



Published in final edited form as:

Contemp Clin Trials. 2020 February ; 89: 105914. doi:10.1016/j.cct.2019.105914.

Methods and rationale to assess the efficacy of a parenting intervention targeting diet improvement and substance use prevention among Latinx adolescents

Sonia Vega-López^{a,b}, Flavio F. Marsiglia^b, Stephanie Ayers^b, Lela Rankin Williams^b, Meg Bruening^a, Anaïd Gonzalvez^b, Beatriz Vega-Luna^b, Alex Perilla^c, Mary Harthun^b, Gabriel Q. Shaibi^{b,d}, Freddy Delgado^c, Christian Rosario^c, Leopoldo Hartmann^d

^aCollege of Health Solutions, Arizona State University, 550 North 3rd Street, Phoenix, AZ 85004

^bSouthwest Interdisciplinary Research Center, School of Social Work, Watts College of Public Service and Community Solutions, Arizona State University, 201 North Central Avenue, 33rd Floor, Phoenix, AZ 85004

^cAmerican Dream Academy, Arizona State University, 542 E. Monroe Street, Suite D-100, Phoenix, AZ 85004

^dCollege of Nursing and Health Innovation, Arizona State University, 500 North 3rd Street, Phoenix, AZ 85004

Abstract

Latinx adolescents are at higher risk for chronic diseases relative to adolescents of other ethnic groups, in part because of their lack of adherence to diet recommendations and their higher rates of substance use. Given the proximal influence of family factors during the developmental stage of adolescence, parenting interventions may be an effective way to promote healthy nutrition and substance use prevention simultaneously. This article describes the design and theoretical rationale of a study assessing the effects of *Families Preparing the New Generation Plus* (FPNG Plus), a 10-week culturally-tailored nutrition and substance use prevention parenting program, on diet and substance use outcomes among Latinx middle school students (6th–8th grade). The 3-arm cluster randomized controlled trial compares FPNG Plus (substance use prevention and healthy nutrition), FPNG (substance use prevention only), and a comparison condition (focusing on academic success) in 1,494 parent-child dyads from 18 schools, randomized at the school level. Adolescents and parents will complete surveys pre- and post-intervention, and 16-weeks after program participation, regarding diet behaviors, substance use, and parenting practices. A random subsample of 126 dyads (42 from each program), will participate in additional data collection to assess the home food environment, detailed dietary intake (via two 24-h recalls), and provide

Corresponding author: Sonia Vega-López, PhD, FAHA, College of Health Solutions and Southwest Interdisciplinary Research Center, Arizona State University, 550 North 3rd Street, Phoenix, AZ 85004, Sonia.Vega.Lopez@asu.edu, (602) 496-3350.

Conflict of Interest

The authors have no conflict of interest to disclose.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

biomarkers of cardiometabolic risk (blood pressure, total cholesterol and HbA1c). If successful, this study will provide evidence contributing to helping Latinx parents assist their adolescent children develop and maintain long-lasting positive lifestyle behaviors in order to prevent concurrent substance use and diet-related chronic diseases.

Keywords

Adolescents; diet; Latinxs; nutrition; parenting; substance use prevention

1. Introduction

Latinx adolescents are at increased risk for cardiometabolic disease (i.e. cardiovascular disease, type 2 diabetes) because of their increasing overweight and obesity rates, lack of adherence to nutrition and physical activity recommendations, and greater rates of tobacco and illicit drug use than their non-Latinx counterparts [1,2]. Behavior change interventions promoting healthy nutrition and substance use prevention for Latinx adolescents have been implemented in school settings with limited parental engagement [3–5]. However, interventions targeting adolescents tend to have a greater impact when the entire family is involved [6–8]. The role of parents is particularly important due to their ability to create a home environment that promotes healthful behaviors (including substance use prevention and healthy nutrition), and parents' role as providers of resources to the family (including food). Cross-sectional evidence suggests that familial factors (e.g., parenting feeding style, frequency of family meals, food insecurity, acculturation, and resiliency) are associated with adolescents' weight status and healthy nutrition [9–12]. Whereas parenting has been used as an efficacious strategy for substance use prevention among Latinx adolescents [7,13], few studies have used a family approach to address healthy nutrition. Whether parenting interventions are an effective way to promote healthy nutrition and substance use prevention simultaneously is unknown. The integration of multiple levels or domains of influence (e.g. simultaneously assessing outcomes at the biological, family or household level and within other domains within the ecological framework) is needed to enhance intervention effects for preventing, reducing and eventually eliminating health disparities.

Families Preparing the New Generation (FPNG) is an efficacious parenting intervention to increase parent-child communication and family functioning as a means to prevent substance use in Latinx adolescents [7,13]. Based on epidemiological data and feedback from FPNG community partners, there is a pressing need to integrate healthy nutrition into the FPNG curriculum in order to make a greater impact on the health needs of Latinx adolescents. Using a community-based participatory research (CBPR) approach [14], the study team developed a nutrition-enhanced version of the intervention, now called *Families Preparing the New Generation Plus* (FPNG Plus). FPNG Plus was developed in partnership with parents and adolescents from the target population to weave culturally acceptable nutrition improvement strategies into the existing parenting intervention. The purpose of the project described herein is to test the efficacy of the enhanced intervention over time through a 3-arm cluster randomized controlled trial comparing FPNG Plus (substance use prevention and healthy nutrition), FPNG (substance use prevention only), and a comparison condition

(focusing on academic success) on adolescents' substance use and nutrition outcomes. The study will also assess mediating effects of parenting strategies and moderating effects of sociocultural factors. Finally, an exploratory aim of the study will evaluate effects at the biological and environmental level through assessing the preliminary effects of FPNG Plus, relative to FPNG and the comparison condition, on modifiable cardiometabolic disease risk factors (glycosylated hemoglobin [HbA1c], total cholesterol, blood pressure, body weight) and the home food environment (availability of fruit, vegetables, and sugar-laden foods) in a subsample of participants.

2. Theoretical approach

2.1. The role of parents in substance use and nutrition behaviors

Parents are a primary change agent for the prevention of substance use and improvements in nutrition behaviors. Many parenting-related factors have a bearing on adolescent substance use and nutrition behaviors [15–17]. Effective parenting practices, such as parental monitoring and involvement, are associated with reduced adolescent substance use [15–18]. Family functioning, such as parental attachment, parent-child communication, and family connectedness, are also associated with reduced risk of substance use [19–21]. Additionally, *familismo* (the centerness of family in Latinx cultures) is associated with reduced risk of substance use [17,22]. Conversely, poor family functioning and family problems are risk factors for substance use [23].

Regarding diet behaviors, positive norms such as parental modeling and encouragement of healthy food consumption, support of family meals, and parental monitoring of junk food, have been associated with greater fruit and vegetable intake, lower consumption of unhealthy foods and snacks, and greater overall diet quality in adolescents [24–30]. In contrast, inappropriate parental modeling and permissive feeding have been associated with increased consumption of fat- and sugar-laden foods and beverages [24,29].

In addition to traditional parenting factors, grocery shopping and the availability of healthy or unhealthy food at home are key factors influencing the quality of the children's diet. Healthier environments are generally associated with greater intake of healthy foods, such as fresh fruits and vegetables, and lower consumption of their unhealthy counterparts, such as sugar-containing snack foods and beverages, among children and adolescents [24–26,28,29,31–36]. Whereas information on how the home food environment influences diet behaviors among Latinxs is limited, research consistently supports that parental feeding practices and food availability are associated with children's dietary quality and health outcomes [37–40].

Behavioral change interventions for Latinx adolescents tend to have a greater impact when the other family members are involved [6–8]. The role of parents is particularly important due to their ability to create a home environment that promotes healthy behaviors (including substance use prevention and healthy nutrition), and parents' role as providers of resources to the family (including food). When targeting nutrition, involving parents and children together has been a successful strategy because of the strong role parents play in modeling and facilitating children's behaviors [41–43]. Although the home food environment has a

localized and direct impact on food choice, and consequently health [44,45], the focus of nutrition interventions on environmental influences at the household level has been limited [25]. The present study follows an ecological systems approach [46]. The ecological systems theory accounts for the different ecosystems that influence children development. It identifies family, peers, and school (microsystem), the interactions between them (the mesosystem) and broader systems such as culture of origin (macrosystem) as influencing children's attitudes and behaviors toward the outcomes of interest in this study [46]. In addition, the ecological systems theory integrates person-environment interrelations through a biosocial perspective [47].

2.2. Acculturative stress and substance use and nutrition behaviors among Latinx adolescents

Acculturative stress has been identified as a factor that may hasten the erosion of health as immigrants adapt to American culture. Acculturation stressors reported by Mexican heritage and other Latinx adolescents have been categorized into six domains: (1) immigration, (2) communication and language, (3) school and academic, (4) peer, (5) family, and (6) social and economic [48]. These domains are interrelated, as family disruption is often a consequence of acculturative adaptation and acculturative stress and can operate as a pathway to adverse health outcomes. Substance use rates, deteriorating diet quality, and related negative health consequences appear to increase significantly with acculturation [49–62].

