.51&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.20***</td>
</tr>
<tr>
<td>ST Parenting Practices 2</td>
<td>TPPEDBADDAY</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a: Pearson correlation coefficients with corresponding adolescents’ EBRBs.
b. Spearman correlation coefficient

** p < .001, *** p < .0001.
Appendix B. SAS Codes for Statistical Analyses in Chapter 2

*Read in formats SAS files;
libname library 'C:\SAS\Teen Demographic SAS';
libname tdemo 'C:\SAS\Teen Demographic SAS';
libname tdiet 'C:\SAS\Teen Diet SAS - Updated';
libname tpa 'C:\SAS\Teen Physical Activity SAS';
libname pdemo 'C:\SAS\Parent Demographic SAS';
libname pdiet 'C:\SAS\Parent Diet SAS - Updated';
libname ppa 'C:\SAS\Parent Physical Activity SAS';

proc format lib = work cntlin = library.formats noprint;
run;
data teen_demo;
set tdemo.TeenDemo_public_09022015;
run;
data teen_diet;
set tdiet.teen_diet_public_updated;
run;
data teen_pa;
set tpa.teenpa_public_updated;
run;

get par_demo;
set pdemo.ParentDemo_public_09022015;
run;
data par_diet;
set pdiet.parent_diet_public_updated;
run;
data par_pa;
set ppa.parent_pa_public_updated;
run;

*combine teen_demo par_demo teen_diet and teen PA datasets;
proc sort data = teen_demo;
by dyadid;
run;
proc sort data = teen_diet;
by dyadid;
run;
proc sort data = teen_pa;
by dyadid;
run;
proc sort data = par_demo;
by dyadid;
run;
proc sort data = par_diet;
by dyadid;
run;
proc sort data = par_pa;
by dyadid;
run;

data flashe;
merge teen_demo teen_diet teen_pa par_demo par_diet par_pa;
by dyadid;

run;

*Assign missing value to numeric variables;
data flashe;
set flashe;
array miss_numeric;
do over miss;
if miss=-9 then miss=.;
end;
run;

*Exclude teens with health conditions that could limit PA/interfere sports participation/interfere outings;
data flashe;
set flashe;
if PPHCPALIMIT = 1 then delete;
if PPHCPASPORT = 1 then delete;
if PPHCPAOUT = 1 then delete;
run;

*Recode Socio-Demographic variables;
data flashe;
set flashe;
if PHIGHED=1 or PHIGHED=2 or PHIGHED=3 then PHIGHED_rc=0; *some college or less;
if PHIGHED=4 then PHIGHED_rc=1; *college or more;
if PKIDSINHOME_RC=1 then PKIDSINHOME_RC2=0; *No siblings;
if PKIDSINHOME_RC=2 or PKIDSINHOME_RC=3 then PKIDSINHOME_RC2=1; *Has siblings;
if XPWGHTSTAT=1 or XPWGHTSTAT=2 then XPWGHTSTAT_rc = 0; *Not overweight or obese;
if XPWGHTSTAT = 3 or XPWGHTSTAT = 4 then XPWGHTSTAT_rc=1; *overweight or obese;
array TREdum(4) TRE1-TRE4; *create dummy variables for each teen race/ethnicity;
do i = 1 to 4;
TREdum (i) = (TETHRAC_RC = i);
end;
drop i;
run;

*Descriptive analysis of participants' sociodemographic characteristics;
*Results presented in table 2.1;
proc freq data=flashe;
tables TAGE TSEX TETHRAC_RC TNATIVITY XTLANGHOME_RC PKIDSINHOME_RC2 PAGE_RC PSEX PHIGHED PHIGHED_rc PWORKSTAT PHSEHLDINCM_RC XPWGHTSTAT XPWGHTSTAT_rc/missing ;
run;

*Create total weekly PA and weekly screen time;
*Square root transform EBRBs;
data flashe;
set flashe;
TMVPA=XTVPREDWEEKS+XTVPREDWEEKOFS+XTVPREDWEEKW;
TMVPAh=TMVPA/60;
XTVPREDWEEKSEDh=XTVPREDWEEKSED/60;
sqrtxtfv_freq_tc= sqrt (xtfv_freq_tc);
sqrtxtjunk_ssb_freq_tc = sqrt (xtjunk_ssb_freq_tc);
sqrtTMVPA = sqrt (TMVPAh);
sqrtXTVPREDWEEKSED = sqrt (XTVPREDWEEKSEDh);
run;

*Descriptive analysis of adolescents' EBRBs result shown in table 2.2;
proc univariate data=flashe normal plot;
var xtfv_freq_tc sqrtxtfv_freq_tc xtjunk_ssb_freq_tc sqrtxtjunk_ssb_freq_tc TMVPAh sqrtTMVPA XTPREDWEEKSEDh sqrtXTVPREDWEEKSED;
run;

*Item selection for constructing EBRB-parenting practices;
*Step 1: delete items without correlations with corresponding EBRBs;
%let EBRB=sqrtxtfv_freq_tc sqrtxtjunk_ssb_freq_tc sqrtTMVPA sqrtXTPREDWEEKSED;
%let mfvpp6 = TDPFVBUY TDPFVTRYEAT TDPFVTRYVAR TDPFVDECEDE TDPFVENOUGH TDPFVMEAT;
%let mjfpp6 = TDPBBADDAY TDPBNOTBUY TDPBAVOID TDPBDECIDE TDPBBNOTEAT TDPBPARDEC;
%let mpapp5 = TPPPANENOUGH TPPPATKPLCS TPPPAPADICED TPPPAMKEXRC TPPPAEACTV;
%let mstpp6 = TPEDBADDAY TPEDDECIDE TPEDTKPLCS TPEDPARDEC TPEDPARRREG TPEDTRYLIM;
%let mEBRBpp_g1 = mfvpp6 mjfpp6 mpapp5 mstpp6;
%do i=1 %to 4;
%let mmEBRBpp_g1 = %scan (&mEBRBpp_g1, &i);
proc corr data=flashe spearman nomiss;
var &&&mmEBRBpp_g1;
run;
%mend;
%corr_tPP:

%macro corr_EBRB_tPP1;
%do i=1 %to 4;
%let mmEBRBpp_g1 = %scan (&mEBRBpp_g1, &i);
%let mEBRB = %scan (&EBRB, &i);
proc corr data=flashe spearman nomiss;
var &mEBRB with &mEBRB;
run;
%mend;
%corr_EBRB_tPP1;

*Step 2: factor analysis to develop EBRB-specific parenting practice scales;
data flashe;
set flashe;
TDPFBADDAY_rc=TDPFBADDAY;
TPPEDBADDAY_rc=TPPEDBADDAY;
TPPEDTKPLCS_rc=TPPEDTKPLCS;
run;

%let mjfp4 = TDPFBADDAY rc TDPFBNOTBUY TDPFBAVOID TDPFBDECIDE;
%let mstpp6_rc = TPPEDBADDAY_rc TPPEDDECIDE TPPEDTKPLCS_rc TPPEDPARDEC TPPEDPARREG TPPEDTRYLIM;
%let mEBRBpp_g2 = mfvpp6 mjfp4 mpapp5 mstpp6_rc;

%macro factor_tEBRBPP;
%do i=1 %to 4;
%let mmEBRBpp_g2 = %scan (&mEBRBpp_g2, &i);
proc factor data=flashe
msa
method=prin
priors=smc
plots=scree
rotate=promax reoder
round
flag=.40;
var &&&mmEBRBpp_g2;
run;
quit;
%end;
%mend;

%factor_tEBRBPP;

*Step 3: examine internal consistency;
%let mfvp1 = TDPFVBUY TDPFVTRYEAT TDPFVTRYVAR;
%let mfvp2 = TDPFVDECIDE TDPFVENOUGH TDPFVMKEAT;
%let mjfp = TDPFBNOTBUY TDPFBAVOID TDPFBDECIDE;
%let mpapp = TPPPAENOUGH TPPPATKPLCS TPPPADECIDE TPPPAMKEACTV TPPPABEACTV;
%let mstpp1 = TPPEDDECIDE TPPEDPARDEC TPPEDPARREG TPPEDTRYLIM;
%let mstpp2 = TPPEDBADDAY_rc TPPEDTKPLCS_rc;
%let mEBRBpp_g3 = mfvpp1 mfvp2 mjfp mpapp mstpp1 mstpp2;

%macro corr_tEBRBpp_g3_alpha;
%do i=1 %to 6;
%let mmEBRBpp_g3 = %scan (&mEBRBpp_g3, &i);
proc corr data=flashe alpha spearman nomiss;
var &&&mmEBRBpp_g3;
run;
%end;
%mend;

%corr_tEBRBpp_g3_alpha;

*Step 4: Create scales of EBRB-related parenting practices;
data flashe;
set flashe;
fvpp1 = mean (TDPFVBUY, TDPFVTRYEAT, TDPFVTRYVAR); *FV-related parenting practices scale 1;
fvpp2 = mean (TDPFVDECIDE, TDPFVENOUGH, TDPFVMKEAT); *FV-related parenting practices scale 2;
jfpp = mean (TDPFBNOTBUY, TDPFBAVOID, TDPFBDECIDE); *JF/D-related parenting practices scale 1;
papp = mean (TPPENAENOUGH, TPPATKPLCS, TPPADECIDE, TPPAMKEXRC, TPPABEACTV); *PA-related parenting practices scale;

stpp1 = mean (TPPEDDECIDE, TPPEDPARDEC, TPPEDPARREG, TPPEDTRYLIM); *screen time-related parenting practices scale 1;

stpp2 = mean (TPPEDBADDAY, TPPEDTKPLCS); *screen time-related parenting practices scale 2;
run;

*Descriptive analysis of EBRB-related parenting practices;
*Results shown in table 2.2;
proc univariate data=flashe normal plot;
var fvpp1 fvpp2 jfpp papp stpp1 stpp2;
run;

proc freq data=flashe;
tables fvpp1 fvpp2 jfpp papp stpp1 stpp2;
run;

*Parenting dimension scales;
data flashe;
set flashe;
TGETAWAY_rc = 6 - TGETAWAY; *reverse coding;
TNOTTELLTRB_rc = 6 - TNOTTELLTRB; *reverse coding;
TMKMOSTDEC_rc = 6 - TMKMOSTDEC; *reverse coding;
TDEM = mean (TFOLFAMRUL, TGETAWAY_rc); *control scale;
TRES = mean (T_COUNTONPAR, TNOTTELLTRB_rc); *warmth scale;
TAUT = mean (TRESPCTPRIV, TMKMOSTDEC_rc); *autonomy granting scale;
run;

*Descriptive analysis of parenting dimension scales;
*Results shown in table 2.2;
proc univariate data=flashe normal plot;
var TDEM TRES TAUT;
run;

*Correlations between EBRBs, EBRB-related parenting practices and parenting dimensions;
*Results shown in table 2.3 and 2.4;
%let EBRB=sqrtxtfv_freq_tc sqrtxtjunk_ssb_freq_tc sqrtTMVPA sqrtXTPREDWEEKSED;
%let PP=fvpp1 fvpp2 jfpp papp stpp1 stpp2;
%let PD=TDEM TRES TAUT;

proc corr data=flashe nomiss;
var &EBRB &PP &PD;
run;

*Associations among key variables;
%let coVa = TAGE TSEX TRE1 TRE2 TRE4 PKIDSINHOME_RC2 PSEX PNATIVITY PHIGHED_rc XPWGHTSTAT_rc;

*Regression analysis of EBRB-related parenting practices after adjusting socio-demographic covariates;
proc reg data=flashe;
model sqrtxtfv_freq_tc = &coVa tfvpp1 /clb vif;
run;
quit;
proc reg data=flashe;
model sqrtxtfv_freq_tc = &coVa tfvpp2 /clb vif;
run;
quit;

proc reg data=flashe;
model sqrtxtjunk_ssb_freq_tc = &coVa tfvpp /clb vif;
run;
quit;

proc reg data=flashe;
model sqrtTMVPA = &coVa tpapp /clb vif;
run;
quit;

proc reg data=flashe;
model sqrtXTPREDWEEKSED = &coVa tstpp1 /clb vif;
run;
quit;

proc reg data=flashe;
model sqrtXTPREDWEEKSED = &coVa tstpp2 /clb vif;
run;
quit;

*Moderation analyses of parenting dimensions;
%macro glm_PD;
%do i=1 %to 3;
%let mPD = %scan (&PD, &i);
proc glm data=flashe;
model sqrtxtfv_freq_tc = &coVa fvpp1|&mPD /solution;
run;
quit;
%MEND;
%glm_PD;

%macro glm_PD;
%do i=1 %to 3;
%let mPD = %scan (&PD, &i);
proc glm data=flashe;
model sqrtxtfv_freq_tc = &coVa fvpp2|&mPD /solution clparm;
run;
quit;
%MEND;
%glm_PD;

%macro glm_PD;
%do i=1 %to 3;
%let mPD = %scan (&PD, &i);
proc glm data=flashe;
model sqrtxtjunk_ssb_freq_tc = &coVa jfpp|&mPD /solution clparm;
run;
quit;
%end;
%mend;
%glm_PD;

%macro glm_PD;
%do i=1 %to 3;
%let mPD = %scan (&PD, &i);
proc glm data=flashe;
model sqrtTMVPA = &coVa papp|&mPD
/solution;
run;
quit;
%mend;
%glm_PD;

%macro glm_PD;
%do i=1 %to 3;
%let mPD = %scan (&PD, &i);
proc glm data=flashe;
model sqrtXTMPREDWEEKSED = &coVa stpp1|&mPD
/solution;
run;
quit;
%mend;
%glm_PD;

%macro glm_PD;
%do i=1 %to 3;
%let mPD = %scan (&PD, &i);
proc glm data=flashe;
model sqrtXTMPREDWEEKSED = &coVa stpp2|&mPD
/solution;
run;
quit;
%mend;
%glm_PD;

*Associations stratified by parenting dimension quartiles;
proc means data=flashe n mean std median p10 p25 p50 p75 p90;
var TDEM TRES TAUT;
run;
*Quartiles of parenting dimension scales;
data flashe;
set flashe;
if TDEM >=1 and TDEM <=3 then TDEMq = 1;
if TDEM =3.5 then TDEMq = 2;
if TDEM =4 then TDEMq = 3;
if TDEM >=4.5 then TDEMq = 4;
if TRES >=1 and TRES <=3 then TRESq = 1;
if TRES =3.5 or TRES =4 then TRESq = 2;
if TRES = 4.5 then TRESq = 3;
if TRES = 5 then TRESq = 4;

if TAUT >= 1 and TAUT <= 2.5 then TAUTq = 1;
if TAUT = 3 then TAUTq = 2;
if TAUT = 3.5 then TAUTq = 3;
if TAUT >= 4 then TAUTq = 4;
run;

*Stratified association analyses:
*fvpp1 X autonomy granting;
proc sort data=flashe;
by TAUTq;
run;
proc glm data=flashe;
by TAUTq;
model sqrtxtfv_freq_tc = &coVa
fvpp1 / clparm;
run;

proc glm data=flashe;
class TAUTq;
model sqrtxtfv_freq_tc = &coVa TAUTq
fvpp1*TAUTq;
contrast "Q1 vs Q2" TAUTq*fvpp1 1 -1 0 0;
contrast "Q1 vs Q3" TAUTq*fvpp1 1 0 -1 0;
contrast "Q1 vs Q4" TAUTq*fvpp1 1 0 0 -1;
contrast "Q2 vs Q3" TAUTq*fvpp1 0 1 -1 0;
contrast "Q2 vs Q4" TAUTq*fvpp1 0 1 0 -1;
contrast "Q3 vs Q4" TAUTq*fvpp1 0 0 1 -1;
run;
quit;