Longer residence time in the U.S. results in individuals abandoning more traditional dietary patterns and shifting to processed foods, lower intake of fresh fruits and vegetables, and high added sugars intake [12,50,59,63,64]. These changes in nutrition practices are associated with increases in body mass index, and higher diabetes and cardiovascular disease risk [65,66]. Moreover, acculturative stress has been identified to affect the substance use of Latinx adolescents disproportionately and adversely [67]. Lack of familiarity with mainstream American culture and the discriminatory environment that exists in many communities and schools further limits the ability of many Mexican heritage adolescents and parents to seek help and to benefit from existing prevention efforts [68,69]. Because 95% of children of immigrants are U.S. born, there is a need to address possible ecodevelopmental influences –beyond individual factors – that place these children at risk, and prevent the erosion or disappearance of the original protective factors connected to their culture of origin [70].

2.3. Addressing substance use and unhealthy diet behaviors in Latinx adolescents from an ecodevelopmental framework

Adolescence is a critical period for the adoption of behaviors relevant to health and provides an opportunity for the acquisition and maintenance of life-long health trajectories [71]. A useful approach to examine health related behaviors such as substance use and diet is the Ecodevelopmental Theory. This theory derives from Bronfenbrenner's work [46] and more specifically focuses on the multiple, interacting social contexts that influence ethnic minority adolescent development [72,73]. Risk and resiliency for Latinx adolescents emerge from interdependent relationships across proximal and distal nested systems [74], including the

broad social structures and forces that influence parents and adolescents (e.g., cultural processes, migration, residential instability, socioeconomic inequality). Proximal and distal systems interact to influence adolescent health behaviors and biological vulnerability [73,75–78]. Knowledge of these interactions helps identify strategies for improving family functioning, parenting skills, the home environment, and the neighborhood social environment as a means to strengthen adolescent health behaviors and reduce biological vulnerability [79,80]. Positive support within and between these systems facilitates positive health outcomes, while conflict within or among them increases vulnerability to risky health behaviors.

Ecodevelopmental Theory posits that parents and families play a primary role in the socialization of adolescents and directly influence adolescents across the other microsystems (e.g., parental monitoring of involvement with peers) [81]. Many family-related factors have a bearing on adolescent health behaviors including family connectedness, family cohesion, family support, parent-child communication, parental attachment, parental modeling, parental involvement, support of family meals, and parental monitoring [15–30,82]. *Familismo* is associated with reduced risk of health behaviors and improvements in health practices [22,83]. Conversely, poor family functioning and family problems are associated with risk factors for adolescents, like substance use [23]. Families also reflect socioeconomic assets and resources that influence housing, school, and neighborhood characteristics [82,84]. When families live in low socioeconomic, disadvantaged areas, opportunities for pro-social activities, interactions, and behaviors are diminished and replaced by feelings of stress, fear, and distrust further limiting healthy behaviors [85–90].

The Ecodevelopmental Theory provides broad-based approaches for investigating risk and resiliency in Latinx adolescent drug use and dietary behaviors, as these models can account for important familial and parent-child influences that characterize Latinx adolescents and families as they undergo acculturation processes [73,91–93]. As Latinx adolescents are called upon to navigate two distinct sets of cultural norms, promoting biculturalism may help them to sustain strong family, peer, and community ties, and reduce the likelihood of engaging in risky health behaviors [94]. Adolescents who are able to construct a culturally blended identity that adheres positively to both native and host cultures evidence the best outcomes across mental health, physical health, and relational domains [95]. However, the postulated parent-child gaps in communication resulting from differential rates of acculturation between Latinx parents and their children can interfere with effective parenting, induce social isolation of immigrant parents, compromise the ability to attain adequate social support, and disturb role relations as when parents rely on the adolescents to navigate arenas where English proficiency may be required. Stress related to forced assimilation, colonization, and acculturation has been cited as contributing to risk behaviors among Latinx adolescents [96]. When the disruptions and stress imposed by acculturation are managed effectively, such as when Latinx parents maintain active involvement in their child's activities, fewer acculturation-based behavioral problems occur [97,98]. These are skills that can be taught, albeit only within programs that are grounded in their developmental and cultural experiences [99].

From an ecodevelopmental perspective, the present study aims to intervene in the family/parents ecosystem in order to optimize the health benefits at the child's level. The assumption is that there are recent immigrant parents who are able to successfully manage the stressors related to acculturation, while others encounter more difficulties. Bringing parents together in small groups will provide a needed forum to share their experiences. The intervention will help parents identify and strengthen what it is working, learn new strategies to overcome challenges, and be actively engaged in their children healthy eating and substance use prevention.

3. Methods

This study was approved by the Institutional Review Board at Arizona State University (Protocol ID: STUDY00006797). All study-related materials are available in English and Spanish. This study is registered in [ClinicalTrials.gov](https://clinicaltrials.gov/ct2/show/study/NCT03517111) (Identifier: NCT03517111).

3.1. Study aims

The purpose of the project described herein is to test the efficacy of a nutrition-enhanced parenting intervention over time. It is proposed that by strengthening parent-child communication and family functioning, it is possible to impact two health behaviors (nutrition and substance use) simultaneously among Latinx adolescents and positively improve multiple health outcomes.

Specifically, we will: (1) test the efficacy of FPNG Plus relative to the original FPNG and the comparison condition on adolescents substance use and nutrition outcomes; (2) examine the mediating effects of parenting strategies (e.g., parental social support, enhancing family functioning, parenting skills) on the effects of the expanded (FPNG Plus) and the original (FPNG) interventions; (3) examine the moderator effects of sociocultural factors (e.g., acculturation, acculturation gaps, acculturative stress, food insecurity, and resiliency) on the efficacy of the two versions of FPNG both on parenting strategies and on specific adolescents substance use and nutrition outcomes; and (4) explore the preliminary effects of FPNG Plus, relative to FPNG and the comparison condition, on modifiable chronic disease risk factors and the home food environment in a subsample of participants.

3.2. Study design

Study aims will be achieved through a 3-arm group cluster randomized controlled trial comparing FPNG Plus (substance use prevention and healthy nutrition), FPNG (substance use prevention only), and the *Realizing the American Dream* (RAD) comparison condition (focusing on academic success) on adolescent substance use and nutrition outcomes (Figure 1). Each 10-week group-based intervention will be delivered to parents in local middle schools. A total of 1494 parent-child dyads will be recruited from 18 different schools (n=6 schools; 83 parent-child dyads per school; 498 dyads per condition). Randomization will occur at the school level, each school randomly assigned to one of the three conditions. Data collection from both parents and adolescents will take place at baseline (T1), immediately post-intervention at 10 weeks (T2), and at approximately 16 weeks post-intervention (T3). Parents will participate in one of the three intervention conditions and complete data

collection procedures. Their adolescent children will only complete data collection procedures. Recruitment will occur in cohorts starting each consecutive semester to ensure reaching the target sample size.

Randomization to treatment conditions (FPNG Plus, FPNG, or comparison [RAD]) will occur at the school level. School eligibility will be dependent on the following criteria: (1) public school offering 6th, 7th, and 8th grades with at least 65 students per grade; (2) located in Maricopa County, AZ; (3) having at least 60% of Latinx students; (4) receiving Title I funds from the federal government to assist in meeting student's education needs; and (5) willing to offer one of the three programs to their students' parents at their facilities. From the 18 participating schools, 6 each will be randomized into one of the three conditions. The schools will be clustered by geographic location (3 schools per cluster) and within each cluster, schools will be sorted by the estimated number of Hispanic 7th grade students from largest to smallest. School demographic information was obtained from the U.S. Department of Education Public Elementary/Secondary School Universe Survey CCD School Database [100]. Within each cluster, schools will be given a random number, and the school with the highest random number will be randomized into FPNG Plus, second highest into FPNG, and lowest into RAD. Stratified randomization on site characteristics and ethnic composition is not expected to be necessary because the sites are very homogeneous in these respects, but this assumption will be verified.

3.3. Study setting

The study will be conducted in partnership with Arizona State University's American Dream Academy (ADA), an established organization with the infrastructure to deliver the intervention to the families of middle-school children. ADA is a multi-site community program serving 4,000 families a year, mainly through the delivery of Realizing the American Dream (RAD), and other academic success programs with no substance use prevention or nutrition content. ADA programs are delivered in participating schools from the Phoenix Metropolitan area that contract with ADA to offer the programs to their students' parents through trained facilitators. Since 2006, ADA has delivered programs in 250 schools. ADA has a demonstrated record of successfully recruiting and retaining thousands of Latinx parents into RAD, in part due to the work of their state-of-the-art call center staffed with experienced bilingual and bicultural personnel.