*fvpp2 X responsiveness;
proc sort data=flashe;
by TRESq;
run;
proc glm data=flashe;
by TRESq;
model sqrtxtfv_freq_tc = &coVa TRESq
fvpp2*TRESq;
contrast "Q1 vs Q2" TRESq*fvpp2 1 -1 0 0;
contrast "Q1 vs Q3" TRESq*fvpp2 1 0 -1 0;
contrast "Q1 vs Q4" TRESq*fvpp2 1 0 0 -1;
contrast "Q2 vs Q3" TRESq*fvpp2 0 1 -1 0;
contrast "Q2 vs Q4" TRESq*fvpp2 0 1 0 -1;
contrast "Q3 vs Q4" TRESq*fvpp2 0 0 1 -1;
run;
quit;

*fvpp2 X autonomy granting;
**proc sort data=flashe;**
by TAUTq;
run;
**proc glm data=flashe;**
by TAUTq;
model sqrtxtfv_freq_tc = &coVa
fvpp2 / clparm;
run;
**proc glm data=flashe;**
class TAUTq;
model sqrtxtfv_freq_tc = &coVa TAUTq
fvpp2*TAUTq;
contrast "Q1 vs Q2" TAUTq*fvpp2 1 -1 0 0;
contrast "Q1 vs Q3" TAUTq*fvpp2 1 0 -1 0;
contrast "Q1 vs Q4" TAUTq*fvpp2 1 0 0 -1;
contrast "Q2 vs Q3" TAUTq*fvpp2 0 1 -1 0;
contrast "Q2 vs Q4" TAUTq*fvpp2 0 1 0 -1;
contrast "Q3 vs Q4" TAUTq*fvpp2 0 0 1 -1;
run;
quit;

*tjfpp X demandingness;  
*results shown in table 2.5;  
**proc sort data=flashe;**
by TDEMq;
run;
**proc glm data=flashe;**
where TDEMq NE .;
by TDEMq;
model sqrtxtjunk_ssb_freq_tc = &coVa
jfpp / clparm;
run;
**proc glm data=flashe;**
where TDEMq NE .;
class TDEMq;
model sqrtxtjunk_ssb_freq_tc= &coVa TDEMq
jfpp*TDEMq;
contrast "Q1 vs Q2" TDEMq*jfpp 1 -1 0 0;
contrast "Q1 vs Q3" TDEMq*jfpp 1 0 -1 0;
contrast "Q1 vs Q4" TDEMq*jfpp 1 0 0 -1;
contrast "Q2 vs Q3" TDEMq*jfpp 0 1 -1 0;
contrast "Q2 vs Q4" TDEMq*jfpp 0 1 0 -1;
contrast "Q3 vs Q4" TDEMq*jfpp 0 0 1 -1;
run;
quit;
**proc anova data=flashe;**
class TDEMq;
model jfpp=TDEMq;
means TDEMq/tukey;
run;

*JFPP X responsiveness;  
*results shown in table 2.5;  
**proc sort data=flashe;**
by TRESq;
run;

proc glm data=flashe;
where TRESq NE .;
by TRESq;
model sqrtXTjunk_ssb_freq_tc = &coVa jfpp / clparm;
run;

proc glm data=flashe;
where TRESq NE .;
class TRESq;
model sqrtXTjunk_ssb_freq_tc= &coVa TRESq jfpp*TRESq;
contrast "Q1 vs Q2" TRESq*jfpp 1 -1 0 0;
contrast "Q1 vs Q3" TRESq*jfpp 1 0 -1 0;
contrast "Q1 vs Q4" TRESq*jfpp 1 0 0 -1;
contrast "Q2 vs Q3" TRESq*jfpp 0 1 -1 0;
contrast "Q2 vs Q4" TRESq*jfpp 0 1 0 -1;
contrast "Q3 vs Q4" TRESq*jfpp 0 0 1 -1;
run;
quit;

proc anova data=flashe;
class TRESq;
model jfpp=TRESq;
means TRESq/tukey;
run;

*stpp1 x autonomy granting;
proc sort data=flashe;
by TAUTq;
run;
proc glm data=flashe;
by TAUTq;
model sqrtXTPREDWEEKSED = &coVa stpp1 /
clparm;
run;

proc glm data=flashe;
class TAUTq;
model sqrtXTPREDWEEKSED = &coVa TAUTq stpp1*TAUTq;
contrast "Q1 vs Q2" TAUTq*stpp1 1 -1 0 0;
contrast "Q1 vs Q3" TAUTq*stpp1 1 0 -1 0;
contrast "Q1 vs Q4" TAUTq*stpp1 1 0 0 -1;
contrast "Q2 vs Q3" TAUTq*stpp1 0 1 -1 0;
contrast "Q2 vs Q4" TAUTq*stpp1 0 1 0 -1;
contrast "Q3 vs Q4" TAUTq*stpp1 0 0 1 -1;
run;
quit;

*create parenting styles;
data flashe;
set flashe;
if TDEM >= 4.0 then TDEMc = 1; else TDEMc = 0;
if TRES >= 4.5 then TRESc = 1; else TRESc = 0;
if TDEM = . then TDEMc = .;
if TRES = . then TRESc = .;

if TDEMc = 1 and TRESc = 1 then TAV = 1; else TAV = 0; /* authoritative;*/
if TDEMc = 1 and TRESc = 0 then TAN = 1; else TAN = 0; /* authoritarian;*/
if TDEMc = 0 and TRESc = 1 then TIN = 1; else TIN = 0; /* permissive;*/
if TDEMc = 0 and TRESc = 0 then TNE = 1; else TNE = 0; /* uninvolved;*/
if TDEMc = . or TRESc = . then TAV = .;
if TDEMc = . or TRESc = . then TAN = .;
if TDEMc = . or TRESc = . then TIN = .;
if TDEMc = . or TRESc = . then TNE = .;

if TAV = 1 then TPS = 1;
if TAN = 1 then TPS = 2;
if TIN = 1 then TPS = 3;
if TNE = 1 then TPS = 4;
Run;

proc freq data=flashe;
tables TPS/missing;
run;

/* stratified analysis by parenting styles;*/
%let PP1=fvpp1 jfpp papp stpp1; /* EBRB-related parenting practices group 1;*/
%let PP2=fvpp2 jfpp papp stpp2; /* EBRB-related parenting practices group 2;*/

proc sort data=flashe;
by TPS;
run;

%macro glm_PS1;
%do i=1 %to 4;
%let mEBRB = %scan (&EBRB, &i);
%let mPP1 = %scan (&PP1, &i);
proc glm data=flashe;
where TPS NE .;
by TPS;
model &mEBRB = &coVa &mPP1/clparm;
run;
quit;
%end;
%mend;

%glm_PS1;

%macro glm_pse1;
%do i=1 %to 4;
%let mEBRB = %scan (&EBRB, &i);
%let mPP1 = %scan (&PP1, &i);
proc glm data=flashe;
where TPS NE .;
class TPS;
model &mEBRB = &coVa TPS &mPP1*TPS;
contrast "AV vs AN" &mPP1*TPS 1 -1 0 0;
contrast "AV vs IN" &mPP1*TPS 1 0 -1 0;
contrast "AV vs NE" &mPP1*TPS 1 0 0 -1;
contrast "AN vs IN" &mPP1*TPS 0 1 -1 0;
contrast "AN vs NE" &mPP1*TPS 0 1 0 -1;
contrast "IN vs NE" &mPP1*TPS 0 0 1 -1;
run;
quit;
%end;
%mend;
%glm_pse1;

%macro glm_PS2;
%do i=1 %to 4;
%let mEBRB = %scan (&EBRB, &i);
%let mPP2 = %scan (&PP2, &i);
proc glm data=flashe;
where TPS NE .;
by TPS;
model &mEBRB = &coVa &mPP2/clparm;
run;
quit;
%end;
%mend;
%glm_PS2;

%macro glm_pse2;
%do i=1 %to 4;
%let mEBRB = %scan (&EBRB, &i);
%let mPP2 = %scan (&PP2, &i);
proc glm data=flashe;
where TPS NE .;
class TPS;
model &mEBRB = &coVa TPS &mPP2*TPS;
contrast "AV vs AN" &mPP2*TPS 1 -1 0 0;
contrast "AV vs IN" &mPP2*TPS 1 0 -1 0;
contrast "AV vs NE" &mPP2*TPS 1 0 0 -1;
contrast "AN vs IN" &mPP2*TPS 0 1 -1 0;
contrast "AN vs NE" &mPP2*TPS 0 1 0 -1;
contrast "IN vs NE" &mPP2*TPS 0 0 1 -1;
run;
quit;
%end;
%mend;
%glm_pse2;

*visualize significant moderation effects of parenting styles;
*JF-PP and JFD intake;
proc glm data=flashe order = internal;
class TPS;
model sqrtxtjunk_ssb_freq_tc = &coVa TPS|jfpp /solution clparm;
store jfpps;
run;
quit;

proc plm restore = jfpps;
effectplot slicefit (x=jfpp sliceby = TPS);
run;

proc glm data=flashe order = internal;
class TPS;
model sqrtTMVPA = &coVa TPS|papp /solution clparm;
store papps;
run;
quit;

proc plm restore = papps;
effectplot slicefit (x=papp sliceby = TPS);
run;

*Identify significant associations between parenting dimensions and adolescents' EBRBs;
%macro reg_ebrbp;
%do i=1 %to 4;
%let mEBRB = %scan (&EBRB, &i);
%do j=1 %to 3;
%let mPD = %scan (&PD, &j);
proc reg data=flashe;
model &mEBRB = &coVa &mPD /clb vif;
run; quit;
%end
%end
%mend;

%reg_ebrbp;

*PROCESS mediation analysis;
*Load Haye's PROCESS marco before running following codes;

*Mediating effects of EBRB-PP on associations between demandingness and adolescents' EBRBs;
%process (data=flashe, coV = TAGE TSEX TRE1 TRE2 TRE4 PKIDSINHOME_RC2 PSEX PNATIVITY PHIGED_rc XPWGHTSTAT_rc, y=sqrtxtfv_freq_tc, m= fvpp1, x = TDEM, total = 1, model = 4);
%process (data=flashe, coV = TAGE TSEX TRE1 TRE2 TRE4 PKIDSINHOME_RC2 PSEX PNATIVITY PHIGED_rc XPWGHTSTAT_rc, y=sqrtxtjunk_ssb_freq_tc, m= jfpp, x = TDEM, total = 1, model = 4);
%process (data=flashe, coV = TAGE TSEX TRE1 TRE2 TRE4 PKIDSINHOME_RC2 PSEX PNATIVITY PHIGED_rc XPWGHTSTAT_rc, y=sqrtMVPA, m= papp, x = TDEM, total = 1, model = 4);
%process (data=flashe, coV = TAGE TSEX TRE1 TRE2 TRE4 PKIDSINHOME_RC2 PSEX PNATIVITY PHIGED_rc XPWGHTSTAT_rc, y=sqrtXTPREDWEEKSED, m= stpp2, x = TDEM, total = 1, model = 4);
*Mediating effects of EBRB-PP on associations between responsiveness and adolescents' EBRBs;*

```sas
%process (data=flashe, coV = TAGE TSEX TRE1 TRE2 TRE4 PKIDSINHOME_RC2 PSEX PNATIVITY PHIGHED_rc XPWGHTSTAT_rc, y=sqrtxtjunk_ssb_freq_tc, m= jfpp, x = TRES, total = 1, model =4);
%process (data=flashe, coV = TAGE TSEX TRE1 TRE2 TRE4 PKIDSINHOME_RC2 PSEX PNATIVITY PHIGHED_rc XPWGHTSTAT_rc, y=sqrtXTPREDWEEKSED, m= stpp2, x = TRES, total = 1, model =4);
```

*Mediating effects of EBRB-PP on associations between autonomy granting and adolescents' EBRBs;*

```sas
%process (data=flashe, coV = TAGE TSEX TRE1 TRE2 TRE4 PKIDSINHOME_RC2 PSEX PNATIVITY PHIGHED_rc XPWGHTSTAT_rc, y=sqrtxtfv_freq_tc, m= fvpp1, x = TAUT, total = 1, model =4);
%process (data=flashe, coV = TAGE TSEX TRE1 TRE2 TRE4 PKIDSINHOME_RC2 PSEX PNATIVITY PHIGHED_rc XPWGHTSTAT_rc, y=sqrtxtfv_freq_tc, m= fvpp2, x = TAUT, total = 1, model =4);
%process (data=flashe, coV = TAGE TSEX TRE1 TRE2 TRE4 PKIDSINHOME_RC2 PSEX PNATIVITY PHIGHED_rc XPWGHTSTAT_rc, y=sqrtxtjunk_ssb_freq_tc, m= jfpp, x = TAUT, total = 1, model =4);
%process (data=flashe, coV = TAGE TSEX TRE1 TRE2 TRE4 PKIDSINHOME_RC2 PSEX PNATIVITY PHIGHED_rc XPWGHTSTAT_rc, y=sqrtTMVPA, m= papp, x = TAUT, total = 1, model =4);
```

*Identify significant associations between parenting styles and adolescents' EBRBs;*

```sas
%let PS=TAV TAN TIN TNE;
%macro reg_ebrbps;
%do i=1 %to 4;
%let mEBRB = %scan (&EBRB, &i);
%do j=1 %to 4;
%let mPS = %scan (&PS, &j);
proc reg data=flashe;
model &mEBRB = &coVa &mPS /clb vif;
run;
quit;
%end;
%end;
%mend;
%reg_ebrbps;
```

*Mediating effects of EBRB-PP on associations between authoritative parenting style and adolescents' EBRBs;*

```sas
%process (data=flashe, coV = TAGE TSEX TRE1 TRE2 TRE4 PKIDSINHOME_RC2 PSEX PNATIVITY PHIGHED_rc XPWGHTSTAT_rc, y=sqrtxtfv_freq_tc, m= fvpp1 , x =TAV , total = 1, model =4);
%process (data=flashe, coV = TAGE TSEX TRE1 TRE2 TRE4 PKIDSINHOME_RC2 PSEX PNATIVITY PHIGHED_rc XPWGHTSTAT_rc, y=sqrtxtfv_freq_tc, m= fvpp2 , x =TAV , total = 1, model =4);
%process (data=flashe, coV = TAGE TSEX TRE1 TRE2 TRE4 PKIDSINHOME_RC2 PSEX PNATIVITY PHIGHED_rc XPWGHTSTAT_rc, y=sqrtxtjunk_ssb_freq_tc, m= jfpp, x = TAV, total = 1, model =4);
%process (data=flashe, coV = TAGE TSEX TRE1 TRE2 TRE4 PKIDSINHOME_RC2 PSEX PNATIVITY PHIGHED_rc XPWGHTSTAT_rc, y=sqrtXTPREDWEEKSED, m= stpp2, x = TAV, total = 1, model =4);
```
*Mediating effects of EBRB-PP on associations between permissive parenting style and adolescents’ EBRBs;

\texttt{process (data=flashe, coV = TAGE TSEX TRE1 TRE2 TRE4 PKIDSINHOME_RC2 PSEX PNATIVITY PHIGHED_rc XPWGHTSTAT_rc, y=sqrtxtfv_freq_tc, m=fvpp1, x=TIN, total = 1, model =4);}

*Mediating effects of EBRB-PP on associations between neglectful parenting style and adolescents’ EBRBs;

\texttt{process (data=flashe, coV = TAGE TSEX TRE1 TRE2 TRE4 PKIDSINHOME_RC2 PSEX PNATIVITY PHIGHED_rc XPWGHTSTAT_rc, y=sqrtxtjunk_ssb_freq_tc, m=jfpp, x=TIN, total = 1, model =4);}
Appendix C. Demographic Questionnaire Used in The Focus Group Study.

About you
1. How old are you? _____
2. In what country were you born? _____
3. In what year did you move to the US? _____
4. In what year did you move to MN? _____

Place a √ in the corresponding spaces
5. Sex:
   Female
   Male
   Other

6. Education:
   No school
   Primary school
   High School
   GED
   Some University / Technical School
   University or higher

7. Currently you are:
   Student
   Housekeeper / Husband at home
   Unemployed
   Employee halftime
   Full time employee
   Retired
   Other

About your family:
8. In the following spaces, please indicate the number of people in your home (including you)
   # of people in your home: _____
   # | Age √ | Gender √ |
   1 |
   2 |
   3 |
   4 |
   5 |
   6 |
   7 |
   8 |
9. Are you or someone in your household participating in any of these programs? (check all that apply):

<table>
<thead>
<tr>
<th>Program</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>WIC</td>
<td></td>
</tr>
<tr>
<td>SNAP (Supplemental Nutrition Assistance Program)</td>
<td></td>
</tr>
<tr>
<td>Free or Reduced Price School Food</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

10. What is the approximate monthly income in your family?

<table>
<thead>
<tr>
<th>Income Range</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $1000</td>
<td></td>
</tr>
<tr>
<td>Between $1001 and $2000</td>
<td></td>
</tr>
<tr>
<td>Between $2001 and $3000</td>
<td></td>
</tr>
<tr>
<td>Between $3001 and $4000</td>
<td></td>
</tr>
<tr>
<td>More than $4001</td>
<td></td>
</tr>
</tbody>
</table>

11. What is the language (Spanish / English) they use in their home?

<table>
<thead>
<tr>
<th>Language Description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Spanish only</td>
<td></td>
</tr>
<tr>
<td>More Spanish than English</td>
<td></td>
</tr>
<tr>
<td>Almost equal Spanish and English</td>
<td></td>
</tr>
<tr>
<td>More English than Spanish</td>
<td></td>
</tr>
<tr>
<td>English only</td>
<td></td>
</tr>
</tbody>
</table>

12. How often do your family eat together?

<table>
<thead>
<tr>
<th>Frequency</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 time a week</td>
<td></td>
</tr>
<tr>
<td>2 times a week</td>
<td></td>
</tr>
<tr>
<td>3 times per week</td>
<td></td>
</tr>
<tr>
<td>More than 3 times a week</td>
<td></td>
</tr>
</tbody>
</table>

13. How often do you, and your early adolescent who is participating today eat together?

<table>
<thead>
<tr>
<th>Frequency</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 time a week</td>
<td></td>
</tr>
<tr>
<td>2 times a week</td>
<td></td>
</tr>
<tr>
<td>3 times per week</td>
<td></td>
</tr>
<tr>
<td>More than 3 times a week</td>
<td></td>
</tr>
<tr>
<td>More than 3 times a week</td>
<td></td>
</tr>
</tbody>
</table>

14. How often do you do grocery shopping for your family?

<table>
<thead>
<tr>
<th>Frequency</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td></td>
</tr>
<tr>
<td>Rarely</td>
<td></td>
</tr>
<tr>
<td>Sometimes</td>
<td></td>
</tr>
<tr>
<td>Often</td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td></td>
</tr>
</tbody>
</table>
15. How often do you prepare food for your family?

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rarely</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sometimes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Often</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. Think about your child who came with you to participate in today's discussion, to what extent do you care about the following behaviors?

<table>
<thead>
<tr>
<th>Behaviors</th>
<th>Not at all</th>
<th>A little</th>
<th>Some what</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Do not eat breakfast</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Not eat enough</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Drink too many sugary drinks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Eat too many sweet foods</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Eat too many salty snacks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Not be physically active enough</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Watch too much television</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Spend too much time playing video games</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Do not play sports or active games</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix D. Adolescent-Reported EBRB-related Parenting Practices
Fruits are apples, bananas, oranges, pears, grapes, and more. They can be fresh, cut-up, canned or dried.

1. How many times in a day do you think your FATHER wants you to eat fruits?
   - 0 times
   - 1 time
   - 2 times
   - 3 times or more
   - I don't know

<table>
<thead>
<tr>
<th>How often does your FATHER …</th>
<th>Almost never or never</th>
<th>Not often</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost always or always</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. buy fruits for you to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. prepare fruits for you to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. ask your MOTHER to buy fruits for you to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. make sure you have different kinds of fruits to choose from?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Vegetables are carrots, tomatoes, celery, lettuce, beans, broccoli, and more. They can be fresh, cup-up, canned, or cooked.

1. How many times in a day do you think your FATHER wants you to eat vegetables?
   - 0 times
   - 1 time
   - 2 times
   - 3 times or more
   - I don't know

<table>
<thead>
<tr>
<th>How many times in a week</th>
<th>Almost never or never</th>
<th>Less than 1 time in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. do you see your FATHER eating vegetables?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. does your FATHER eat vegetables with you?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often does your FATHER...</th>
<th>Almost never or never</th>
<th>Not often</th>
<th>Some times</th>
<th>Often</th>
<th>Almost always or always</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. buy vegetables for you to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. prepare vegetables for you to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. ask your MOTHER to buy vegetables for you to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. make sure you have different kinds of vegetables to choose from?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Sugary drinks are regular sodas, fruit drinks, iced teas, sport drinks, and more.

1. How often does your FATHER allow you to drink sugary drinks?

<table>
<thead>
<tr>
<th>How many times in a week ...</th>
<th>Almost never or never</th>
<th>Less than 1 time in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. do you see your FATHER drinking sugary drinks?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. does your FATHER drink sugary drinks with you?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

4. buy sugary drinks for you to drink?

<table>
<thead>
<tr>
<th>How often does your FATHER...</th>
<th>Almost never or never</th>
<th>Not often</th>
<th>Some times</th>
<th>Often</th>
<th>Almost always or always</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. buy sugary drinks for you to drink?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. prepare sugary drinks for you to drink?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. give you money to buy sugary drinks?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Sweets are candies, cookies, cakes, ice cream, pastry, and more. Salty snacks are potato chips, corn chips, Cheetos, Takis and more.

1. How often does your FATHER allow you to eat sweets and/or salty snacks?
- O No sweets and/or salty snacks are allowed
- O Less than 1 time in a week
- O 1-3 times in a week
- O 4-6 times in a week
- O 1 or more times in a day
- O As often as I want
- O I don’t know.

<table>
<thead>
<tr>
<th>How many times in a week ...</th>
<th>Almost never or never</th>
<th>Less than 1 time in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. do you see your FATHER eating sweets and/or salty snacks?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. does your FATHER eat sweets and/or salty snacks with you?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often does your FATHER...</th>
<th>Almost never or never</th>
<th>Not often</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost always or always</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. buy sweets and/or salty snacks for you to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. prepare sweets and/or salty snacks for you to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. give you money to buy sweets and/or salty snacks?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Fast foods are foods bought from fast food restaurants like McDonald's or convenient foods like frozen pizzas.

<table>
<thead>
<tr>
<th>1. How often does your FATHER allow you to eat fast food?</th>
</tr>
</thead>
<tbody>
<tr>
<td>O No fast food is allowed</td>
</tr>
<tr>
<td>O Less than 1 time in a week</td>
</tr>
<tr>
<td>O 1-3 times in a week</td>
</tr>
<tr>
<td>O 4-6 times in a week</td>
</tr>
<tr>
<td>O 1 or more times in a day</td>
</tr>
<tr>
<td>O As often as I want</td>
</tr>
<tr>
<td>O I don't know</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How many times in a week ...</th>
<th>Almost never or never</th>
<th>Less than 1 time in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. do you see your FATHER eating fast food?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. does your FATHER eat fast food with you?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often does your FATHER...</th>
<th>Almost never or never</th>
<th>Not often</th>
<th>Some times</th>
<th>Often</th>
<th>Almost always or always</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. buy fast food for you to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. prepare fast food for you to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. give you money to buy fast food?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Physical activity includes exercise, sports, active games, and more. Being physically active means your body moves and your heart beats faster.

1. How many hours in a day do you think your father wants you to be physically active?

- 0 minutes
- 30 minutes or less
- 30 minutes to 1 hour
- 1 hour to 2 hours
- 2 hours or more
- I don’t know

<table>
<thead>
<tr>
<th>How active is your FATHER?</th>
<th>Not active at all</th>
<th>Not very active</th>
<th>Neither</th>
<th>Active</th>
<th>Very active</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

2. How many times in a week is your FATHER...?

<table>
<thead>
<tr>
<th>How many times in a week is your FATHER</th>
<th>Almost never or never</th>
<th>Less than 1 time in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. physically active with you?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

3. How often does your FATHER...?

<table>
<thead>
<tr>
<th>How often does your FATHER...</th>
<th>Almost never or never</th>
<th>Not often</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost always or always</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. take you to a place where you can be physically active?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. send you outside to be physically active when the weather is nice?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. provide opportunities for you to be physically active?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Screen time includes watching TV, playing video games, using smartphones, and more.

<table>
<thead>
<tr>
<th>1. How much screen time does your FATHER allow you to have in a day?</th>
</tr>
</thead>
<tbody>
<tr>
<td>O No screen time is allowed</td>
</tr>
<tr>
<td>O 30 minutes or less</td>
</tr>
<tr>
<td>O 30 minutes to 1 hour</td>
</tr>
<tr>
<td>O 1 hour to 2 hours</td>
</tr>
<tr>
<td>O 2 hours or more</td>
</tr>
<tr>
<td>O As much as I want</td>
</tr>
<tr>
<td>O I don’t know.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How many times in a week...</th>
<th>Almost never or never</th>
<th>Less than 1 time in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. do you see your father having screen time?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. does your father have screen time together with you?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often does your FATHER provide you with screen time opportunities? (Examples are giving you a smartphone, tablet or computer to play, allowing you to use TV or video game)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almost never or never</td>
</tr>
<tr>
<td>-----------------------</td>
</tr>
<tr>
<td>4. provide you with screen time opportunities?</td>
</tr>
</tbody>
</table>
Appendix E. Father-Reported EBRB-related Parenting Practices

We want to know what you think and do regarding your child’s food intake, physical activity and screen time. Please choose only one answer for each question.

Section 1: Fruit Intake

This section asks about what you think and do regarding your child’s fruit intake. Fruits may be fresh, canned, frozen, or dried, and may be whole, cut-up, or pureed.

8. How many cups of fruit do you want your child to eat in a day?

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>1 cup</th>
<th>2 cups</th>
<th>3 cups or more</th>
<th>As many as he or she wants</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

*one cup of fruit equals one small apple, one large banana, or eight large strawberries.

For the questions below, please circle the number that best describes you or your child.

<table>
<thead>
<tr>
<th>How many times in a week</th>
<th>Almost never or never</th>
<th>Less than once in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. does your child see you eating fruit?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. do you eat fruits with your child?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often do you …</th>
<th>Almost never or never</th>
<th>Rarel y</th>
<th>Some times</th>
<th>Often</th>
<th>Almost always / always</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. buy fruit for your child to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. prepare fruit for your child to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. make sure your child has different kinds of fruit to choose from?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Section 2: Vegetable Intake
This section asks about what you think and do regarding your child’s vegetable intake. Vegetables may be raw, canned, dried or cooked; and may be whole, cut-up, or mashed. Vegetables include fresh and dried beans and peas. Deep fried starchy vegetables, such as French fries, are not counted as vegetables.

1. How many cups of vegetables do you want your child to eat in a day?

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>1 cup</th>
<th>2 cups</th>
<th>3 cups or more</th>
<th>As many as he or she wants</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a cup of vegetables equals one large bell pepper, two large stalks of celery, or 3 spears of broccoli.*

For the questions below, please circle the number that best describes you or your child.

<table>
<thead>
<tr>
<th>How many times in a week</th>
<th>Almost never or never</th>
<th>Less than once in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. does your child see you eating vegetables?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. do you eat vegetables with your child?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often do you …</th>
<th>Almost never or never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost always or always</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. buy vegetables for your child to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. prepare vegetables for your child to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. make sure your child has different kinds of vegetables to choose from?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Section 3. Sugary Drinks
This section asks about what you think and do regarding your child’s consumption of sugary drinks. Sugary drinks include regular sodas, fruit-flavored drinks, sport and energy drinks, sweetened tea and coffee drinks, and powdered or reconstituted drinks.

<table>
<thead>
<tr>
<th>1. How often do you allow your child to drink sugary drinks?</th>
</tr>
</thead>
<tbody>
<tr>
<td>O No sugary drinks are allowed</td>
</tr>
<tr>
<td>O Less than once in a week</td>
</tr>
<tr>
<td>O 1-3 times in a week</td>
</tr>
<tr>
<td>O 4-6 times in a week</td>
</tr>
<tr>
<td>O Once a day or more</td>
</tr>
<tr>
<td>O As often as he or she wants</td>
</tr>
</tbody>
</table>

For the questions below, please circle the number that best describes you or your child.

<table>
<thead>
<tr>
<th>How many times in a week</th>
<th>Almost never or never</th>
<th>Less than once in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. does your child see you drinking sugary drinks?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. do you drink sugary drinks with your child?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often do you …</th>
<th>Almost never or never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost always or always</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. buy sugary drinks for your child to drink?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. prepare sugary drinks for your child to drink?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. give your child money to buy sugary drinks?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Section 4. Sweets and Salty Snacks
This section asks about what you think and do regarding your child’s consumption of sweets and salty snacks. Sweets include candy, jam, syrup, chocolate confections, dairy desserts, and grain-based desserts. Salty snacks include potato chips, corn chips, crackers, cheese balls or curls, and other similar food items.

1. How often do you allow your child to eat sweets or salty snacks?
   - O No sweets and/or no salty snacks are allowed
   - O Less than once in a week
   - O 1-3 times in a week
   - O 4-6 times in a week
   - O Once a day or more
   - O As often as he or she wants

For the questions below, please circle the number that best describes you or your child.

<table>
<thead>
<tr>
<th>How many times in a week ...</th>
<th>Almost never or never</th>
<th>Less than once in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. does your child see you eating sweets or salty snacks?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. do you eat sweets or salty snacks with your child?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often do you ...</th>
<th>Almost never or never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost always or always</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. buy sweets or salty snacks for your child to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. prepare sweets or salty snacks for your child to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. give your child money to buy sweets or salty snacks?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Section 5. Fast Food
This section asks about what you think and do regarding your child’s consumption of fast food. Fast food includes food bought from quick service places such as fast food restaurants.

1. How often do you allow your child to eat fast food?

<table>
<thead>
<tr>
<th>Choice</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>O No fast food is allowed</td>
<td></td>
</tr>
<tr>
<td>O Less than once in a week</td>
<td></td>
</tr>
<tr>
<td>O 1-3 times in a week</td>
<td></td>
</tr>
<tr>
<td>O 4-6 times in a week</td>
<td></td>
</tr>
<tr>
<td>O Once a day or more</td>
<td></td>
</tr>
<tr>
<td>O As often as he or she wants</td>
<td></td>
</tr>
</tbody>
</table>

For the questions below, please circle the number that best describes you or your child.

<table>
<thead>
<tr>
<th>How many times in a week …</th>
<th>Almost never or never</th>
<th>Less than once in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. does your child see you eating fast food?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. do you eat fast food with your child?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often do you …</th>
<th>Almost never or never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost always or always</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. buy fast food for your child to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. go to fast food restaurants with your child</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. give your child money to buy fast food?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Section 6. Physical Activity
This section asks about what you think and do regarding your child’s physical activity. Physical activity includes sports, exercise, active games, and house chores.

1. How much time do you want your child to be physically active in a day?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>O 0 minutes</td>
<td>O 30 minutes or less</td>
</tr>
<tr>
<td>O 30 minutes to one hour</td>
<td>O 1 hour to 2 hours</td>
</tr>
<tr>
<td>O 2 hours or more</td>
<td>O As much as he or she wants</td>
</tr>
</tbody>
</table>

For the questions below, please circle the number that best describes you or your child.