3.4. Participants

The study will recruit parent-child dyads consisting of one parent and one adolescent enrolled in 6th, 7th or 8th grade at the time of recruitment. Following inclusiveness policies from our community partner, the ADA, parents of children enrolled in other grades will also be included if interested in the program, but their children will not be part of the study. Adults will be eligible to participate if they are 18 years of age or older, are the parent/caregiver/guardian of an eligible adolescents, or a parent of a child enrolled in participating schools who expresses interest in the program.

Participant recruitment will occur in cohorts starting every consecutive semester in up to 9 different schools at the time to ensure reaching the study sample size. The study team will

provide ADA with general “invitation scripts” to be used by the trained operators of the ADA phone call center describing the study and inviting parents and their children to participate. Because FPNG and FPNG Plus are specifically designed for parents of 6th–8th grade children, additional recruitment activities will take place to increase visibility of the programs and target families who have a child in those grades. These activities include: meeting with the 6th–8th grade teachers to explain the study; getting permission to present in their classrooms; handing out take-home flyers for the students; placing additional phone calls to parents of 6th–8th graders to give them additional information about the study; and attending school events (e.g., meet the teacher day, school open house, curriculum night) to advertise the programs.

Interested parents will be invited to the initial intervention session. A trained team member will read aloud the study consenting documents while parents follow along. The team member will then explain in more detail the study procedures and what is being asked of participating parents and children, after which they will have the chance to ask questions. Interested participants will be asked to provide written consent to participate, and initial survey data collection will take place. If participating parents have a child in 6th–8th grade, they will also be asked to provide consent for their child to participate in data collection procedures. Adolescents will be asked to provide written assent prior to data collection. Parents will also be asked to consent for optional data collection procedures (in order to be eligible for randomization to be part of the subsample). Parents do not have to agree to be part of the subsample in order to be part of the overall study (i.e., complete the surveys). Parents who are interested in the program but do not want to consent for the study will be welcome to attend the program but will not be involved in data collection procedures.

3.5. Intervention programs

FPNG Plus curriculum adaptation—The original FPNG curriculum was adapted to incorporate nutrition content in all intervention sessions, with a primary emphasis on how to apply parenting strategies that are already part of FPNG to diet-related behaviors. FPNG Plus supports dietary change and aligns with adolescent values of autonomy (e.g. increasing communication with family members to talk about healthy eating and how it can help them feel better about themselves [i.e., how eating breakfast can help them improve performance in sports]). FPNG Plus was designed to help parents reinforce life skills and other proactive behaviors with their children (i.e., how to avoid junk food, particularly in response to peer-pressure, monitoring availability of unhealthful foods in the home, shopping together for fruits, vegetables and healthy snacks, or joining a community garden as a family). The nutrition content is consistent with current diet recommendations for the U.S. population [101,102], and mainly focuses on increasing fruit and vegetable intake, and reducing consumption of sugar-laden processed foods. The FPNG Plus curriculum also includes themes for addressing potential food insecurity (e.g., healthy eating on a tight budget, healthy food access) and issues related to body image. Core components of the original FPNG curriculum were preserved, e.g. overall structure, topics, and skills training in the use of substance use prevention strategies.

Intervention programs curricula—Table 1 includes lists of topics covered in each of the sessions for the three intervention curricula.

The control program, Realizing the American Dream (RAD), is centered around helping participants' children achieve academic success. Parents learn the importance of being involved in their children's education; receive information and resources regarding academic standards in Arizona; learn how to implement effective discipline; and create a success plan that will help their child move on to the next step in their education.

The original Families Preparing a New Generation (FPNG) program is designed to help parents raise healthy children who lead pro-social lives and avoid the use of substances. Parents learn about the importance of social support and resources available to help them as they raise their children; using different styles for effective communication; strategies for effective behavior control; strategies for adolescents to avoid the use of substances; information about the stages of child development; and the social, emotional, academic, and physical changes that adolescents face.

The Families Preparing the New Generation Plus (FPNG Plus) program, was designed to include the same topics as the original FPNG, with the addition of two entirely new workshops focused on healthy eating and parenting strategies to promote healthy eating behaviors. Lessons from the original FPNG curriculum have comparable content and objectives, but include activities and examples that focus on nutrition and healthy eating practices.

Intervention program delivery, fidelity and retention—All three intervention programs (FPNG+, FPNG, and RAD) will be manualized and delivered as indicated by ADA's trained community facilitators in group settings at participating schools (about 15 parents per group). Study team members will observe 20–25% of the total workshops per semester; these will be randomly chosen, but for FPNG+, at least one of the nutrition sessions will be observed with each facilitator. Fidelity checks will be recorded on standardized forms that contain a checklist with all the activities in the lesson, as well as questions regarding what was added or skipped, how parents and facilitator interacted, and how many parents completed the assigned homework from the prior week. If drift occurs, the team member will provide feedback to the facilitator after the workshop; if more than three activities are not completed correctly, the team will re-train the facilitator in coordination with the ADA program manager.

Parents who complete the program and their families will be invited to a graduation ceremony where participants will receive certificates of recognition for their participation. Additional retention strategies will include calling parents who miss a session in order to re-engage with them and invite them to the next session, and incentivizing perfect attendance with the opportunity to participate in a raffle at the end of the program.

Facilitator training—Facilitators from the ADA will undergo extensive training to implement the three programs reliably. All ADA facilitators are also required to attend 8-hour training sessions twice per year in order to discuss facilitation skills and review

program updates. They also attend monthly mandatory meetings to learn about updates in logistics and ADA programming.

Specific training for FPNG (8 hours) and FPNG Plus (12 hours, allowing additional time to discuss nutrition-related content) includes content designed to understand program-related concepts, as well as instruction designed to enhance facilitation skills. The trainings were designed by curriculum, facilitation, and content experts from the research team (MH, AG, SVL, BVL). The training sessions will follow the same type of progression and layout of the curriculum workshops, so facilitators become familiar with lesson development and why each lesson follows a certain pattern. Facilitators will learn the theoretical foundations of the program, how to work with adult learners and create a successful learning environment, and practice all the workshops in the curriculum they are assigned to. In order to enable learning of the content and become familiar with the curriculum activities, the training sessions will utilize multiple active learning strategies, including videos, role-plays, discussions, activity sheets, games and a practicum.

3.6. Data collection and measures

Data collection from both parents and adolescents will take place at baseline (T1), immediately post-intervention at 10 weeks (T2), and at approximately 16 weeks post-intervention (T3). All parents and adolescents will be asked to complete a survey to collect information on substance use and nutrition outcomes regardless of intervention condition at the adolescents' school. Additional data will be gathered from a random subsample of 126 families (42 per condition) at the same time points (T1, T2 and T3) to explore the preliminary effects of FPNG+ on modifiable chronic disease risk factors and the home food environment. These data will be collected at participants' homes by a team of trained research technicians during times at which both parent and adolescents will be available. During this data collection home visit the following procedures will take place: (1) measurement of parent and child body weight, height, and blood pressure; (2) collection of a finger prick blood sample from parent and child for measurement of HbA1c and total cholesterol using portable point-of-care devices; and (3) completion of a home food inventory to record availability of fruit, vegetables, and sugar-laden foods. Parents and adolescents from the subsample will also be asked to complete 2 unannounced 24-hour diet recalls over the phone for assessment of diet intake.

Survey—Self-administered surveys will be available in Spanish and English so the respondent can complete them in the language he/she chooses without needing to request the accommodation and will be administered using an electronic tablet on a Qualtrics (Qualtrics, Provo, UT, USA) platform. If participants cannot read in either language, a Research Assistant will read the questions to them. The surveys will include items to collect sociodemographic information (T1 only) and instruments for assessment of the outcomes described below (T1, T2 and T3). The surveys will be saved locally on the tablet, and uploaded to the main Qualtrics server when wi-fi access is available, after which the data will no longer be available on the tablet.

Main outcomes—Data on the recent use of substances (amount and frequency of alcohol, cigarettes, e-cigarettes, marijuana, and inhalants) will be collected with individual items modeled after Likert scale items used by Flannery, et al. [103]. Drug resistance strategies measures, validated by Hecht, et al. [104], will assess adolescents' responses to substance use offers in the last 30 days and likely responses to hypothetical situations of risks, as well as adolescents' anti-drug norms [3]. Intake of fruit, vegetable, and sugar-laden foods will be assessed with the NCI *Dietary Screener Questionnaire* [105], a short (26-item) instrument used to estimate frequency of intake of select food groups (fruit & vegetables, fiber & whole grains, added sugars, dairy, calcium-containing foods, and red meat & processed meat). This questionnaire has been validated for use with the general population and with Latinos [106,107].

Mediators—Family functioning will be assessed through three sets of indicators: (1) parental involvement [108], (2) parental self-agency [109], and (3) parental monitoring [110]. Each measure can be created into a mean scale. Parental involvement will measure the extent to which the parent is involved in the child's life, and the Parent Self-Agency Measure [109] will gauge the parent's sense of parenting competence and ability to positively influence the child's development. Parental monitoring will assess the parents' knowledge of the adolescent's peers, activities, and whereabouts. To assess parent-child communication (including specifically about substance use and risky behaviors), we will utilize questions from the National Longitudinal Study of Adolescent Health (Add-Health) parent survey [111]. Family's eating habits will be assessed as previously used by Berge et al. [112,113], and parental attitudes, beliefs and practices about feeding will be assessed using the Child Feeding Questionnaire [114]. Parents' social support will be assessed with the 10-item Multidimensional Scale of Perceived Social Support (MSPSS) [115].

Moderators—The Acculturation Rating Scale for Mexican Americans–II (ARSMA-II) [116,117] will be used to measure acculturation related to language, ethnic identity, and ethnic interaction. The reliability, and validity of the ARSMA-II are well established in English and Spanish [116]. Acculturation-gaps will be computed from the ARSMA-II by subtracting the parent's score from the adolescent's score [118]. Acculturative stress will be assessed with the Pressure to Acculturate and Pressure Against Acculturation subscales of the Multidimensional Acculturative Stress Inventory [119], developed for use with Mexican heritage individuals living in the U.S. Food insecurity will be assessed using the 6-item Food Security Scale [120,121], a short screener that has been shown to have high specificity and sensitivity to identify household food insecurity. Resiliency will be assessed with the 10-item Connor-Davidson Resilience Scale [122], a validated instrument that has been used with English and Spanish-speaking adults to assess multiple dimensions of resilience.

Chronic disease risk factors—Body weight and height of parents and adolescents from the subsample will be collected in triplicate using light indoor clothing without shoes, using a standardized protocol. BMI for adults will be calculated in kg/m². For adolescents, weight and height will be used to determine BMI percentiles for age and sex based upon the 2000 CDC growth curves. Participants' (parents and adolescents) blood pressure will be measured in triplicate using an automated blood pressure monitor (Omron IntelliSense HEM-907XL;

Omron Healthcare, Inc.; Bannockburn, IL). A finger prick blood sample will be collected from parents and adolescents to measure total cholesterol and HbA1c. Total cholesterol will be measured as a marker of cardiovascular disease risk using the Accutrend Plus System (Roche Diagnostics; Indianapolis, IN), a point of care device that accurately measures cholesterol concentrations [123]. HbA1c will be measured as a marker of glycemic control and diabetes risk using the A1cNow+ system (PTS Diagnostics; Indianapolis, IN), an FDA-approved and National Glycohemoglobin Standardization Program-certified instrument that accurately measures HbA1c in point-of-care settings [124].

Diet and home food environment—Detailed nutrition variables of interest (energy, macronutrients, consumption of sugar-sweetened beverages, added sugars, servings of fruits and vegetables, and whole grains) from adolescents will be obtained using two unannounced 24-hour recalls administered via phone, reporting intake from one weekday and one weekend day, following a five-step multiple pass method [125]. The Nutrition Data System for Research (NDSR) software version 2019, developed by the Nutrition Coordinating Center (NCC), University of Minnesota, Minneapolis, MN, will be used to analyze dietary data. Dietary variables of interest include estimates of total energy intake, amount and percentage of energy provided by macronutrients, and intake of fruit, vegetables and sugar-containing foods. A modified version of the validated Home Food Inventory [126] will be used to assess availability and variety of fruit, vegetables, sugar-containing foods and beverages, snack foods, and breakfast cereals in the home. Modifications included cultural adaptations to include foods commonly consumed by Latinos (e.g., *pan dulce*, papaya, cactus pads), and inclusion of breakfast cereals. Although this instrument was developed for self-report, we will utilize research staff for data collection to minimize self-report bias.

3.7. Statistical analyses

Power calculations took into account design effects related to the clustering of outcome means by school sites. The total estimated sample size is 1494 parent-child dyads, across 18 schools. Based on data from the FPNG effectiveness trial, the level of clustering is low for our outcomes, including an intraclass correlation equal to 0.01, a student level R-square of 0.25, and a school level R-square of 0.03 [13]. Because the effect size for substance use outcomes ($d=0.20$; FPNG vs. C) is lower than the expected effect size for nutrition outcomes ($d=0.78$; prior non-related intervention study), the total sample size is calculated for substance use outcomes. Accounting for these parameters, the power of this design is 0.802. For the subsample, the estimated sample size is 126 households across 18 schools – 7 per school. The average effect size of .69 is calculated based upon prior work on home food availability of vegetables, fruits, and desserts. Given the above stated parameters, the power of this design is 0.814.

All analyses will be conducted using multilevel analyses in Mplus [127], with families clustered within schools. This analysis accounts for the clustering which, if uncorrected, may result in biased standard errors [128]. All analyses will employ a robust maximum likelihood estimator to adjust for any non-normality in the distributions of outcomes and to best control for Type I errors [129]. The analyses will also utilize full-information maximum

likelihood (FIML) [130] to conduct intent-to-treat analyses that account and adjust for attrition and any item missing data.

We will use both baseline adjusted general linear model procedures (i.e., variants of multiple regression) and latent change modeling to test intervention efficacy. In all models, because the FPNG Plus is the intervention condition of interest, all analyses will use FPNG Plus as the reference group. The two remaining conditions (FPNG and Comparison) will be compared with the reference group. The first method will predict short-term (T2) and then long-term (T3) post-test outcome measures (e.g., adolescents substance use and diet outcomes), while controlling simultaneously for the baseline (T1) measure of the particular outcome. Latent-change models [131] will test whether and how changes over time in the outcomes differ significantly. Latent-change models will enable the assessment of change between T1 and T2 separately from change between T2 and T3. This examination will simultaneously test for improvements manifested during the course of the intervention (i.e., between T1 and T2) and for improvements maintained following the completion of the intervention (i.e., between T2 and T3).

For mediation analyses, we will employ multivariate linear regression path analyses [132,133]. Each mediation model will test the indirect path between the intervention condition at T1 and outcome measures at T3 (e.g., adolescents substance use and nutrition outcomes) mediated through family functioning, parenting strategies, and parents' social support at T2. Mediation models will control for baseline (T1) measures of the particular mediator and outcome. We will employ a bias-corrected bootstrap approach to test the indirect effect [134].

The moderation effects of sociocultural factors on outcome measures will be tested employing mean centered interactions of the measures of acculturation, acculturative stress, food insecurity, and resiliency with the dummy variable contrasts of intervention conditions, following Aiken & West (1991) [135]. We will use baseline adjusted general linear model procedures to test for moderation. If significant moderation exists, we will use latent-change models to test whether and how changes over time in the outcomes differ significantly between adolescents who vary in the sociocultural moderating measures of interest (e.g., for those adolescents who are less and more acculturated).

Intervention effects on cardiometabolic risk factors and home food environment outcomes measured in the subsample will be tested through baseline adjusted regression models, including models that can appropriately analyze count data (e.g., Poisson, Negative Binomial). We will examine changes in short-term (T2) and long-term (T3) outcomes with dummy variable contrasts of intervention conditions, while controlling simultaneously for the baseline (T1) measure of the particular outcome.

4. Summary

There is an urgent need for successful strategies to improve diet quality and reduce substance use in Latinx adolescents. Few studies have used family-based or household-level environmental approaches to address diet improvement among Latinx adolescents.

Moreover, community-based interventions involving the whole family have successfully addressed barriers that Latinos experience when attempting to access care [136,137]. Recent research also suggests that parenting programs with an emphasis on family functioning can prevent the onset of cardiometabolic diseases in early adolescence [138]. Healthy nutrition promotion strategies must align with adolescent food preferences, values of autonomy from adult control, and importance of peers [139–141].

The study described herein represents a substantive culturally grounded and multilevel approach to encourage preventive behaviors among Latinx adolescents by extending the scope and capitalizing on the success of an efficacious parenting intervention from one (substance use) to two conditions (substance use and healthy nutrition). The study focuses on Latinx adolescents, an underrepresented population, at a particularly vulnerable transition period in which future behaviors are established [72,73,142]. This supports adolescence as an optimal time to implement health promotion behavioral interventions. Of particular relevance is the focus on family and cultural values that are central to Latino cultures to promote relevant strategies for behavior modification more effectively, capitalizing on promoting existing behaviors, traditions, and rituals that are already compatible with acceptable behaviors.