<table>
<thead>
<tr>
<th>How many times in a week …</th>
<th>Almost never or never</th>
<th>Less than once in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. does your child see you being physically active?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. are you physically active with your child?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often do you …</th>
<th>Almost never or never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost always or always</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. take your child to a place he/she can be physically active?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. send your child outside to be physically active when the weather is nice?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. make opportunities available for your child to be physically active?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Section 7. Screen Time
This section asks about what you think and do regarding your child’s screen time. Screen time includes watching TV and movies, playing video games, and using computers, smartphones, and tablets for fun but not for activities related to study or work.

1. How much screen time do you allow your child to have in a day?

<table>
<thead>
<tr>
<th></th>
<th>O No screen time is allowed</th>
<th>O 30 minutes or less</th>
<th>O 30 minutes to one hour</th>
<th>O 1 hour to 2 hours</th>
<th>O 2 hours or more</th>
<th>O As much as he or she wants</th>
</tr>
</thead>
</table>

For the questions below, please circle the number that best describes you or your child.

2. How many times in a week …

<table>
<thead>
<tr>
<th>How many times in a week …</th>
<th>Almost never or never</th>
<th>Less than once in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. does your child see you having screen time?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. do you have screen time together with your child?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

3. How often do you …

<table>
<thead>
<tr>
<th>How often do you …</th>
<th>Almost never or never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost always or always</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. give screen time opportunities to your child? (Examples include giving a smartphone, tablet, or computer to your child to use, or allowing your child to use the TV or video game.)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
### Appendix F. Adolescent-Reported Energy Balance Related Behaviors

<table>
<thead>
<tr>
<th>How often do you eat the following fruits?</th>
<th>Almost never or never</th>
<th>Less than 1 time in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Apple</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Banana</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Orange</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Grapes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. Melons</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. Berries</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. Other fresh, canned or frozen fruits</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. 100% fruit juice</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often do you eat the following vegetables?</th>
<th>Almost never or never</th>
<th>Less than 1 time in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Green salad</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Beans and peas</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Raw vegetables such as carrots, cucumber, tomato, etc.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Cooked vegetables not including deep fried vegetables such as French fries.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often do you drink the following beverages?</th>
<th>Almost never or never</th>
<th>Less than 1 time in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Regular soda or pop</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
2. **Sports drinks such as Gatorade**  & 1 & 2 & 3 & 4 & 5  
3. **Energy drinks such as Red Bull**  & 1 & 2 & 3 & 4 & 5  
4. **Other sweetened beverages such as fruit punch and lemonade**  & 1 & 2 & 3 & 4 & 5  
5. **Homemade sweetened drinks such as Agua fresca**  & 1 & 2 & 3 & 4 & 5  
6. **Coffee drinks such as lattes and Frappuccino?**  & 1 & 2 & 3 & 4 & 5  

<table>
<thead>
<tr>
<th>How often do you eat the following foods?</th>
<th>Almost never or never</th>
<th>Less than 1 time in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Candy bars, chocolate, or other candy</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Cake, donuts, sweet rolls, or pastry</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Cookies and bars</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Ice cream, popsicle, or ice cream bars</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often do you eat the following foods?</th>
<th>Almost never or never</th>
<th>Less than 1 time in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Potato chips such as Lay’s</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Corn chips or tortilla chips such as Takis and Doritos</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Cheese puffs or curls such as Cheetos</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Crackers such as CheezIt, and Chex mix</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. Other salty snacks</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often do you eat foods from the following places?</th>
<th>Almost never or never</th>
<th>Less than 1 time in a week</th>
<th>1-3 times in a week</th>
<th>4-6 times in a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. American fast food restaurants, such as McDonalds or Burger King</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Mexican fast food restaurants, such as Taco Bell</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Sandwich or subs shop, such as Subway</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Pizza places, such as Pizza Hut and Little Caesars</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. Asian buffets or restaurants</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. Deli or food stand on the street or in food markets.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

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

1. Vigorous exercise (heart beats rapidly) each week

| O None | Examples: soccer, aerobic dancing, running, swimming laps, basketball, biking fast, tennis, skating, cross-country skiing |
| 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 | |

2. Moderate exercise (not difficult) each week
### 3. Mild exercise (little effort) each week

<table>
<thead>
<tr>
<th>Duration</th>
<th>None</th>
<th>Less than 30 minutes</th>
<th>30 minutes-2 hours</th>
<th>2 1/2-4 hours</th>
<th>4 1/2-6 hours</th>
<th>6+ hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Examples:</strong></td>
<td></td>
<td>walking slowly (to school, to friend's house, etc.), light house chores</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

In your free time on an average WEEKEND day (Saturday or Sunday),

<table>
<thead>
<tr>
<th>how many hours do you spend doing the following activities?</th>
<th>0 hr</th>
<th>0.5 hr</th>
<th>1 hr</th>
<th>2 hr</th>
<th>3 hr</th>
<th>4 hr</th>
<th>5+ hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Watching TV/DVDs/Videos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Using a computer (not for homework)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Playing electronic games while sitting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Using smartphones or tablets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix G. SAS Codes for Statistical Analyses in Chapter 4

*****************************************
*CREATE THE AFD DATASET
*Variables related to adolescent survey, father survey and *
mother survey are spread out in columns.                  *
The AFD dataset only included observations of adolescent- *
father dyads.                                              *
AFD: Adolescent-Father Dyad
*****************************************

proc import out=afd datafile="C:\SAS\Survey data_vali_all.xlsx"
   DBMS=xlsx;
   sheet="Family";
run;

data afd;
set afd;
*adolescent PARENT PAIRS*****************************************;
*fg: to identify adolescent-parent data pairs,
*CM means adolescent-mother pair,
*CF means adolescent-father pair,
*T means adolescent-father-mother triad,
*M or F means only parent data available.
*records with M or F from the family datasheet were excluded from afd;
*fgs: to identify sex-specific adolescent-parent data pairs,
*GF: girl-father dyad
*BF: boy-father dyad
*GM: girl-mother dyad
*BM: boy-mother dyad
*BFM: boy-father-mother triad
*GFM: girl-father-mother triad;
if cid NE " " and fid EQ " " and mid NE " " then fg="CM";
if cid NE " " and mid EQ " " and fid NE " " then fg="CF";
if cid NE " " and fid NE " " and mid NE " " then fg="T";
if cid EQ " " and fid NE " " and mid EQ " " then fg="F";
if cid EQ " " and fid EQ " " and mid NE " " then fg="M";
if cid NE " " and fid NE " " and mid NE " " and csex=1 then fgs="BFM";
if cid NE " " and fid NE " " and mid NE " " and csex=2 then fgs="GFM";
if cid NE " " and fid NE " " and mid EQ " " and csex=1 then fgs="BF";
if cid NE " " and fid NE " " and mid EQ " " and csex=2 then fgs="BM";
if cid NE " " and fid EQ " " and mid NE " " and csex=1 then fgs="GM";
if fg="CF" or fg="T" then cf="Y"; *to separate adolescent-father pairs;
if fg="CM" or fg="T" then cm="Y"; *to separate adolescent-mother pairs;
if fg="T" then fmp="Y"; *to separate father-mother pairs;
run;

*create the AFD dataset with only adolescent-father dyad observations;

data afd;
set afd;
where cf="Y";
run;
data afd;
set afd;

*MISSING VALUES and OTHER VALUE CHANGES*****************************************************;
*assign missing value of numeric variables;
array missnumerical;
do over miss;
if miss=88 then miss=.;
end;

*adolescent age groups;
if cage>=9 and cage<=12 then cagec=0;
if cage>=13 then cagec=1;

*delete unreasonable values of parent’s age;
if fage<=20 then fage=.;

*create father age categories;
if fage>20 and fage<=40 then fagec=0;
if fage>=41 then fagec=1;

*SEX;
if csex=1 then csex=0; *boy;
if csex=2 then csex=1; *girl;

*divide to two income groups;
if finc>=4 then fincc=1; *>=$35,000;
if finc<=3 and finc>=1 then fincc=0; *<=34,999;

*FOOD SECURITY;
if ffss1=3 or ffss2=3 then ffss=0; *secure;
if ffss1=1 or ffss1=2 or ffss2=1 or ffss2=2 then ffss=1; *insecure;

*EDUCATION;
if fedu=1 or fedu=2 or fedu=3 then feduc=1; *middle school or lower;
if fedu=4 or fedu=5 then feduc=2; *GED or high school;
if fedu=6 or fedu=7 or fedu=8 then feduc=3; *some college or higher;

*YEARS IN THE US;
if fus>=fage then fus=.; *exclude unreasonable values;
if fus>0 and fus<15 then fusc='less than 15 years';
if fus>=15 then fusc='15 years or longer';

*LANGUAGE;
if flan=1 or flan=2 then flanc=0; *exclusive or primary spanish;
if flan>=3 then flanc=1; *equally or more english;

*MARITAL STATUS;
if fmar=1 or fmar=3 or fmar=4 or fmar=5 then fmarc=0; *single;
if fmar=2 or fmar=6 then fmarc=1; *married or with partner;
run;

*EBRB variables;
data afd;
set afd;

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*FFQ convert to daily frequencies;
array ffq(33) cfi1-cfi8 cvi1-cvi4 cdil-cdi6 csil-csi9 cffi1-cffi6;
do i=1 to 33;
if ffq (i)=1 then ffq (i)=0;
if ffq (i)=2 then ffq (i)=0.11;
if ffq (i)=3 then ffq (i)=0.29;
if ffq (i)=4 then ffq (i)=0.71;
if ffq (i)=5 then ffq (i)=1;
end;

*create sum score of each food categories;
cfi=cfi1+cfi2+cfi3+cfi4+cfi5+cfi6+cfi7+cfi8; *daily fruit intake frequencies;
cvi=cvi1+cvi2+cvi3+cvi4; *daily vegetable intake frequencies;
cdi=cdi1+cdi2+cdi3+cdi4+cdi5+cdi6; *daily sugary drink intake frequencies;
csiswt=csi1+csi2+csi3+csi4; *daily sweets intake frequencies;
csisnk=csi5+csi6+csi7+csi8+csi9; *daily salty snack intake frequencies;
csi=csiswt+csisnk; *daily sweets/salty snack intake frequencies;
cffi=cffi1+cffi2+cffi3+cffi4+cffi5+cffi6; *daily fast food intake frequencies;

*convert physical activity responses to hours per week;
cvp=cpat1;
cmp=cpat2;
array cpat (2) cvp cmp;
do i=1 to 2;
if cpat (i)=0 then cpat (i)=0;
if cpat (i)=1 then cpat (i)=0.3;
if cpat (i)=2 then cpat (i)=1.3;
if cpat (i)=3 then cpat(i)=3.3;
if cpat (i)=4 then cpat(i)=5.3;
if cpat (i)=5 then cpat(i)=8;
end;

cmvpe=cvp+cmp; *weekly moderate-to-vigorous physical activity hours;
cswk=cswk1+cswk2+cswk3+cswk4; *screen time hours on a typical weekday;
cswd=cswd1+cswd2+cswd3+cswd4; *screen time hours on a typical weekend day;
csw= cswk*5+cswd*2; *weekly screen time hours;

*exclude outliers;
*define outliers by >1.5 IQR for intakes and st and 70 hrs per week for screen time;
cfie=cfi;
cvie=cvi;
cdie=cdi;
csie=csi;
cffie=cffi;
cmvpe=cvp;
csw=cswe;

if cfi>=8 then cfi=.;
if cvi>= 3.62 then cvi=.;
if cdi>= 4.18 then cdi=.;
if csi>= 3.61 then csi=.;
if cffi>= 1.92 then cffie=.;
if csw>=70 then cswe=.;
run;

*Create and record parenting practice variables;
data afd;
set afd;

*Create new paternal expectation/limit variables by
*recoding expectation/limits responses 0= 0 times or I don't know or as
many as he or she wants;
cflq=cf1;
if cf1=66 then cflq=0;
cvlq=cv1;
if cvl=66 then cvlq=0;

fflq=ff1;
if ff1=77 then fflq=0;
fv1q=fv1;
if fv1=77 then fv1q=0;

*recoding 4= as often as I want (he or she wants) or I don't know;
cdlp=cd1;
if cd1=66 or cd1=77 then cdlp=4;
cslp=cs1;
if cs1=66 or cs1=77 then cslp=4;
cff1p=cff1;
if cff1=66 or cff1=77 then cfflp=4;
cplp=cp1;
if cp1=66 or cp1=77 then cplp=0;
cstlp= cstl;
if cstl=66 or cstl=77 then cstlp=4;

fdlp=fdl;
if fdl=77 then fdlp=4;
fslp=fsl;
if fsl=77 then fslp=4;
ffflp=fffl;
if ffl=77 then fflp=4;
fplp=fp1;
if fp1=77 then fplp=0;
fstlp=fstl;
if fstl=77 then fstlp=4;

*Create dichotomized paternal expectation variables;
*recode 0 = 1 time or less per day, 1= 2 times or more per day;
cflb=cflq;
if cflq=0 or cflq=1 then cflb=0;
if cflq=2 or cflq=3 then cflb=1;
cvlb=cvlq;
if cvlq=0 or cvlq=1 then cvlb=0;
if cvlq=2 or cvlq=3 then cvlb=1;

fflb=fflq;
if fflq=0 or fflq=1 then fflb=0;
if fflq=2 or fflq=3 then fflb=1;
fvlb=fvlq;
if fvlq=0 or fvlq=1 then fvlb=0;
if fvlq=2 or fvlq=3 then fvlb=1;

*recode 0=4-6/wk or more or as many or unknown, 1=1-3/wk or less;
cdlb=cdlp;
if cdlp >= 3 then cdlb=0;
if cdlp >= 0 and cdlp <=2 then cdlb=1;

cslb=cslp;
if cslp >= 3 then cslb=0;
if cslp >= 0 and cslp <=2 then cslb=1;

fdlb=fdlp;
if fdlp >= 3 then fdlb=0;
if fdlp >= 0 and fdlp <=2 then fdlb=1;

fslb=fslp;
if fslp >= 3 then fslb=0;
if fslp >= 0 and fslp <=2 then fslb=1;

*recode 0=1-3/wk or more or as many or unknown, 1=1 time/wk or less;
cfflb=cfflp;
if cfflp=0 or cfflp=1 then cfflb=1;
if cfflp >= 2 then cfflb=0;

ffflb=ffflp;
if ffflp=0 or ffflp=1 then ffflb=1;
if ffflp >= 2 then ffflb=0;

*1=0.5 hour or more, 0=0.5 hour or less or as many or unknown;
cplb=cplp;
if cplp=0 or cplp=1 then cplb=0;
if cplp >= 2 then cplb=1;

fpfb=fpfp;
if fpfp=0 or fpfp=1 then fpfb=0;
if fpfp >= 2 then fpfb=1;

*0=2 hours or more or as many or unknown, 1=less than 2 hours;
cstlb=cstlp;
if cstlp >= 0 and cstlp <=3 then cstlb=1;
if cstlp=4 then cstlb=0;

fstlb=fstlp;
if fstlp >= 0 and fstlp <=3 then fstlb=1;
if fstlp=4 then fstlb=0;

*paternal behavioral role modeling;
*create behavioral modeling scale;
cfbm = (cf2 + cf3)/2;
cvbm = (cv2 + cv3)/2;
cdbm = (cd2 + cd3)/2;
csbm = (cs2 + cs3)/2;
cffbm = (cff2 + cff3)/2;
cpfbm = (cp2 + cp3)/2;
cstbm = (cst2 + cst3)/2;
ffbm = (ff2 + ff3)/2;
fvbm = (fv2 + fv3)/2;
fdbm = (fd2 + fd3)/2;
fsbm = (fs2 + fs3)/2;
fffbm = (fff2 + fff3)/2;
fpbm = (fp2 + fp3)/2;
fstbm = (fst2 + fst3)/2;