The FPNG+ intervention will address multiple behavioral outcomes impacting cardiometabolic disease. Prior adolescent interventions have not focused on simultaneous modification of nutrition improvement and substance use prevention. This unique approach will underscore the success of a culturally grounded intervention, FPNG, by implementing parenting strategies and promoting family and cultural values to intervene in two behaviors known to impact cardiometabolic disease risk simultaneously, substance use and healthy nutrition, among Latinx adolescents. Involving parents is essential because of the central role of the family in Latino cultures, and given their primary responsibility for purchasing and preparing food for the family [17,22,143]. This multi-level intervention (focusing on individual-, family-, and household-level factors) is intended to influence several domains within an ecological framework (focus on biological, behavioral, and environmental outcomes) and capitalizes on a culturally grounded intervention that incorporates family-based approaches to healthy eating, thus ensuring that behavioral strategies will be acceptable not only to participants but also to family members.

Findings will contribute knowledge on how to design and test interventions to impact simultaneously more than one chronic condition and enhance the overall health of Latino communities. Findings will also support immigrant parents on how to engage in the prevention and reduction of health disparities among acculturating Latinx adolescents by preventing or delaying the onset of substance use and nutrition-related chronic conditions.

Acknowledgments

Funding Source

This research was supported by funding from the National Institutes of Health/National Institute on Minority Health and Health Disparities (NIMHD/NIH), award 2U54 MD002316-13 (F. Marsiglia, P.I.). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIMHD or the NIH.

Abbreviations

ADA	American Dream Academy
CBPR	community-based participatory research
FPNG	Families Preparing the New Generation
HbA1c	glycosylated hemoglobin
RAD	Realizing the American Dream

References

- Steinberger J; Daniels SR; Hagberg N; Isasi CR; Kelly AS; Lloyd-Jones D; Pate RR; Pratt C; Shay CM; Towbin JA, et al. Cardiovascular health promotion in children: Challenges and opportunities for 2020 and beyond. A Scientific Statement From the American Heart Association 2016.
- Bachman JG; O'Malley PM; Johnston LD; Schulenberg JE; Wallace JM Racial/ethnic differences in the relationship between parental education and substance use among u.S. 8th-, 10th-, and 12th-grade students: Findings from the monitoring the future project. *J Stud Alcohol Drugs* 2011, 72, 279–285. [PubMed: 21388601]
- Kulis S; Marsiglia FF; Elek E; Dustman P; Wagstaff DA; Hecht ML Mexican/mexican american adolescents and keepin' it real: An evidence-based substance use prevention program. *Child Sch* 2005, 27, 133–145. [PubMed: 21359122]
- Slawta J; Bentley J; Smith J; Kelly J; Syman-Degler L Promoting healthy lifestyles in children: A pilot program of be a fit kid. *Health Promot Pract* 2008, 9, 305–312. [PubMed: 16803930]
- Harrell JS; Gansky SA; McMurray RG; Bangdiwala SI; Frauman AC; Bradley CB School-based interventions improve heart health in children with multiple cardiovascular disease risk factors. *Pediatrics* 1998, 102, 371–380. [PubMed: 9685441]
- Klohe-Lehman DM; Freeland-Graves J; Clarke KK; Cai G; Voruganti VS; Milani TJ; Nuss HJ; Proffitt JM; Bohman TM Low-income, overweight and obese mothers as agents of change to improve food choices, fat habits, and physical activity in their 1-to-3-year-old children. *J Am Coll Nutr* 2007, 26, 196–208. [PubMed: 17634164]
- Marsiglia FF; Ayers SL; Baldwin-White A; Booth J Changing latino adolescents' substance use norms and behaviors: The effects of synchronized youth and parent drug use prevention interventions. *Prevention science : the official journal of the Society for Prevention Research* 2016, 17, 1–12. [PubMed: 26103920]
- St George SM; Wilson DK; McDaniel T; Alia KA Process evaluation of the project shine intervention for african american families: An integrated positive parenting and peer monitoring approach to health promotion. *Health Promot Pract* 2016, 17, 557–568. [PubMed: 27084025]
- Berge JM A review of familial correlates of child and adolescent obesity: What has the 21st century taught us so far? *Int J Adolesc Med Health* 2009, 21, 457–483. [PubMed: 20306760]
- Bruening M; MacLehose R; Loth K; Story M; Neumark-Sztainer D Feeding a family in a recession: Food insecurity among minnesota parents. *Am J Public Health* 2012, 102, 520–526. [PubMed: 22390517]
- Widome R; Neumark-Sztainer D; Hannan PJ; Haines J; Story M Eating when there is not enough to eat: Eating behaviors and perceptions of food among food-insecure youths. *Am J Public Health* 2009, 99, 822–828. [PubMed: 19299675]
- Perez-Escamilla R Acculturation, nutrition, and health disparities in latinos. *Am J Clin Nutr* 2011, 93, 1163S–1167S. [PubMed: 21367946]
- Marsiglia FF; Williams LR; Ayers SL; Booth JM Familias: Preparando la nueva generacion: A randomized control trial testing the effects on positive parenting practices. *Res Soc Work Pract* 2014, 24, 310–320. [PubMed: 25506185]

14. Israel BA; Schulz AJ; Parker EA; Becker AB Community-based participatory research: Policy recommendations for promoting a partnership approach in health research. *Education for health* (Abingdon, England) 2001, 14, 182–197.
15. Macaulay AP; Griffin KW; Gronewold E; Williams C; Botvin GJ Parenting practices and adolescent drug-related knowledge, attitudes, norms, and behavior. *Journal of alcohol and drug education* 2005, 49, 67–83.
16. Nonnemaker JM; Crankshaw EC; Shive DR; Hussin AH; Farrelly MC Inhalant use initiation among u.S. Adolescents: Evidence from the national survey of parents and youth using discrete-time survival analysis. *Addict Behav* 2011, 36, 878–881. [PubMed: 21481544]
17. Ramirez JR; Crano WD; Quist R; Burgoon M; Alvaro EM; Grandpre J Acculturation, familism, parental monitoring, and knowledge as predictors of marijuana and inhalant use in adolescents. *Psychol Addict Behav* 2004, 18, 3–11. [PubMed: 15008680]
18. Li X; Stanton B; Feigelman S Impact of perceived parental monitoring on adolescent risk behavior over 4 years. *J Adolesc Health* 2000, 27, 49–56. [PubMed: 10867352]
19. Mosher C; Rotolo T; Phillips D; Krupski A; Stark KD Minority adolescents and substance use risk/protective factors: A focus on inhalant use. *Adolescence* 2004, 39, 489–502. [PubMed: 15673225]
20. Pokhrel P; Unger JB; Wagner KD; Ritt-Olson A; Sussman S Effects of parental monitoring, parent-child communication, and parents' expectation of the child's acculturation on the substance use behaviors of urban, hispanic adolescents. *Journal of ethnicity in substance abuse* 2008, 7, 200–213. [PubMed: 19042806]
21. Prado G; Huang S; Schwartz SJ; Maldonado-Molina MM; Bandiera FC; de la Rosa M; Pantin H What accounts for differences in substance use among u.S.-born and immigrant hispanic adolescents?: Results from a longitudinal prospective cohort study. *J Adolesc Health* 2009, 45, 118–125. [PubMed: 19628137]
22. Ober AJ; Miles JN; Ewing B; Tucker JS; D'Amico EJ Risk for inhalant initiation among middle school students: Understanding individual, family, and peer risk and protective factors. *J Stud Alcohol Drugs* 2013, 74, 835–840. [PubMed: 24172109]
23. Best DW; Wilson AS; MacLean S; Savic M; Reed M; Bruun A; Lubman DI Patterns of family conflict and their impact on substance use and psychosocial outcomes in a sample of young people in treatment. *Vulnerable Children and Youth Studies* 2014, 9, 114–122.
24. Couch SC; Glanz K; Zhou C; Sallis JF; Saelens BE Home food environment in relation to children's diet quality and weight status. *J Acad Nutr Diet* 2014, 114, 1569–1579 e1561. [PubMed: 25066057]
25. Heim S; Bauer KW; Stang J; Ireland M Can a community-based intervention improve the home food environment? Parental perspectives of the influence of the delicious and nutritious garden. *J Nutr Educ Behav* 2011, 43, 130–134. [PubMed: 21273132]
26. Wyse R; Campbell E; Nathan N; Wolfenden L Associations between characteristics of the home food environment and fruit and vegetable intake in preschool children: A cross-sectional study. *BMC Public Health* 2011, 11, 938. [PubMed: 22177136]
27. Arcan C; Neumark-Sztainer D; Hannan P; van den Berg P; Story M; Larson N Parental eating behaviours, home food environment and adolescent intakes of fruits, vegetables and dairy foods: Longitudinal findings from project eat. *Public Health Nutr* 2007, 10, 1257–1265. [PubMed: 17391551]
28. Ostbye T; Malhotra R; Stroe M; Lovelady C; Brouwer R; Zucker N; Fuemmeler B The effect of the home environment on physical activity and dietary intake in preschool children. *Int J Obes (Lond)* 2013, 37, 1314–1321. [PubMed: 23736357]
29. Wang L; Dalton WT 3rd; Schetzina KE; Fulton-Robinson H; Holt N; Ho AL; Tudiver F; Wu T Home food environment, dietary intake, and weight among overweight and obese children in southern appalachia. *Southern medical journal* 2013, 106, 550–557. [PubMed: 24096948]
30. Hendrie G; Sohonpal G; Lange K; Golley R Change in the family food environment is associated with positive dietary change in children. *The international journal of behavioral nutrition and physical activity* 2013, 10, 4. [PubMed: 23294481]