*Create dichotomized paternal behavior modeling variables;
  if cfbm >= 1 and cfbm <= 3 then cfbmc = 0;
  if cfbm > 3 then cfbmc = 1;

  if cvbm >= 1 and cvbm <= 3 then cvbmc = 0;
  if cvbm > 3 then cvbmc = 1;

  if cdbm > 3 then cdbmc = 0;
  if cdbm >= 1 and cdbm <= 3 then cdbmc = 1;

  if csbm > 2 then csbmc = 0;
  if csbm >= 1 and csbm <= 2 then csbmc = 1;

  if cffbm > 2 then cffbmc = 0;
  if cffbm >= 1 and cffbm <= 2 then cffbmc = 1;

  if cpbm >= 1 and cpbm <= 3 then cpbmc = 0;
  if cpbm > 3 then cpbmc = 1;

  if cstbm > 3 then cstbmc = 0;
  if cstbm >= 1 and cstbm <= 3 then cstbmc = 1;

  if ffbm >= 1 and ffbm <= 3 then ffbmc = 0;
  if ffbm > 3 then ffbmc = 1;

  if fvbm >= 1 and fvbm <= 3 then fvbmc = 0;
  if fvbm > 3 then fvbmc = 1;

  if fdbm > 3 then fdbmc = 0;
  if fdbm >= 1 and fdbm <= 3 then fdbmc = 1;

  if fsbm > 2 then fsbmc = 0;
  if fsbm >= 1 and fsbm <= 2 then fsbmc = 1;

  if fffbm > 2 then fffbmc = 0;
  if fffbm >= 1 and fffbm <= 2 then fffbmc = 1;

  if fpbm >= 1 and fpbm <= 3 then fpbmc = 0;
  if fpbm > 3 then fpbmc = 1;

  if fstbm > 3 then fstbmc = 0;
  if fstbm >= 1 and fstbm <= 3 then fstbmc = 1;

*Create paternal provision scale;
*adolescent reported;
cfp = (cf6 + cf7 + cf9)/3;
cvp = (cv6 + cv7 + cv9)/3;
cdp = (cd6 + cd7 + cd8)/3;
csp = (cs6 + cs7 + cs8)/3;
cffe=(cffe+cffe+cffe)/3;
cpp=(cpp+cpp+cpp)/3;
*father reported;
ffp=(ffp+ffp+ffp)/3;
fvp=(fvp+fvp+fvp)/3;
fdp=(fdp+fdp+fdp)/3;
fsp=(fsp+fsp+fsp)/3;
fffp=(fffp+fffp+fffp)/3;
fpp=(fpp+fpp+fpp)/3;

*create dichotomized paternal availability/accessibility variables;
if cfp>=1 and cfp<4 then cfpc=0;
if cfp>=4 then cfpc=1;
if cvp>=1 and cvp<4 then cvpc=0;
if cvp>=4 then cvpc=1;
if cdp>=1 and cdp<=2 then cdpc=0;
if cdp>2 then cdpc=1;
if csp>=1 and csp<=2 then cspc=0;
if csp>2 then cspc=1;
if cffp>=1 and cffp<=2 then cffpc=0;
if cffp>2 then cffpc=1;
if cpp>=1 and cpp<4 then cppc=0;
if cpp>=4 then cppc=1;
if fvp>=1 and fvp<4 then fvp=0;
if fvp>=4 then fvp=1;
if fdp>=1 and fdp<=2 then fdp=0;
if fdp>2 then fdp=1;
if fsp>=1 and fsp<=2 then fsp=0;
if fsp>2 then fsp=1;
if fpp>=1 and fpp<=2 then fpp=0;
if fpp>=4 then fpp=1;
if fst>=1 and fst<4 then fst=0;
if fst>=4 then fst=1;

*create a difference score to compare youth and father reported parenting practices;
*differences in setting expectations;
cflqd=cflq-cflq;
cvlqd=cvlq-cvlq;
cdlpd=cdlp-cdlp;
cslpd=cslp-cslp;
cfflpd=cfflp-cfflp;
cplpd=cplp-cplp;
cstlpd=dstl-cdstl;

*differences in role modelings;
cfbmd=cfbm-ffbm;
cvbd=csvbm-fvbm;
cdbmd=cdbm-fdbm;
csbmd=csbm-fsbm;
*DESCRIPTIVE ANALYSIS/DEMOGRAPHICS;
proc means data=afd n median range q1 q3 mean std ;
var cage fage fus;
run;
proc freq data=afd;
table cagec csex fagec fmarc feduc fincc ffs fusc flanc/missing;
run;

*DESCRIPTIVE ANALYSIS/EBRB;
*adolescents' EBRBs;
proc freq data=afd;
tables cfi cvi cdi csi cffi cmvp csw/missing;
run;
proc univariate data=afd normal;
var cfi cvi cdi csi cffi cmvp csw
cfie cvie cdie csie cffie cmvpe cswe;
histogram;
run;
proc means data=afd n nmiss min max range Q1 Q3 qrange median mean std;
var cfi cvi cdi csi cffi cmvp csw
cfie cvie cdie csie cffie cmvpe cswe;
run;

***************************************************************;
*EBRD-RELATED PARENTING PRACTICES;
*Paternal expectations;
*Adolescent-reported paternal expectations;
proc freq data=afd;
tables cf1 cv1 cd1 cs1 cff1 cp1 cst1
cf1q cv1q cd1p cs1p cff1p cp1p cst1p
cf1b cv1b cd1b cs1b cff1b cp1b cst1b
/missing;
run;

%let mcexp = cf1b cv1b cd1b cs1b cff1b cp1b cst1b;
%let mEBRB = cfie cvie cdie csie cffie cmvpe cswe;

%macro EBRBdifexpc;
%do i = 1 %to 7;
%let mmcexp = %scan (&mcexp, &i);
%let mmEBRB = %scan (&mEBRB, &i);
proc sort data=afd;
by &&mmcexp;

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run;

proc means data=afd n nmiss median Q1 Q3 qrange mean std clm;
var &mmEBRB;
class &mmcexp;
run;
ods graphics on;
proc npar1way data=afd wilcoxon median plots=(wilcoxonboxplot medianplot);
class &mmcexp;
var &mmEBRB;
run;
ods graphics off;
%end;
%mend;
%EBRBdifexpf;

**************************************************************;
*Father-reported paternal expectations;

proc freq data=afd;
tables ff1 fv1 fd1 fs1 fff1 fp1 fst1
fflq fvlq fdlp fslp ffflp fplp fstlp
fflb fvlb fdlb fslb ffflb fplb fstlb/missing;
run;
%let mfexp = ff1b fv1b fd1b fs1b fff1b fp1b fst1b;

%macro EBRBdifexpf;
%do i = 1 %to 7;
%let mmfexp = %scan (&mfexp, &i);
%let mmEBRB = %scan (&mEBRB, &i);
proc sort data=afd;
by &mmfexp;
run;

proc means data=afd n nmiss median Q1 Q3 qrange mean std clm;
var &mmEBRB;
class &mmfexp;
run;
ods graphics on;
proc npar1way data=afd wilcoxon median plots=(wilcoxonboxplot medianplot);
class &mmfexp;
var &mmEBRB;
run;
ods graphics off;
%end;
%mend;
%EBRBdifexpf;

**************************************************************;
*Paternal Behavioral Modeling scale******************************;
************************************************************;
*adolescent-reported;
**correlation between behavior modeling and EBRB;**

%let mcbm= cfbm cvbm cdbm csbm cffbm cpbm cstbm;

%macro corrbmc;
%do i = 1 %to 7;
%let mmcbm = %scan (&mcbm, &i);
%let mmEBRB = %scan (&mEBRB, &i);
proc corr data=afd plot=scatter spearman;
var &amp;mmEBRB;
with &amp;mmcbm;
run;
%mend;
%corrbmc;

*compare EBRBs by high and low behavioral modeling groups;*

%let mcbmc= cfbmc cvbmc cdbmc csbmc cffbmc cpbmc cstbmc;

%macro EBRBdifbmc;
%do i = 1 %to 7;
%let mmcbmc = %scan (&mcbmc, &i);
%let mmEBRB = %scan (&mEBRB, &i);
proc sort data=afd;
by &amp;mmcbmc;
run;
%mend;
%EBRBdifbmc;

*father-reported role modeling;*

proc freq data=afd;
tables ffbm fvbm fdbm fsbm fffbm fpbm fstbm
ffbmc fvbmc fdbmc fsbmc fffbmc fpbmc fstbmc/missing;
run;

*correlation between behavior modeling and EBRB;*

%let mfbm= ffbm fvbm fdbm fsbm fffbm fpbm fstbm;

%macro corrbmf;
%do i = 1 %to 7;
%let mmfbm = %scan (&mfbm, &i);
%let mmEBRB = %scan (&mEBRB, &i);
proc corr data=afd plot=scatter spearman;
run;
%mend;
%corrbmf;
*compare EBRBs by high and low behavioral modeling groups;*

%let mfbmc= ffbmc fvbmc fdbmc fsbmc fffbmc fpbmc fstbmc;

%macro EBRBdifbmf;
%do i = 1 %to 7;
%let mmfbmc = %scan (&mfbmc, &i);
%let mmEBRB = %scan (&mEBRB, &i);
proc sort data=afd;
by &mmfbmc;
run;

proc means data=afd n nmiss median Q1 Q3 qrange mean std clm;
var &mmEBRB;
class &mmfbmc;
run;

ods graphics on;
proc npar1way data=afd wilcoxon median plots=(wilcoxonboxplot
medianplot);
class &mmfbmc;
var &mmEBRB;
run;
ods graphics off;
%end;
%mend;
%EBRBdifbmf;

***************************************************
*paternal provision;  
***************************************************
*internal consistency of paternal provision scales;  
proc corr data=afd alpha nomiss;
var cf6 cf7 cf9;
run;
proc corr data=afd alpha nomiss;
var cv6 cv7 cv9;
run;
proc corr data=afd alpha nomiss;
var cd6-cd8;
run;
proc corr data=afd alpha nomiss;
var cs6-cs8;
run;
proc corr data=afd alpha nomiss;
var cff6-cff8;
run;
proc corr data=afd alpha nomiss;
var cp6-cp8;
run;

*descriptive analysis of provision scales;
proc means data=afd n nmiss median Q1 Q3 qrange mean std clm;
var cfp cvp cdp csp cffp cpp csp cffpc cpp cppc cst6;
run;

proc freq data=afd;
tables cfp cfpc cvp cvpc cdp cdpc csp cs p cffp cffpc cpp cppc cst6 
cstpc;
run;

%let mcp = cfp cvp cdp csp cffp cpp cst6;
*create provision scales;
%macro corrpc;
%do i = 1 %to 7;
%let mmcp = %scan (&mcp, &i);
%let mmEBRB = %scan (&mEBRB, &i);
proc corr data=afd plot=scatter spearman;
var &&mmEBRB;
with &&mmcp;
run;
%mend;
%corrpc;

*compare adolescents' EBRBs by adolescent-perceived paternal provision;
%let mcpc = cfpc cvpc cdpc cspc cffpc cppc cstpc;

%macro EBRBdifpc;
%do i = 1 %to 7;
%let mmcpc = %scan (&mcpc, &i);
%let mmEBRB = %scan (&mEBRB, &i);
proc sort data=afd;
by &&mmcpc;
run;

proc means data=afd n nmiss median Q1 Q3 qrange mean std clm;
var &&mmEBRB;
class &&mmcpc;
run;

ods graphics on;
proc npar1way data=afd wilcoxon median plots=(wilcoxonboxplot
medianplot);
class &&mmcpc;
var &&mmEBRB;
run;
ods graphics off;
%end;
%mend;
%EBRBdifpc;

*father-reported provisions;
*internal consistenfey of paternal provision scales;
proc corr data=afd alpha nomiss;
var ff6 ff7 ff9;
run;
proc corr data=afd alpha nomiss;
var fv6 fv7 fv9;
run;
proc corr data=afd alpha nomiss;
  var fd6-fd8;
run;
proc corr data=afd alpha nomiss;
  var fs6-fs8;
run;
proc corr data=afd alpha nomiss;
  var fff6-fff8;
run;
proc corr data=afd alpha nomiss;
  var fp6-fp8;
run;
proc freq data=afd;
  tables ffp ffpc fvp fdpc fsp fspc fffp ffpc fpp fpfp fst6 fspc;
run;

%let mfp = ffp fvp fdp fsp fffp fpp ffp fsp fspc fst6;
*create provision scales;
%macro corrpf;
  %do i = 1 %to 7;
  %let mmfp = %scan (&mfp, &i);
  %let mmEBRB = %scan (&mEBRB, &i);
  proc corr data=afd plot=scatter spearman;
    var &mmEBRB;
    with &mmfp;
  run;
  %end;
%mend;
%corrpf;

*compare adolescents' EBRBs by fater-reported paternal provision;
%let mfpc = ffpc fvpc fdpc fspc fffpc fpfp fstpc;
%macro EBRBdifpf;
  %do i = 1 %to 7;
  %let mmfpc = %scan (&mfpc, &i);
  %let mmEBRB = %scan (&mEBRB, &i);
  proc sort data=afd;
    by &mmfpc;
  run;
  proc means data=afd n nmiss median Q1 Q3 qrange mean std clm;
    var &mmEBRB;
    class &mmfpc;
  run;
  ods graphics on;
  proc npar1way data=afd wilcoxon median plots=(wilcoxonboxplot
    medianplot);
    class &mmfpc;
    var &mmEBRB;
  run;
  ods graphics off;
%end;
%mend;
%EBRRdifpf;

***********************************************************************
******
*comparing adolescent-reported and father-reported paternal parenting
practices;

%macro kappaexp;
%do i = 1 %to 7;
%let mmcexp = %scan (&mcexp, &i);
%let mmfexp = %scan (&mfexp, &i);
ods graphics on;
proc freq data=afd;
tables &&mmcexp * &&mmfexp/agree plots=agreeplot;
test kappa;
run;
%end;
%mend;

%kappaexp:

%macro kappabm;
%do i = 1 %to 7;
%let mmcbmc = %scan (&mcbmc, &i);
%let mmfbmc = %scan (&mfbmc, &i);
ods graphics on;
proc freq data=afd;
tables &&mmcbmc * &&mmfbmc/agree plots=agreeplot;
test kappa;
run;
%mend;

%kappabm:

%macro kappap;
%do i = 1 %to 7;
%let mmcppc = %scan (&mcpc, &i);
%let mmfpc = %scan (&mfpc, &i);
ods graphics on;
proc freq data=afd;
tables &&mmcppc * &&mmfpc/agree plots=agreeplot;
test kappa;
run;
%mend;

%kappap:

*use wilcoxon signed rank to compare the significance of differences;
proc univariate data=afd;
var cf1qd cv1qd cd1pd cs1pd cff1pd cp1pd cst1pd
cfmdb cvbmd cdbmd csbmd cffbmd cpbmd ctsbmd
cfd cvpd cdpd cspd cffpd cppd cts6d;
histogram;
run;
*macro of six intraclass correlation measures downloaded from http://support.sas.com/kb/25/031.html accessed on 06/16/2018;

```sas
%macro intracc(data=_LAST_,target=TARGET???,rater=RATER???,
depvar=DEPVAR???,nrater=0,out=_DATA_,print=1);
```

**title2 'Intraclass Correlations for Inter-Rater Reliability';**

**proc glm data=&data outstat=_stats_;**

  %if &print<3 %then noprint; ;
  * use glm to get sums of squares for use in reliability calculation;
  class &target &rater;
  model &depvar = &target &rater;
  run;

**proc sort data=_stats_;**

  by _name_ _SOURCE_;
  run;

  %if &print>=2 %then %do;

  **proc print data=_stats_;**

  title3 'Statistics from 2-way ANOVA w/o Interaction';
  run;