31. Ding D; Sallis JF; Norman GJ; Saelens BE; Harris SK; Kerr J; Rosenberg D; Durant N; Glanz K Community food environment, home food environment, and fruit and vegetable intake of children and adolescents. *J Nutr Educ Behav* 2012, 44, 634–638. [PubMed: 21531177]
32. Kegler MC; Alcantara I; Veluswamy JK; Haardorfer R; Hotz JA; Glanz K Results from an intervention to improve rural home food and physical activity environments. *Progress in community health partnerships: research, education, and action* 2012, 6, 265–277.
33. Gentile DA; Welk G; Eisenmann JC; Reimer RA; Walsh DA; Russell DW; Callahan R; Walsh M; Strickland S; Fritz K Evaluation of a multiple ecological level child obesity prevention program: Switch what you do, view, and chew. *BMC Med* 2009, 7, 49. [PubMed: 19765270]
34. Trapp GS; Hickling S; Christian HE; Bull F; Timperio AF; Boruff B; Shrestha D; Giles-Corti B Individual, social, and environmental correlates of healthy and unhealthy eating. *Health Educ Behav* 2015, 42, 759–768. [PubMed: 25842383]
35. Cullen KW; Baranowski T; Owens E; Marsh T; Rittenberry L; de Moor C Availability, accessibility, and preferences for fruit, 100% fruit juice, and vegetables influence children's dietary behavior. *Health Educ Behav* 2003, 30, 615–626. [PubMed: 14582601]
36. Campbell KJ; Crawford DA; Salmon J; Carver A; Garnett SP; Baur LA Associations between the home food environment and obesity-promoting eating behaviors in adolescence. *Obesity (Silver Spring, Md.)* 2007, 15, 719–730.
37. Ochoa A; Berge JM Home environmental influences on childhood obesity in the latino population: A decade review of literature. *J Immigr Minor Health* 2017, 19, 430–447. [PubMed: 28005241]
38. Santiago-Torres M; Cui Y; Adams AK; Allen DB; Carrel AL; Guo JY; LaRowe TL; Schoeller DA Structural equation modeling of the associations between the home environment and obesity-related cardiovascular fitness and insulin resistance among hispanic children. *Appetite* 2016, 101, 23–30. [PubMed: 26850309]
39. Conlon BA; McGinn AP; Lounsbury DW; Diamantis PM; Groisman-Perelstein AE; Wylie-Rosett J; Isasi CR The role of parenting practices in the home environment among underserved youth. *Childhood obesity (Print)* 2015, 11, 394–405. [PubMed: 26258561]
40. Larson N; Eisenberg ME; Berge JM; Arcan C; Neumark-Sztainer D Ethnic/racial disparities in adolescents' home food environments and linkages to dietary intake and weight status. *Eating behaviors* 2015, 16, 43–46. [PubMed: 25464066]
41. Faith MS; Van Horn L; Appel LJ; Burke LE; Carson JA; Franch HA; Jakicic JM; Kral TV; Odoms-Young A; Wansink B, et al. Evaluating parents and adult caregivers as “agents of change” for treating obese children: Evidence for parent behavior change strategies and research gaps: A scientific statement from the american heart association. *Circulation* 2012, 125, 1186–1207. [PubMed: 22271754]
42. West F; Sanders MR; Cleghorn GJ; Davies PS Randomised clinical trial of a family-based lifestyle intervention for childhood obesity involving parents as the exclusive agents of change. *Behav Res Ther* 2010, 48, 1170–1179. [PubMed: 20883981]
43. Golan M; Kaufman V; Shahar DR Childhood obesity treatment: Targeting parents exclusively v. Parents and children. *Br J Nutr* 2006, 95, 1008–1015. [PubMed: 16611394]
44. Bryant M; Stevens J; Wang L; Tabak R; Borja J; Bentley ME Relationship between home fruit and vegetable availability and infant and maternal dietary intake in african-american families: Evidence from the exhaustive home food inventory. *J Am Diet Assoc* 2011, 111, 1491–1497. [PubMed: 21963015]
45. Patterson RE; Kristal AR; Shannon J; Hunt JR; White E Using a brief household food inventory as an environmental indicator of individual dietary practices. *Am J Public Health* 1997, 87, 272–275. [PubMed: 9103109]
46. Bronfenbrenner U Ecological systems theory In *Six theories of child development: Revised formulations and current issues*, Vasta R, Ed. Jessica Kingsley Publishers: London, England, 1992; pp 187–249.
47. Bronfenbrenner U *Making human beings human: Bioecological perspectives on human development*. Sage Publications: Thousand Oaks, CA, 2005.
48. Cervantes RC; Cordova D Life experiences of hispanic adolescents: Developmental and language considerations in acculturation stress. *Journal of community psychology* 2011, 39, 336–352.

49. Marsiglia FF; Yabiku ST; Kulis S; Nieri T; Parsai M; Becerra D The influence of linguistic acculturation and gender on the initiation of substance use among mexican heritage preadolescents in the borderlands. *The Journal of early adolescence* 2011, 31, 271–299. [PubMed: 21660121]
50. Ayala GX; Baquero B; Klinger S A systematic review of the relationship between acculturation and diet among latinos in the united states: Implications for future research. *J Am Diet Assoc* 2008, 108, 1330–1344. [PubMed: 18656573]
51. Goel MS; McCarthy EP; Phillips RS; Wee CC Obesity among us immigrant subgroups by duration of residence. *JAMA* 2004, 292, 2860–2867. [PubMed: 15598917]
52. Gao SK; Beresford SA; Frank LL; Schreiner PJ; Burke GL; Fitzpatrick AL Modifications to the healthy eating index and its ability to predict obesity: The multiethnic study of atherosclerosis. *Am J Clin Nutr* 2008, 88, 64–69. [PubMed: 18614725]
53. Wilson TA; Adolph AL; Butte NF Nutrient adequacy and diet quality in non-overweight and overweight hispanic children of low socioeconomic status: The viva la familia study. *J Am Diet Assoc* 2009, 109, 1012–1021. [PubMed: 19465183]
54. Montez JK; Eschbach K Country of birth and language are uniquely associated with intakes of fat, fiber, and fruits and vegetables among mexican-american women in the united states. *J Am Diet Assoc* 2008, 108, 473–480. [PubMed: 18313430]
55. Dubowitz T; Subramanian SV; Acevedo-Garcia D; Osypuk TL; Peterson KE Individual and neighborhood differences in diet among low-income foreign and u.S.-born women. *Womens Health Issues* 2008, 18, 181–190. [PubMed: 18222706]
56. Gregory-Mercado KY; Staten LK; Gillespie C; Ranger-Moore J; Thomson CA; Giuliano AR; Will JC; Ford ES; Marshall J Ethnicity and nutrient intake among arizona wisewoman participants. *J Womens Health* 2007, 16, 379–389.
57. Neuhouser ML; Thompson B; Coronado GD; Solomon CC Higher fat intake and lower fruit and vegetables intakes are associated with greater acculturation among mexicans living in washington state. *J Am Diet Assoc* 2004, 104, 51–57. [PubMed: 14702584]
58. Ayala GX; Rogers M; Arredondo EM; Campbell NR; Baquero B; Duerksen SC; Elder JP Away-from-home food intake and risk for obesity: Examining the influence of context. *Obesity* 2008, 16, 1002–1008. [PubMed: 18309297]
59. Duffey KJ; Gordon-Larsen P; Ayala GX; Popkin BM Birthplace is associated with more adverse dietary profiles for us-born than for foreign-born latino adults. *J. Nutr.* 2008, 138, 2428–2435. [PubMed: 19022968]
60. Dixon LB; Sundquist J; Winkleby M Differences in energy, nutrient, and food intakes in a us sample of mexican-american women and men: Findings from the third national health and nutrition examination survey, 1988–1994. *Am. J. Epidemiol.* 2000, 152, 548–557. [PubMed: 10997545]
61. Bleich SN; Wang YC; Wang Y; Gortmaker SL Increasing consumption of sugar-sweetened beverages among us adults: 1988–1994 to 1999–2004. *Am J Clin Nutr* 2009, 89, 372–381. [PubMed: 19056548]
62. Monroe KR; Hankin JH; Pike MC; Henderson BE; Stram DO; Park S; Nomura AMY; Wilkens LR; Kolonel LN Correlation of dietary intake and colorectal cancer incidence among mexican-american migrants: The multiethnic cohort study. *Nutrition & Cancer* 2003, 45, 133–147. [PubMed: 12881006]
63. Van Hook J; Quiros S; Frisco ML; Fikru E It is hard to swim upstream: Dietary acculturation among mexican-origin children. *Population Research and Policy Review* 2016, 35, 177–196. [PubMed: 27152059]
64. Batis C; Hernandez-Barrera L; Barquera S; Rivera JA; Popkin BM Food acculturation drives dietary differences among mexicans, mexican americans, and non-hispanic whites. *J Nutr* 2011, 141, 1898–1906. [PubMed: 21880951]
65. Carrera PM; Gao X; Tucker KL A study of dietary patterns in the mexican-american population and their association with obesity. *J Am Diet Assoc* 2007, 107, 1735–1742. [PubMed: 17904933]
66. Chen Z; Watanabe RM; Stram DO; Buchanan TA; Xiang AH High calorie intake is associated with worsening insulin resistance and beta-cell function in hispanic women after gestational diabetes mellitus. *Diabetes Care* 2014, 37, 3294–3300. [PubMed: 25404660]