  %end;

**data &out;**

  **title3 'Calculate all reliabilities in one fell swoop';**
  retain msw msb wms ems edf bms bdf jdf k;
  set _stats_;
  by _name_

  if upcase(_type_)="SS1" then delete;
  if upcase(_source_)="ERROR" then do;
    ems=ss/df;
    edf=df;
  end;
  if upcase(_source_)="%upcase(&target)" then do;
    bms=ss/df;
    msb=bms;
    bdf=df;
  end;
  if upcase(_source_)="%upcase(&rater)" then do;
    jms=ss/df;
    jdf=df;
    k=df+1;
  end;
  if last._name_ then do;
    msw=((ems*edf)+(jms*jdf))/(edf+jdf);
    wms=msw;
    n=bdf+1;
    theta=(msb-msw)/(k*msw);
    * used in Winer formulae;
    wsingle=theta/(1+theta);
    wk=(k*theta)/(1+k*theta);
    %if &nrater %then %do;
    wnrater=(&nrater*theta)/(1+&nrater*theta);
    %end;
    sfsingle=(bms-wms)/(bms+(k-1)*wms);
    sfrandom=(bms-ems)/
```
\[
((bms) + ((k-1) \times ems) + ((k \times (jms-ems))/n)) \quad * \text{ICC(2,1)};
\]
\[
sffixed= (bms-ems)/(bms+((k-1) \times ems)) \quad * \text{ICC(3,1)};
\]
\[
sfk= (bms-wms)/bms \quad * \text{ICC(1,k)};
\]
\[
sfrandk= (bms-ems)/(bms+((jms-ems)/n)) \quad * \text{ICC(2,k)};
\]
\[
sffixedk= (bms-ems)/bms \quad * \text{ICC(3,k) with no interaction};
\]

assumption;
output;
end;

label wsingle="Winer reliability: single score"
wk="Winer reliability: mean of k scores"
%if &nrater %then %do;
wrater="Winer reliability: mean of &nrater scores"
%end;
sfsingle="Shrout-Fleiss reliability: single score"
sfrandom="Shrout-Fleiss reliability: random set"
sffixed="Shrout-Fleiss reliability: fixed set"
sfk="Shrout-Fleiss reliability: mean k scores"
sfrandk="Shrout-Fleiss rel: rand set mean k scrs"
sffixedk="Shrout-Fleiss rel: fxd set mean k scrs";
run;

%if &print %then %do;
proc print label;
id _name_
var maw msb wms edf bms bdf jms jdf k theta
wsingle wk %if &nrater %then wrater;
sfsingle sfrandom sffixed sfk sfrandk sffixedk;
run;
%end;
%mend intracc;

data fp;
do cid=1 to 95;
do d=1 to 2;
input fpl @@;
output;
end;
datalines;
3.33 3.33
1.67 3.67
3.33 4.67
5.00 5.00
4.33 4.33
2.33 3.33
3.00 .
3.67 5.00
4.67 .
2.00 4.00
4.00 4.00
3.67 4.33
1.67 2.67
3.33 .
4.33 5.00
3.33 1.67
1.33 2.00


data vp;
do cid=1 to 96;
do d=1 to 2;
input vpl @@;
output;
end;
datalines;
3.33 2.00
1.33 2.67
5.00 3.67
5.00 5.00
3.33 4.00
3.00 3.00
2.00 .
3.00 3.33
5.00 4.00
1.33 4.00
3.00 3.00
3.67 4.33
1.67 3.33
1.67 3.33
4.33 5.00
4.00 2.67
1.00 1.33
1.33 2.00


data dp;
do cid=1 to 96;
do d=1 to 2;
input dpl @@;
output;
end;
datalines;
2.67 2.00
1.33 2.67
5.00 3.67
2.00 2.33
2.33 1.67
2.00 1.67
2.33 1.00
1.33 2.33
2.00 1.33
1.00 2.00
1.33 3.00
1.00 1.67
2.00 1.67
1.67 2.67
3.33 1.67
1.00 1.67
3.33 .


data sp;
do cid=1 to 96;
do d=1 to 2;
input spl @@;
output;
end;
datalines;
3.33 2.00
1.33 2.67
5.00 3.67
2.00 2.33
1.67 1.67
2.00 2.33
2.00 1.00
2.00 1.00
2.00 1.00
2.00 1.67
1.67 1.00
2.00 1.67
1.00 2.00
2.33 2.33
1.00 1.67
3.33 1.67
1.00 1.67
3.33 .

232
| 4.33 | 4.00 | 2.00 | 4.67 | 1.00 | 1.67 | 2.67 | 2.00 |
| 3.00 | 4.33 | 5.00 | 5.00 | 1.67 | 2.00 | 1.67 | 1.67 |
| .    | 3.00 | 1.67 | 1.00 | 2.00 | 2.67 | 1.67 | 2.33 |
| 4.33 | 5.00 | 2.67 | 2.33 | 2.33 | 2.67 | 2.33 | 2.33 |
| 4.00 | 5.00 | 4.00 | 4.67 | 2.00 | 1.67 | 2.00 | 2.00 |
| .    | 4.00 | 3.33 | 5.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2.33 | 5.00 | .    | 4.00 | 1.33 | 1.00 | 1.00 | 1.00 |
| 3.33 | 2.67 | .    | 5.00 | 2.00 | 1.00 | 2.00 | 1.00 |
| 3.00 | 3.00 | .    | 2.33 | .    | 2.00 | 2.00 | 1.33 |
| 1.00 | 2.33 | 3.33 | 3.00 | 1.00 | 2.33 | 3.00 | 1.67 |
| 2.33 | 3.67 | 1.33 | 4.00 | 5.00 | 3.00 | 1.33 | 2.00 |
| 2.67 | 4.00 | .    | 2.67 | 2.00 | 2.33 | 3.67 | 1.67 |
| 4.33 | 4.00 | 3.00 | 5.00 | 1.67 | 2.33 | 2.00 | 1.67 |
| 3.33 | 4.00 | 4.33 | 4.00 | 1.00 | 1.00 | 2.00 | 1.00 |
| 3.67 | 2.67 | 5.00 | 4.00 | 1.00 | 2.67 | 1.00 | 1.00 |
| 2.33 | 4.33 | 1.33 | 3.33 | 2.00 | 2.33 | 1.33 | 2.00 |
| 1.33 | .    | 2.67 | 4.00 | 3.33 | 2.00 | 1.67 | 1.67 |
| 2.00 | 3.67 | 1.00 | 1.00 | 3.33 | 1.00 | 3.67 | 2.33 |
| 3.00 | 3.33 | 3.67 | 4.33 | 2.33 | 2.00 | 2.00 | 3.33 |
| 2.33 | 4.67 | 3.33 | 4.33 | 2.33 | 2.00 | 2.33 | 3.33 |
| 3.33 | 3.00 | 2.00 | 3.00 | 2.00 | 1.67 | 2.00 | 1.67 |
| ;    | ;    | ;    | ;    | ;    | ;    | ;    | ;    |

---

**data ffp:**
```plaintext
data ffp;
do cid=1 to 96;
do d=1 to 2;
input ffpl @@;
output;
end;
end;
datalines;
2.33 3.00
1.67 2.33
2.67 2.67
1.33 1.67
2.67 2.00
2.00 2.67
2.33 2.33
2.00 2.67
1.33 1.33
1.67 3.00
.  3.67
1.00 1.00
3.67 2.00
1.67 1.33
3.00 .
1.67 1.67
1.67 2.00
3.00 .
3.67 3.00
.  1.33
3.00 1.67
2.00 2.33
2.67 2.33
2.67 3.00
;```

---

**data pp:**
```plaintext
data pp;
do cid=1 to 96;
do d=1 to 2;
input ppl @@;
output;
end;
end;
datalines;
3.00 3.00
3.67 4.67
3.00 4.00
3.67 5.00
4.00 3.67
2.00 3.33
3.00 3.33
1.67 5.00
5.00 4.33
1.00 3.33
3.67 3.33
5.00 3.00
1.00 4.00
1.00 4.00
3.00 4.00
2.00 4.00
2.00 4.00
3.00 4.00
4.00 4.00
2.00 4.00
3.00 4.00
5.00 4.00
3.00 4.00
5.00 1.00
5.00 1.00
4.00 2.00
3.00 4.00
4.00 3.00
4.00 3.00
5.00 4.00
3.00 4.00
4.00 3.00
4.00 3.00
4.00 3.00
```
<table>
<thead>
<tr>
<th>1.67</th>
<th>2.67</th>
<th>4.33</th>
<th>4.67</th>
<th>3.00</th>
<th>3.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00</td>
<td>2.67</td>
<td>3.33</td>
<td>2.33</td>
<td>4.00</td>
<td>3.00</td>
</tr>
<tr>
<td>1.67</td>
<td>2.33</td>
<td>2.67</td>
<td>2.33</td>
<td>3.00</td>
<td>4.00</td>
</tr>
<tr>
<td>1.67</td>
<td>1.00</td>
<td>2.33</td>
<td>3.67</td>
<td>4.00</td>
<td>3.00</td>
</tr>
<tr>
<td>1.67</td>
<td>2.00</td>
<td>1.67</td>
<td>1.67</td>
<td>4.00</td>
<td>4.00</td>
</tr>
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Appendix H. Survey Items Used in The Pilot Testing Study of Chapter 5
Demographic Survey for Parents
This part asks some basic information about you, your child and your family.

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<thead>
<tr>
<th></th>
<th>1. Your sex:</th>
<th>2. How old are you?</th>
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<tbody>
<tr>
<td>O</td>
<td>Male</td>
<td>___________ years old</td>
</tr>
<tr>
<td>O</td>
<td>Female</td>
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<td>O</td>
<td>Other</td>
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<tr>
<th></th>
<th>3. How many years have you lived in the U.S?</th>
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<tr>
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<td>_______________ years</td>
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<tr>
<td>O</td>
<td>I born in the U.S.</td>
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<th></th>
<th>4. What is your highest level of formal education? (mark only one)</th>
<th>5. What is your current employment status? (mark only one)</th>
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<tr>
<td>O</td>
<td>I didn’t go to school</td>
<td>O Student</td>
</tr>
<tr>
<td>O</td>
<td>Primary school</td>
<td>O Self-employed</td>
</tr>
<tr>
<td>O</td>
<td>Middle school</td>
<td>O Unemployed</td>
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<tr>
<td>O</td>
<td>High school</td>
<td>O Employed part-time</td>
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<tr>
<td>O</td>
<td>GED</td>
<td>O Employed full-time</td>
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<tr>
<td>O</td>
<td>Some college or technical school</td>
<td>O Homemaker</td>
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<tr>
<td>O</td>
<td>Bachelor’s degree</td>
<td>O Retired</td>
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<td>O</td>
<td>Advanced degree</td>
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<th>6. What is your current marital status? (mark only one)</th>
<th>7. What is your annual household income? (mark only one)</th>
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<tr>
<td>O</td>
<td>Single</td>
<td>O Under $15,000</td>
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<td>O</td>
<td>Married</td>
<td>O $15,000 to $24,999</td>
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<tr>
<td>O</td>
<td>Separated</td>
<td>O $25,000 to $34,999</td>
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<tr>
<td>O</td>
<td>Divorced</td>
<td>O $35,000 to $49,999</td>
</tr>
<tr>
<td>O</td>
<td>Widowed</td>
<td>O $50,000 to $74,999</td>
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<tr>
<td>O</td>
<td>Living with a partner</td>
<td>O $75,000 to $99,999</td>
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<th>8. How many children under the age of 18 live in your household?</th>
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<th>9. How many adults including yourself live in your household?</th>
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<td>_______________ adults</td>
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<th>10. What languages are used in your household?</th>
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O Native language only (Spanish or any language other than English)
O More native language than English
O Almost equal amount of native language and English
O More English than native language
O English only

11. Do you or anyone in your household participate in any of these programs? (mark all that apply)
O WIC
O SNAP (Supplemental Nutrition Assistance Program)
O Free or reduced price foods at school
O Minnesota Family Investment Program (also known as Cash Assistance)
O None
O I don’t know

The next two statements are about the food eaten in your household and whether you were able to afford the food you need.

12. Within the past 12 months, we worried about whether our food would run out before we got money to buy more.
O Often true
O Sometimes true
O Never true

13. Within the past 12 months, the food we bought just didn’t last and we didn’t have money to get more.
O Often true
O Sometimes true
O Never true

In the past year, did you or anyone in your household participate in any classes, training, or other group activities for becoming a better parent?
O Yes
O No
O I don’t know

14. Have you or anyone in your household ever attended any of the following nutrition classes?
O SNAP (Supplemental Nutrition Assistance Program (Food Stamps) education
O EFNEP (Expanded Food and Nutrition Education Program)
O WIC
O Cooking Matters
O Extension, community education or school nutrition course
O Any other nutrition and/or fitness classes, please specify ________________
O I have not attended any such classes
O I don’t know

The following questions are about the child who is participating in this program. Please only think about this child when you answer these questions.
15. What is your relationship to the child participating in this study?

- Father
- Mother
- Grandfather
- Grandmother
- Uncle
- Aunt
- Sibling
- Guardian male
- Guardian female
- Other, please specify _______

<table>
<thead>
<tr>
<th>16. How concerned are you about your child’s current weight as an adolescent?</th>
<th>17. How concerned are you about your child’s future weight as an adult?</th>
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<tbody>
<tr>
<td>O Not concerned at all</td>
<td>O Not concerned at all</td>
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<tr>
<td>O A little concerned</td>
<td>O A little concerned</td>
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<tr>
<td>O Quite concerned</td>
<td>O Quite concerned</td>
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<tr>
<td>O Very concerned</td>
<td>O Very concerned</td>
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**Food Behavior Checklist for Parents**

We are interested in what people eat. The questions below will ask you about how often and how much you eat certain types of foods.

1. Do you eat more than one kind of fruit each day?

   - No
   - Yes, sometimes
   - Yes, often
   - Yes, always

2. How many servings of fruits do you eat each day? (This could be half or whole servings)

   ____________servings
3. Do you eat fruits or vegetables as snacks?

- O No
- O Yes, sometimes
- O Yes, often
- O Yes, always

4. Do you eat more than one kind of vegetable each day?

- O No
- O Yes, sometimes
- O Yes, often
- O Yes, always

5. Do you eat 2 or more vegetables at your main meal?

- O No
- O Yes, sometimes
- O Yes, often
- O Yes, always

6. How many servings of vegetables do you eat each day? (This could be half or whole servings)

___________ servings

7. Do you drink fruit drinks, sport drinks or punch?
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<th>Number</th>
<th>Question</th>
<th>Options</th>
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<td>8</td>
<td>Do you drink regular soda?</td>
<td>O No</td>
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<td>O Yes, sometimes</td>
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<td>O Yes, often</td>
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<td>O Yes, always</td>
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<td>Do you eat cake, candy, ice cream, or other sweets or desserts?</td>
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<td>O Yes, sometimes</td>
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<td>O Yes, always</td>
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<tr>
<td>10</td>
<td>Do you eat chips, puffs, or other salty snacks?</td>
<td>O No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O Yes, sometimes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O Yes, often</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O Yes, always</td>
</tr>
<tr>
<td>11</td>
<td>Do you eat fast foods from fast food restaurants such as Pizza Hut,</td>
<td>O No</td>
</tr>
<tr>
<td></td>
<td>McDonalds, or Taco bell?</td>
<td>O Yes, sometimes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O Yes, often</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O Yes, always</td>
</tr>
</tbody>
</table>

**International Physical Activity Questionnaire Short Form for Parents**

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the vigorous activities that you did in the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

1. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?

   ________ days per week

   O No vigorous physical activities  
   
   **Skip to question 3**
2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

| _________ hours per day |
| _________ minutes per day |
| O Don’t know/Not sure |

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carry light loads, bicycling at a regular pace, or double tennis? Do not include walking.

| _________ days per week |
| O No moderate physical activities |
| Skip to question 5 |

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

| _________ hours per day |
| _________ minutes per day |
| O Don’t know/Not sure |

Think about the time you spent walking in the past 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

| _________ days per week |
| O No walking |
| Skip to question 7 |

6. How much time did you usually spend **walking** on one of those days?
7. During the last 7 days, how much time did you spend sitting on a week day?

_____________ hours per day

_____________ minutes per day

O Don’t know/Not sure

The last question is about the time you spent sitting on weekdays during the last 7 days. Include time spent at work, at home, and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.


Project EAT Screen Time Questions for Both Parents and Adolescents

In your free time on an average WEEKDAY (ONE day from Monday to Friday), how many hours do you spend doing the following activities?

5. Watching TV/DVDs/Videos
6. Using a computer (not for work)
7. Playing electronic games while sitting
8. Using smartphones or tablets

In your free time on an average WEEKEND day (Saturday or Sunday), how many hours do you spend doing the following activities?

5. Watching TV/DVDs/Videos
6. Using a computer (not for work)
7. Playing electronic games while sitting
8. Using smartphones or tablets

Parenting Style & Dimension Questionnaire for Parents

We are interested in your response to the following statements about parenting.
Please think about all statements carefully. Sometimes there may be statements you think are not applicable to you and your child. Please try to answer these questions as best as you can. At times, there may be questions you might think: “I would like to act this way, but in reality, I am not doing this.” Please answer these questions by indicating what you are actually doing.”

<table>
<thead>
<tr>
<th>How often do you do following?</th>
<th>never/ almost never</th>
<th>seldom</th>
<th>about half of time</th>
<th>usually</th>
<th>always/ almost always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I give my child a lot of freedom to make up his/her own mind.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I physically express affection to my child (e.g., hugging, kissing, holding).</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I provide instructions to my child for appropriate behavior.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I take my child’s desires into account before asking my child to do something.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I encourage my child to talk about his/her troubles.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I respect my child’s opinion and encourage him/her to express it.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I encourage my child to look at both sides of the issue.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I ask my child’s opinion about decisions that will affect him or her.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. I help my child understand the impact of behavior by encouraging him/her to talk about the consequences of his/her actions.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. I explain to my child how I feel about his or her good and bad behavior.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. When my child does something that is not allowed, I do not talk to him/her until he/she says he/she is sorry.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. I am easy going and relaxed with my child.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. I encourage my child to freely express (him/herself) even when disagreeing with parents.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. I listen when my child has something to say.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. I tell my child how much I appreciate it when he/she helps me.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. I take away privileges as punishment for misbehavior.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. I have clear expectations for how my child should behave.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>18. I have warm and intimate times together with my child.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>19. I use physical punishment as a way of disciplining my child.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>20. When I ask my child to do something, I expect him/her to do it immediately without any questions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>21. When my child has a friend over, I frequently check to see what they are doing.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>22. I set and enforce rules.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>23. I help my child understand impact of his/her behavior by encouraging talking about the consequences.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>24. I take into account my child’s preferences when making family plans.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>25. I do not allow or tolerate behavior that is immature or problematic.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>26. I give comfort and show understanding when my child is upset.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>27. I scold and criticize to make my child improve.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>28. I use threats as punishment.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>29. I give praise when my child does something good.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>30. I listen to my child’s point of view even when I disagree with him or her.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>31. I allow my child to give input into family rules.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>32. I care about having my child obey me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>33. I do not allow my child to question my decisions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>34. I explode in anger towards my child.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>35. I yell or shout when my child misbehaves.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>36. I require my child to behave in certain ways.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>37. I let my child know that I am the boss in our house.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
38. I do not allow my child to get angry with me.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>


**Project EAT Home Food Availability and Accessibility Questions for Both Parents and Adolescents**

For each of the following statements, please circle the number that best matches your home.

<table>
<thead>
<tr>
<th>How often are the following statements true?</th>
<th>Never</th>
<th>Sometimes</th>
<th>Usually</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fruits are available in my home.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. Vegetables are available in my home.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Vegetables are served at dinner in my home.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. Sugary drinks are available in my home.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. I have “junk food” in my home.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. Sweets are available in my home.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. Potato chips or other salty snack foods are available in my home.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. In my home, there is fresh fruit on the counter, table or somewhere where my child can easily get it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. In my home, there are cut-up vegetables in the refrigerator for my child to eat.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>


**Project EAT physical activity questions adapted from Godin-Shepherd Leisure-Time Exercise Questionnaire**

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

<table>
<thead>
<tr>
<th>4. Vigorous exercise (heart beats rapidly) each week</th>
<th>None</th>
<th>Less than 30 minutes</th>
<th>30 minutes-2 hours</th>
<th>2 1/2-4 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples: soccer, aerobic dancing, running, swimming laps, basketball, biking fast, tennis, skating, cross-country skiing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

247
<table>
<thead>
<tr>
<th></th>
<th>4 1/2-6 hours</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6+ hours</td>
<td></td>
</tr>
</tbody>
</table>

5. Moderate exercise (not difficult) each week

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Examples: walking quickly, baseball, gymnastics, easy bicycling, volleyball, skiing, snowboarding...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less than 30 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30 minutes-2 hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 1/2-4 hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 1/2-6 hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6+ hours</td>
<td></td>
</tr>
</tbody>
</table>

6. Mild exercise (little effort) each week

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Examples: walking slowly (to school, to friend’s house, etc.), light house chores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less than 30 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30 minutes-2 hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 1/2-4 hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 1/2-6 hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6+ hours</td>
<td></td>
</tr>
</tbody>
</table>


Appendix I. After Session Evaluation Forms for Parents (An Example from Session 1)

After Session Evaluation
Session 1: Parenting Styles and Healthy Habits

1. Thank you for your feedback about today’s session, please mark (X) the appropriate response.

<table>
<thead>
<tr>
<th>To what extent you have felt that …</th>
<th>Not at all</th>
<th>A little</th>
<th>Some what</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) The things I learned today are helpful to me as a parent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) I felt comfortable sharing my opinions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) The sessions held my interest.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) The facilitator provided supports that help my learning.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) The facilitators addressed the needs and interests of the group.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Based on what you learned today, which of the following phrases are true or false? (Mark with an X)

<table>
<thead>
<tr>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Calorie balance depends on calories consumed and calories burned.</td>
<td></td>
</tr>
<tr>
<td>2) When you take in more calories than you use, you will lose weight.</td>
<td></td>
</tr>
<tr>
<td>3) Positive parenting practices will help children develop healthy lifestyle habits.</td>
<td></td>
</tr>
</tbody>
</table>

3. What are the things you learned most during today’s session?

4. What things could have made today’s session better?
Appendix J. SAS Codes for Statistical Analysis in Chapter 5

libname pilot 'C:\Pilot data\SAS';

proc import datafile='C:\Pilot data\SAS\Padres pilot youth data2.xlsx' DBMS=xlsx out=pilot.youth;
run;

*clean dataset;
data pilot.youth;
set pilot.youth;
array miss _numeric_;
do over miss;
if miss=88 then miss=.;
end;

If Vms_pre < 150 then Vms_pre=.;
If Vms_post <150 then Vms_post=.;

PA1 = PA1_post - PA1_pre;
PA2 = PA2_post - PA2_pre;
PA3 = PA3_post - PA3_pre;

ST1_pre = (ST1_wk_pre*5 + ST1_wd_pre*2)/7;
ST1_post = (ST1_wk_post*5 + ST1_wd_post*2)/7;
ST1 = ST1_post-ST1_pre;

ST2_pre = (ST2_wk_pre*5 + ST2_wd_pre*2)/7;
ST2_post = (ST2_wk_post*5 + ST2_wd_post*2)/7;
ST2 = ST2_post-ST2_pre;

ST3_pre = (ST3_wk_pre*5 + ST3_wd_pre*2)/7;
ST3_post = (ST3_wk_post*5 + ST3_wd_post*2)/7;
ST3 = ST3_post-ST3_pre;

ST5_pre = (ST5_wk_pre*5 + ST5_wd_pre*2)/7;
ST5_post = (ST5_wk_post*5 + ST5_wd_post*2)/7;
ST5 = ST5_post-ST5_pre;

Fmod_F_pre = (Fmod1_F_pre+Fmod2_F_pre)/2;
Fmod_F_post = (Fmod1_F_post+Fmod2_F_post)/2;
Fmod_F = Fmod_F_post-Fmod_F_pre;
FAA_F = FAA_F_post - FAA_F_pre;
Fmod_M_pre = (Fmod1_M_pre+Fmod2_M_pre)/2;
Fmod_M_post = (Fmod1_M_post+Fmod2_M_post)/2;
Fmod_M = Fmod_M_post-Fmod_M_pre;
FAA_M = FAA_M_post - FAA_M_pre;
FVen_F = FVen_F_post - FVen_F_pre;
FVen_M = FVen_M_post - FVen_M_pre;
FVg_F = FVg_F_post - FVg_F_pre;
FVg_M = FVg_M_post - FVg_M_pre;
FVt_F = FVt_F_post - FVt_F_pre;
FVt_M = FVt_M_post - FVt_M_pre;
FVr_F = FVr_F_post - FVr_F_pre;
FVr_M = FVr_M_post - FVr_M_pre;
FVc_F = FVc_F_post - FVc_F_pre;
FVc_M = FVc_M_post - FVc_M_pre;
FVk_F = VFk_F_post - VFk_F_pre;
FVk_M = VFk_M_post - VFk_M_pre;

Vmod_F_pre = (Vmod1_F_pre + Vmod2_F_pre)/2;
Vmod_F_post = (Vmod1_F_post + Vmod2_F_post)/2;
Vmod_F = Vmod_F_post - Vmod_F_pre;
VAA_F = VAA_F_post - VAA_F_pre;
Vmod_M_pre = (Vmod1_M_pre + Vmod2_M_pre)/2;
Vmod_M_post = (Vmod1_M_post + Vmod2_M_post)/2;
Vmod_M = Vmod_M_post - Vmod_M_pre;
VAA_M = VAA_M_post - VAA_M_pre;

Dmod_F_pre = (Dmod1_F_pre + Dmod2_F_pre)/2;
Dmod_F_post = (Dmod1_F_post + Dmod2_F_post)/2;
Dmod_F = Dmod_F_post - Dmod_F_pre;
DAA_F = DAA_F_post - DAA_F_pre;
Dmod_M_pre = (Dmod1_M_pre + Dmod2_M_pre)/2;
Dmod_M_post = (Dmod1_M_post + Dmod2_M_post)/2;
Dmod_M = Dmod_M_post - Dmod_M_pre;
DAA_M = DAA_M_post - DAA_M_pre;

Smod_F_pre = (Smod1_F_pre + Smod2_F_pre)/2;
Smod_F_post = (Smod1_F_post + Smod2_F_post)/2;
Smod_F = Smod_F_post - Smod_F_pre;
SAA_F = SAA_F_post - SAA_F_pre;
Smod_M_pre = (Smod1_M_pre + Smod2_M_pre)/2;
Smod_M_post = (Smod1_M_post + Smod2_M_post)/2;
Smod_M = Smod_M_post - Smod_M_pre;
SAA_M = SAA_M_post - SAA_M_pre;

FFmod_F_pre = (FFmod1_F_pre + FFmod2_F_pre)/2;
FFmod_F_post = (FFmod1_F_post + FFmod2_F_post)/2;
FFmod_F = FFmod_F_post - FFmod_F_pre;
FFAA_F = FFAA_F_post - FFAA_F_pre;
FFmod_M_pre = (FFmod1_M_pre + FFmod2_M_pre)/2;
FFmod_M_post = (FFmod1_M_post + FFmod2_M_post)/2;
FFmod_M = FFmod_M_post - FFmod_M_pre;
FFAA_M = FFAA_M_post - FFAA_M_pre;

Dlim_F = Dlim_F_post - Dlim_F_pre;
Dlim_M = Dlim_M_post - Dlim_M_pre;
Slim_F = Slim_F_post - Slim_F_pre;
Slim_M = Slim_M_post - Slim_M_pre;
FFlim_F = FFlim_F_post - FFlim_F_pre;
FFlim_M = FFlim_M_post - FFlim_M_pre;

Dc_F = Dc_F_post - Dc_F_pre;
Dc_M = Dc_M_post - Dc_M_pre;
Sc_F = Sc_F_post - Sc_F_pre;
Sc_M = Sc_M_post - Sc_M_pre;
FFc_F = FFc_F_post - FFc_F_pre;
FFc_M = FFc_M_post - FFc_M_pre;

Dk_F = Dk_F_post - Dk_F_pre;
Dk_M = Dk_M_post - Dk_M_pre;
Sk_F = Sk_F_post - Sk_F_pre;
Sk_M = Sk_M_post - Sk_M_pre;
FFk_F = FFk_F_post - FFk_F_pre;
FFk_M = FFk_M_post - FFk_M_pre;

Dre_F = Dre_F_post - Dre_F_pre;
Dre_M = Dre_M_post - Dre_M_pre;
Sre_F = Sre_F_post - Sre_F_pre;
Sre_M = Sre_M_post - Sre_M_pre;
FFre_F = FFre_F_post - FFre_F_pre;
FFre_M = FFre_M_post - FFre_M_pre;

PAAmod_F_pre = (PAmod1_F_pre + PAmod2_F_pre) / 2;
PAAmod_F_post = (PAmod1_F_post + PAmod2_F_post) / 2;
PAAmod_F = PAAmod_F_post - PAAmod_F_pre;
PAAmod_M_pre = (PAmod1_M_pre + PAmod2_M_pre) / 2;
PAAmod_M_post = (PAmod1_M_post + PAmod2_M_post) / 2;
PAAmod_M = PAAmod_M_post - PAAmod_M_pre;
PAAmod_M = PAAmod_M_post - PAAmod_M_pre;
PAAen_F = PAen_F_post - PAen_F_pre;
PAAen_M = PAen_M_post - PAen_M_pre;
PAG_F = PAG_F_post - PAG_F_pre;
PAG_M = PAG_M_post - PAG_M_pre;
PAT_F = PAT_F_post - PAT_F_pre;
PAT_M = PAT_M_post - PAT_M_pre;
PAR_F = PAR_F_post - PAR_F_pre;
PAR_M = PAR_M_post - PAR_M_pre;
PAC_F = PAC_F_post - PAC_F_pre;
PAC_M = PAC_M_post - PAC_M_pre;
PAK_F = PAK_F_post - PAK_F_pre;
PAK_M = PAK_M_post - PAK_M_pre;