67. Cubbin C; Pollack C; Flaherty B; Hayward M; Sania A; Vallone D; Braveman P Assessing alternative measures of wealth in health research. *Am J Public Health* 2011, 101, 939–947. [PubMed: 21252050]
68. Orozco GL Understanding the culture of low-income immigrant latino parents: Key to involvement. *The School Community Journal* 2008, 18, 21–37.
69. Munsey C Deciding who belongs. *APA Monitor* 2010, 41, 18–20.
70. Vega WA; Sribney WM Understanding the hispanic health paradox through a multi-generation lens: A focus on behavior disorders. *Nebr Symp Motiv* 2011, 57, 151–168. [PubMed: 21166308]
71. Halfon N; Hochstein M Life course health development: An integrated framework for developing health, policy, and research. *Milbank Q* 2002, 80, 433–479, iii. [PubMed: 12233246]
72. Coatsworth JD; Pantin H; McBride C; Briones E; Kurtines W; Szapocznik J Ecodevelopmental correlates of behavior problems in young hispanic females. *Applied Developmental Science* 2002, 6, 18p.
73. Story M; Neumark-Sztainer D; French S Individual and environmental influences on adolescent eating behaviors. *J Am Diet Assoc* 2002, 102, S40–51. [PubMed: 11902388]
74. Smokowski PR; David-Ferdon C; Stroupe N Acculturation and violence in minority adolescents: A review of the empirical literature. *J Prim Prev* 2009, 30, 215–263. [PubMed: 19387835]
75. Coatsworth JD; Pantin H; Szapocznik J Familias unidas: A family-centered ecodevelopmental intervention to reduce risk for problem behavior among hispanic adolescents. *Clin Child Fam Psychol Rev* 2002, 5, 113–132. [PubMed: 12093012]
76. Perrino T; Gonzalez-Soldevilla A; Pantin H; Szapocznik J The role of families in adolescent hiv prevention: A review. *Clin Child Fam Psychol Rev* 2000, 3, 81–96. [PubMed: 11227063]
77. Szapocznik J; Coatsworth JD An ecodevelopmental framework for organizing the influences on drug abuse: A developmental model of risk and protection In *Drug abuse: Origins & interventions*, Glantz M; Hartel C, Eds. American Psychological Association: Washington, DC, 1999.
78. Hovell M; Wahlgren D; Adams M The logical and empirical basis for the behavioral ecological model In *Emerging theories in health promotion practice and research*, 2nd ed.; DiClemente RJ; Crosby RA; Kegler M, Eds. Wiley: 2009.
79. Pantin H; Prado G; Lopez B; Huang S; Tapia MI; Schwartz SJ; Sabillon E; Brown CH; Branchini J A randomized controlled trial of familias unidas for hispanic adolescents with behavior problems. *Psychosom Med* 2009, 71, 987–995. [PubMed: 19834053]
80. Pantin H; Schwartz SJ; Sullivan S; Coatsworth JD; Szapocznik J Preventing substance abuse in hispanic immigrant adolescents: An ecodevelopmental parent-centered approach. *Hisp J Behav Sci* 2003, 25, 469–500.
81. Fredricks JA; Simpkins SD Promoting positive youth development through organized after-school activities: Taking a closer look at participation of ethnic minority youth. *Child Development Perspectives* 2012, 6, 280–287.
82. Kumanyika S; Taylor WC; Grier SA; Lassiter V; Lancaster KJ; Morssink CB; Renzaho AM Community energy balance: A framework for contextualizing cultural influences on high risk of obesity in ethnic minority populations. *Prev Med* 2012, 55, 371–381. [PubMed: 22800683]
83. Katiria Perez G; Cruess D The impact of familism on physical and mental health among hispanics in the united states. *Health Psychol Rev* 2014, 8, 95–127. [PubMed: 25053010]
84. Braveman P; Gottlieb L The social determinants of health: It's time to consider the causes of the causes. *Public Health Rep* 2014, 129 Suppl 2, 19–31.
85. Burdette AM; Hill TD An examination of processes linking perceived neighborhood disorder and obesity. *Soc Sci Med* 2008, 67, 38–46. [PubMed: 18433964]
86. Tucker-Seeley RD; Subramanian SV; Li Y; Sorensen G Neighborhood safety, socioeconomic status, and physical activity in older adults. *Am J Prev Med* 2009, 37, 207–213. [PubMed: 19595554]
87. Foster S; Giles-Corti B The built environment, neighborhood crime and constrained physical activity: An exploration of inconsistent findings. *Prev Med* 2008, 47, 241–251. [PubMed: 18499242]

88. Suglia SF; Shelton RC; Hsiao A; Wang YC; Rundle A; Link BG Why the neighborhood social environment is critical in obesity prevention. *J Urban Health* 2016, 93, 206–212. [PubMed: 26780582]
89. Griffin SF; Wilson DK; Wilcox S; Buck J; Ainsworth BE Physical activity influences in a disadvantaged african american community and the communities' proposed solutions. *Health Promot Pract* 2008, 9, 180–190. [PubMed: 17728204]
90. Donnelly L; McLanahan S; Brooks-Gunn J; Garfinkel I; Wagner BG; Jacobsen WC; Gold S; Gaydos L Cohesive neighborhoods where social expectations are shared may have positive impact on adolescent mental health. *Health Aff (Millwood)* 2016, 35, 2083–2091. [PubMed: 27834250]
91. Prado G; Huang S; Maldonado-Molina M; Bandiera F; Schwartz SJ; de la Vega P; Brown CH; Pantin H An empirical test of ecodevelopmental theory in predicting hiv risk behaviors among hispanic youth. *Health Educ Behav* 2010, 37, 97–114. [PubMed: 20130302]
92. Locke TF; Newcomb MD; Goodyear RK Childhood experiences and psychosocial influences on risky sexual behavior, condom use, and hiv attitudes/behaviors among latino males. *Psychology of Men and Masculinity* 2005, 6, 25–38.
93. Pantin H; Schwartz SJ; Sullivan S; Prado G; Szapocznik J Ecodevelopmental hiv prevention programs for hispanic adolescents. *Am J Orthopsychiatry* 2004, 74, 545–558. [PubMed: 15554814]
94. Enriquez M; Kelly PJ; Cheng AL; Hunter J; Mendez E An intervention to address interpersonal violence among low-income midwestern hispanic-american teens. *J Immigr Minor Health* 2012, 14, 292–299. [PubMed: 21573749]
95. Padilla A Bicultural social development. *Hisp J Behav Sci* 2006, 28, 31p.
96. Horevitz E; Organista KC The mexican health paradox: Expanding the explanatory power of the acculturation construct. *Hisp J Behav Sci* 2012, 35, 3–34.
97. Pantin H; Coatsworth JD; Feaster DJ; Newman FL; Briones E; Prado G; Schwartz SJ; Szapocznik J Familias unidas: The efficacy of an intervention to promote parental investment in hispanic immigrant families. *Prevention science : the official journal of the Society for Prevention Research* 2003, 4, 189–201. [PubMed: 12940469]
98. Marsiglia FF; Kulis S; Fitz Harris B; Becerra D Acculturation gaps and problem behaviors among u.S. Southwestern mexican youth. *Social Work Forum* 2010, 42/43, 6–26.
99. Kerig PK; Sink HE; Cuellar RE; Vanderzee KL; Elfstrom JL Implementing trauma-focused cbt with fidelity and flexibility: A family case study. *J Clin Child Adolesc Psychol* 2010, 39, 713–722. [PubMed: 20706923]
100. U.S. Department of Education. National center for education statistics, common core of data (ccd), “public elementary/secondary school universe survey”. 2016–17.
101. American Heart Association Nutrition. C.; Lichtenstein AH; Appel LJ; Brands M; Carnethon M; Daniels S; Franch HA; Franklin B; Kris-Etherton P; Harris WS, et al. Diet and lifestyle recommendations revision 2006: A scientific statement from the american heart association nutrition committee. *Circulation* 2006, 114, 82–96. [PubMed: 16785338]
102. U.S. Department of Health and Human Services; U.S. Department of Agriculture. 2015 – 2020 dietary guidelines for americans. 8th ed.; U.S. Government Printing Office: Washington, DC, 2015.
103. Flannery DJ; Vazsonyi AT; Torquati J; Fridrich A Ethnic and gender differences in risk for early adolescent substance use. *Journal of youth and adolescence* 1994, 23, 195–213.
104. Hecht ML; Marsiglia FF; Elek E; Wagstaff DA; Kulis S; Dustman P; Miller-Day M Culturally grounded substance use prevention: An evaluation of the keepin' it r.E.A.L. Curriculum. *Prevention science : the official journal of the Society for Prevention Research* 2003, 4, 233–248. [PubMed: 14598996]
105. Thompson FE; Midthune D; Subar AF; McNeel T; Berrigan D; Kipnis V Dietary intake estimates in the national health interview survey, 2000: Methodology, results, and interpretation. *J Am Diet Assoc* 2005, 105, 352–363. [PubMed: 15746822]
106. Yaroch AL; Tooze J; Thompson FE; Blanck HM; Thompson OM; Colon-Ramos U; Shaikh AR; McNutt S; Nebeling LC Evaluation of three short dietary instruments to assess fruit and