STmod_F_pre = (STmod1_F_pre + STmod2_F_pre) / 2;
STmod_F_post = (STmod1_F_post + STmod2_F_post) / 2;
STmod_F = STmod_F_post - STmod_F_pre;
STAA_F = STAA_F_post - STAA_F_pre;
STmod_M_pre = (STmod1_M_pre + STmod2_M_pre) / 2;
STmod_M_post = (STmod1_M_post + STmod2_M_post) / 2;
STmod_M = STmod_M_post - STmod_M_pre;
STAA_M = STAA_M_post - STAA_M_pre;
STlim_F = STlim_F_post - STlim_F_pre;
STlim_M = STlim_M_post - STlim_M_pre;
STk_F = STk_F_post - STk_F_pre;
STk_M = STk_M_post - STk_M_pre;
STre_F = STre_F_post - STre_F_pre;
STre_M = STre_M_post - STre_M_pre;

hha_pre = AA1_pre + AA2_pre + AA6_pre + AA7_pre;
hha_post = AA1_post + AA2_post + AA6_post + AA7_post;
hha = hha_post - hha_pre;
uhha_pre = AA3_pre + AA4_pre + AA5_pre;
uhha_post = AA3_post + AA4_post + AA5_post;
uhha = uhha_post - uhha_pre;
run;

proc univariate data=pilot.youth;
var
PA1_pre PA1_post PA1
PA2_pre PA2_post PA2
PA3_pre PA3_post PA3
ST1_pre ST1_post ST1
ST2_pre ST2_post ST2
ST3_pre ST3_post ST3
ST5_pre ST5_post ST5
Fmod_F_pre Fmod_F_post Fmod_F
Fmod_M_pre Fmod_M_post Fmod_M
FAA_F_pre FAA_F_post FAA_F
FAA_M_pre FAA_M_post FAA_M
Vmod_F_pre Vmod_F_post Vmod_F
Vmod_M_pre Vmod_M_post Vmod_M
VAA_F_pre VAA_F_post VAA_F
VAA_M_pre VAA_M_post VAA_M
FVen_F_pre FVen_F_post FVen_F
FVen_M_pre FVen_M_post FVen_M
FVg_F_pre FVg_F_post FVg_F
FVg_M_pre FVg_M_post FVg_M
FVt_F_pre FVt_F_post FVt_F
FVt_M_pre FVt_M_post FVt_M
FVc_F_pre FVc_F_post FVc_F
FVc_M_pre FVc_M_post FVc_M
FVk_F_pre FVk_F_post FVk_F
FVk_M_pre FVk_M_post FVk_M
PAmod_F_pre PAmod_F_post PAmod_F
PAmod_M_pre PAmod_M_post PAmod_M
PAAA_F_pre PAAA_F_post PAAA_F
PAAA_M_pre PAAA_M_post PAAA_M
PAen_F_pre PAen_F_post PAen_F
PAen_M_pre PAen_M_post PAen_M
PAg_F_pre PAg_F_post PAg_F
PAg_M_pre PAg_M_post PAg_M
PAT_F_pre PAT_F_post PAT_F
PAT_M_pre PAT_M_post PAT_M
PAc_F_pre PAc_F_post PAc_F
PAK_F_pre PAK_F_post PAK_F
PAK_M_pre PAK_M_post PAK_M
Dmod_F_pre Dmod_F_post Dmod_F
Dmod_M_pre Dmod_M_post Dmod_M
DAA_F_pre DAA_F_post DAA_F
DAA_M_pre DAA_M_post DAA_M
Dlim_F_pre Dlim_F_post Dlim_F
Dlim_M_pre Dlim_M_post Dlim_M
Dc_F_pre Dc_F_post Dc_F
Dc_M_pre Dc_M_post Dc_M
Dk_F_pre Dk_F_post Dk_F
Dk_M_pre Dk_M_post Dk_M
Dre_F_pre Dre_F_post Dre_F
Dre_M_pre Dre_M_post Dre_M
Smod_F_pre Smod_F_post Smod_F
Smod_M_pre Smod_M_post Smod_M
SAA_F_pre SAA_F_post SAA_F
SAA_M_pre SAA_M_post SAA_M
Slim_F_pre Slim_F_post Slim_F
Slim_M_pre Slim_M_post Slim_M
Sc_F_pre Sc_F_post Sc_F
Sc_M_pre Sc_M_post Sc_M
Sk_F_pre Sk_F_post Sk_F
Sk_M_pre Sk_M_post Sk_M
Sre_F_pre Sre_F_post Sre_F
Sre_M_pre Sre_M_post Sre_M

FFmod_F_pre FFmod_F_post FFmod_F
FFmod_M_pre FFmod_M_post FFmod_M
FFAA_F_pre FFAA_F_post FFAA_F
FFAA_M_pre FFAA_M_post FFAA_M
FFlim_F_pre FFlim_F_post FFlim_F
FFlim_M_pre FFlim_M_post FFlim_M
FFc_F_pre FFc_F_post FFc_F
FFc_M_pre FFc_M_post FFc_M
FFk_F_pre FFk_F_post FFk_F
FFk_M_pre FFk_M_post FFk_M
FFre_F_pre FFre_F_post FFre_F
FFre_M_pre FFre_M_post FFre_M

STmod_F_pre STmod_F_post STmod_F
STmod_M_pre STmod_M_post STmod_M
STAA_F_pre STAA_F_post STAA_F
STAA_M_pre STAA_M_post STAA_M
STlim_F_pre STlim_F_post STlim_F
STlim_M_pre STlim_M_post STlim_M
STc_F_pre STc_F_post STc_F
STc_M_pre STc_M_post STc_M
STk_F_pre STk_F_post STk_F
STk_M_pre STk_M_post STk_M
STre_F_pre STre_F_post STre_F
STre_M_pre STre_M_post STre_M

haa_pre haa_post haa
uhaa_pre uhaa_post uhaa;
run;

proc freq data=pilot.youth;
tables
Fmod_F Vmod_F FAA_F VAA_F FVen_F FVg_F FVt_F FVr_F FVc_F FVk_F
Fmod_M Vmod_M FAA_M VAA_M FVen_M FVg_M FVt_M FVr_M FVc_M FVk_M
Dmod_F Smod_F FFmod_F
Dmod_M Smod_M FFmod_M
DAA_F SAA_F FFAA_F
DAA_M SAA_M FFAA_M
Dlim_F Slim_F FFlim_F
Dlim_M Slim_M FFlim_M
Dc_F Sc_F FFc_F
Dc_M Sc_M FFc_M
Dk_F Sk_F FFk_F
Dk_M Sk_M FFk_M
*Analysis of data from Parent Surveys;
PROC IMPORT DATAFILE="C:\Pilot data\SAS\Padres pilot parent data2.xlsx"
DBMS=xlsx OUT=pilot.parent;
RUN;

*clean dataset;
DATA pilot.parent;
SET pilot.parent;
IF age <20 THEN age=.;

ARRAY miss _numeric_; DO OVER miss; IF miss=88 THEN miss=.; END;
RUN;

*descriptive analysis of demographics;
PROC FREQ DATA=pilot.parent;
TABLES Sex Rela Age Age_cal Adult Child Edu Emp Income Lang Mari Ustay;
RUN;
PROC UNIVARIATE DATA=pilot.parent;
VAR Age_cal Ustay BMI_pre BMI_post;
RUN;

*create food behavior checklist new variables;
DATA pilot.parent;
SET pilot.parent;
FBC1=FBC1_post-FBC1_pre;
FBC2=FBC2_post-FBC2_pre;
FBC3=FBC3_post-FBC3_pre;
FBC45_pre = FBC4_pre + FBC5_pre;
FBC45_post = FBC4_post + FBC5_post;
FBC45 = FBC4_post - FBC4_pre;
FBC6=FBC6_post-FBC6_pre;
FBC7=FBC7_post-FBC7_pre;
FBC8=FBC8_post-FBC8_pre;
RUN;

*Descriptive analysis and paired t-tests of food behavior checklist variables;
PROC UNIVARIATE DATA=pilot.parent;
VAR FBC1_pre FBC1_post FBC2_pre FBC2_post FBC3_pre FBC3_post FBC45_pre FBC45_post FBC6_pre FBC6_post FBC7_pre FBC7_post FBC8_pre FBC8_post FBC1 FBC2 FBC3 FBC45 FBC6 FBC7 FBC8;
RUN;
*creating parenting style variables;

```sas
data pilot.parent;
set pilot.parent;
* a composite score for Authoritative parenting factor 1--warmth and support;
psae1_pre = PS1_pre + PS7_pre + PS12_pre + PS14_pre + PS27_pre;
psae1_post = PS1_post + PS7_post + PS12_post + PS14_post + PS27_post;
psae1=psae1_post - psae1_pre;

* a composite score for Authoritative parenting factor 2--reasoning and induction;
psae2_pre=PS5_pre+PS11_pre+PS25_pre+PS29_pre+PS31_pre;
psae2_post=PS5_post+PS11_post+PS25_post+PS29_post+PS31_post;
psae2=psae2_post-psae2_pre;

* a composite score for Authoritative parenting factor 3--autonomy granting;
psae3_pre=PS3_pre+PS9_pre+PS18_pre+PS21_pre+PS22_pre;
psae3_post=PS3_post+PS9_post+PS18_post+PS21_post+PS22_post;
psae3=psae3_post-psae3_pre;

* a composite score for Authoritarian parenting factor 1--physical coercion;
psan1_pre=PS2_pre+PS6_pre+PS19_pre+PS32_pre;
psan1_post=PS2_post+PS6_post+PS19_post+PS32_post;
psan1=psan1_post-psan1_pre;

* a composite score for Authoritarian parenting factor 2--verbal hostility;
psan2_pre=PS13_pre+PS16_pre+PS23_pre+PS30_pre;
psan2_post=PS13_post+PS16_post+PS23_post+PS30_post;
psan2=psan2_post-psan2_pre;

* a composite score for Authoritarian parenting factor 3--no reasoning;
psan3_pre=PS4_pre+PS10_pre+PS26_pre+PS28_pre;
psan3_post=PS4_post+PS10_post+PS26_post+PS28_post;
psan3=psan3_post-psan3_pre;

* a composite score for permissive parenting;
psp_pre=PS8_pre+PS15_pre+PS17_pre+PS20_pre+PS24_pre;
psp_post=PS8_post+PS15_post+PS17_post+PS20_post+PS24_post;
psp=psp_post-psp_pre;
run;
```

```sas
proc univariate data=pilot.parent;
var
psae1 pre psae1_post
psae2_pre psae2_post
psae3_pre psae3_post
psan1_pre psan1_post
psan2_pre psan2_post
psan3_pre psan3_post
psp_pre psp_post
psae1 psae2 psae3 psan1 psan2 psan3 psp;
run;
```

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*creating parenting practice variables;

```plaintext
data pilot.parent;
set pilot.parent;
*FV-related parenting practices;
Fmod_pre=(Fmod1_pre+Fmod2_pre)/2;
Fmod_post=(Fmod1_post+Fmod2_post)/2;
Fmod=Fmod_post-Fmod_pre;
Vmod_pre=(Vmod1_pre+Vmod2_pre)/2;
Vmod_post=(Vmod1_post+Vmod2_post)/2;
Vmod=Vmod_post-Vmod_pre;
FAA_pre=(FAA1_pre+FAA2_pre)/2;
FAA_post=(FAA1_post+FAA2_post)/2;
FAA=FAA_post-FAA_pre;
VAA_pre=(VAA1_pre+VAA2_pre)/2;
VAA_post=(VAA1_post+VAA2_post)/2;
VAA=VAA_post-VAA_pre;
FVen=FVen_post-FVen_pre;
FVg=FVg_post-FVg_pre;
FVr=FVr_post-FVr_pre;
FVc=FVc_post-FVc_pre;
FK=FVk_post-FVk_pre;
*SSB, sweets/snacks, fast food-related parenting practices;
Dmod_pre=(Dmod1_pre+ Dmod2_pre)/2;
Dmod_post=(Dmod1_post+ Dmod2_post)/2;
Dmod=Dmod_post- Dmod_pre;
Smod_pre=(Smod1_pre+Smod2_pre)/2;
Smod_post=(Smod1_post+Smod2_post)/2;
Smod=Smod_post-Smod_pre;
FFmod_pre=(FFmod1_pre+FFmod2_pre)/2;
FFmod_post=(FFmod1_post+FFmod2_post)/2;
FFmod=FFmod_post-FFmod_pre;
DAA1=DAA1_post-DAA1_pre;
SAA1=SAA1_post-SAA1_pre;
FFAA1=FFAA1_post-FFAA1_pre;
Dk=Dk_post-Dk_pre;
Sk=Sk_post-Sk_pre;
Ffk=Ffk_post-Ffk_pre;
Dlim=Dlim_post-Dlim_pre;
Slim=Slim_post-Slim_pre;
Fflim=Fflim_post-Fflim_pre;
Dc=Dc_post-Dc_pre;
Sc=Sc_post-Sc_pre;
Ffc=Ffc_post-Ffc_pre;
Dre=Dre_post-Dre_pre;
Sre=Sre_post-Sre_pre;
Ffre=Ffre_post-Ffre_pre;
*PA-related parenting practices;
PAmod_pre=(PAmod1_pre+PAmod2_pre)/2;
PAmod_post=(PAmod1_post+PAmod2_post)/2;
PAmod=PAmod_post-PAmod_pre;
PAAA1=PAAA1_post-PAAA1_pre;
PAen=PAen_post-PAen_pre;
PAg=PAg_post-PAg_pre;
PAT=PAT_post-PAT_pre;
```

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PAr = PAr_post - PAr_pre;
PAc = PAc_post - PAc_pre;
PAk = PAk_post - PAk_pre;

*ST-related parenting practices;
STmod_pre = (STmod1_pre + STmod2_pre + STmod3_pre + STmod4_pre + STmod5_pre + STmod6_pre) / 6;
STmod_post = (STmod1_post + STmod2_post + STmod3_post + STmod4_post + STmod5_post + STmod6_post) / 6;
STmod = STmod_post - STmod_pre;
STAA_pre = (STAA1_pre + STAA2_pre) / 2;
STAA_post = (STAA1_post + STAA2_post) / 2;
STk = STk_post - STk_pre;
STlim = STlim_post - STlim_pre;
STre = STre_post - STre_pre;

* a compositte score for healthy food availableity at home;
haa_pre = (AA1_pre + AA2_pre + AA6_pre + AA7_pre) / 4;
haa_post = (AA1_post + AA2_post + AA6_post + AA7_post) / 4;
haa = haal_post - haal_pre;

* a compositte score for unhealthy food availableity at home;

run;

Proc univariate data=pilot.parent;
var
Fmod_pre Fmod_post Fmod
Vmod_pre Vmod_post Vmod
FAA_pre FAA_post FAA
VAA_pre VAA_post VAA
FVen_pre FVen_post FVen
FVg_pre FVg_post FVg
FVt_pre FVt_post FVt
FVr_pre FVr_post FVr
FVk_pre FVk_post FVk

Dmod_pre Dmod_post Dmod
Smod_pre Smod_post Smod
FFmod_pre FFmod_post FFmod
DAA1_pre DAA1_post DAA1
SAA1_pre SAA1_post SAA1
FFAA1_pre FFAA1_post FFAA1
Dlim_pre Dlim_post Dlim
Slim_pre Slim_post Slim
Fflim_pre Fflim_post Fflim
Dk_pre Dk_post Dk
Sk_pre Sk_post Sk
FFk_pre FFk_post FFk
Dre_pre Dre_post Dre
Sre_pre Sre_post Sre
FFre_pre FFre_post FFre
Dc_pre Dc_post Dc
Sc_pre Sc_post Sc
Ffc_pre  Ffc_post  Ffc
PAmod_pre  PAmod_post  PAmod
PAAA1_pre  PAAA1_post  PAAA1
PAen_pre  PAen_post  PAen
Pag_pre  Pag_post  Pag
Pat_pre  Pat_post  Pat
Par_pre  Par_post  Par
PAc_pre  PAC_post  PAC
PAk_pre  PAk_post  PAk
STmod_pre  STmod_post  STmod
STAA_pre  STAA_post  STAA
STlim_pre  STlim_post  STlim
STk_pre  STk_post  STk
STre_pre  STre_post  STre
haa_pre  haa_post  haa
uhaa_pre  uhaa_post  uhaa;
run;
*Pre-post comparisons of NDSR data;
data intake;
  input ID $  fi  vi  si  di;
datalines;
j1  -1.670666667  -0.432666667  -0.017833333  0
j2  0.604333333  2.75  0.388666667  0.432
j3  0.768333333  -0.668666667  -1.224833333
j4  -1.218666667  -0.558333333  0.128333333  -0.5315
j5  -3.105  0.1085  -1.782  -0.629
j6  1.113666667  0.403333333  0.348666667  -1.124666667
j7  0.166666667  -0.196  -0.558333333  0
j8  -0.735666667  1.772333333  2.095666667  -1.368
;
proc univariate data=intake;
  var  fi  vi  si  di;
run;