- vegetable intake: The national cancer institute's food attitudes and behaviors survey. *J Acad Nutr Diet* 2012, 112, 1570–1577. [PubMed: 23017567]
107. Colón-Ramos U; Thompson FE; Yaroch AL; Moser RP; McNeel TS; Dodd KW; Atienza AA; Sugeran SB; Nebeling L Differences in fruit and vegetable intake among hispanic subgroups in california: Results from the 2005 california health interview survey. *J Am Diet Assoc* 2009, 109, 1878–1885. [PubMed: 19857629]
 108. Gorman-Smith D; Tolan PH; Zelli A; Huesmann LR The relation of family functioning to violence among inner-city minority youths. *Journal of Family Psychology* 1996, 10, 115.
 109. Dumka LE; Stoerzinger HD; Jackson KM; Roosa MW Examination of the cross-cultural and cross-language equivalence of the parenting self-agency measure. *Fam Relat* 1996, 45, 216–222.
 110. Stattin H; Kerr M Parental monitoring: A reinterpretation. *Child Dev* 2000, 71, 1072–1085. [PubMed: 11016567]
 111. Jaccard J; Dodge T; Dittus P Parent-adolescent communication about sex and birth control: A conceptual framework. *New Dir Child Adolesc Dev* 2002, 9–41. [PubMed: 14964942]
 112. Berge JM; Wall M; Neumark-Sztainer D; Larson N; Story M Parenting style and family meals: Cross-sectional and 5-year longitudinal associations. *J Am Diet Assoc* 2010, 110, 1036–1042. [PubMed: 20630160]
 113. Berge JM; Wall M; Bauer KW; Neumark-Sztainer D Parenting characteristics in the home environment and adolescent overweight: A latent class analysis. *Obesity (Silver Spring, Md.)* 2010, 18, 818–825.
 114. Birch LL; Fisher JO; Grimm-Thomas K; Markey CN; Sawyer R; Johnson SL Confirmatory factor analysis of the child feeding questionnaire: A measure of parental attitudes, beliefs and practices about child feeding and obesity proneness. *Appetite* 2001, 36, 201–210. [PubMed: 11358344]
 115. Zimet GD; Dahlem NW; Zimet SG; Farley GK The multidimensional scale of perceived social support. *Journal of Personality Assessment* 1988, 52, 30–41.
 116. Cuellar I; Arnold B; Maldonado R Acculturation rating scale for mexican americans-ii: A revision of the original arsmas scale. *Hisp J Behav Sci* 1995, 17, 275–304.
 117. Bauman S The reliability and validity of the brief-acculturation-rating-scale-for-mexican-americans-ii for children and adolescents. *Hisp J Behav Sci* 2005, 27, 426–441.
 118. Marsiglia FF; Kiehne E; Ayers SL Reexamining the acculturation gap. *The Journal of early adolescence* 2016, 0272431616678991.
 119. Rodriguez N; Myers HF; Mira CB; Flores T; Garcia-Hernandez L Development of the multidimensional acculturative stress inventory for adults of mexican origin. *Psychol Assess* 2002, 14, 451–461. [PubMed: 12501570]
 120. Blumberg SJ; Bialostosky K; Hamilton WL; Briefel RR The effectiveness of a short form of the household food security scale. *Am J Public Health* 1999, 89, 1231–1234. [PubMed: 10432912]
 121. Connell CL; Nord M; Lofton KL; Yadrick K Food security of older children can be assessed using a standardized survey instrument. *J Nutr* 2004, 134, 2566–2572. [PubMed: 15465749]
 122. Connor KM; Davidson JRT Development of a new resilience scale: The connor-davidson resilience scale (cd-risc). *Depression & Anxiety* 2003, 18, 7p. [PubMed: 12900948]
 123. Scafoglieri A; Tresignie J; Provyn S; Clarys JP; Bautmans I Reproducibility, accuracy and concordance of accutrend plus for measuring circulating lipid concentration in adults. *Biochem Med (Zagreb)* 2012, 22, 100–108. [PubMed: 22384524]
 124. Jiang F; Hou X; Lu J; Zhou J; Lu F; Kan K; Tang J; Bao Y; Jia W Assessment of the performance of a1cnow(+) and development of an error grid analysis graph for comparative hemoglobin a1c measurements. *Diabetes Technol Ther* 2014, 16, 363–369. [PubMed: 24766632]
 125. Conway JM; Ingwersen LA; Moshfegh AJ Accuracy of dietary recall using the usda five-step multiple-pass method in men: An observational validation study. *J Am Diet Assoc* 2004, 104, 595–603. [PubMed: 15054345]
 126. Fulkerson JA; Nelson MC; Lytle L; Moe S; Heitzler C; Pasch KE The validation of a home food inventory. *The international journal of behavioral nutrition and physical activity* 2008, 5, 55. [PubMed: 18983668]
 127. Muthén LK; Muthén BO Statistical analysis with latent variables. 7th ed.; Mplus: 2015.

128. Raudenbush SW; Bryk AS Hierarchical linear models: Applications and data analysis methods. 2nd ed.; Sage: Newbury Park, CA, 2002.
129. Maydeu-Olivares A Maximum likelihood estimation of structural equation models for continuous data: Standard errors and goodness of fit. *Struct Equ Modeling* 2017, 24, 383–394.
130. Graham JW Missing data analysis: Making it work in the real world. *Annu Rev Psychol* 2009, 60, 549–576. [PubMed: 18652544]
131. McArdle JJ Latent variable modeling of differences and changes with longitudinal data. *Annu Rev Psychol* 2009, 60, 577–605. [PubMed: 18817479]
132. Baron RM; Kenny DA The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *J Pers Soc Psychol* 1986, 51, 1173–1182. [PubMed: 3806354]
133. MacKinnon DP; Lockwood CM; Hoffman JM; West SG; Sheets V A comparison of methods to test mediation and other intervening variable effects. *Psychol Methods* 2002, 7, 83–104. [PubMed: 11928892]
134. Fritz MS; Taylor AB; Mackinnon DP Explanation of two anomalous results in statistical mediation analysis. *Multivariate Behav Res* 2012, 47, 61–87. [PubMed: 24049213]
135. Aiken LS; West SG Multiple regression: Testing and interpreting interactions. Sage: Thousand Oaks, CA, 1991.
136. Marsiglia FF; Bermudez-Parsai M; Coonrod D Familias sanas: An intervention designed to increase rates of postpartum visits among latinas. *J Health Care Poor Underserved* 2010, 21, 119–131. [PubMed: 20675950]
137. Robie L; Alexandru D; Bota DA The use of patient navigators to improve cancer care for hispanic patients. *Clin Med Insights Oncol* 2011, 5, 1–7. [PubMed: 21339858]
138. Smith JD; Montano Z; Maynard A; Miloh T Family functioning predicts body mass index and biochemical levels of youths with nonalcoholic fatty liver disease. *J Dev Behav Pediatr* 2017, 38, 155–160. [PubMed: 27984419]
139. Nicklaus S; Boggio V; Chabanet C; Issanchou S A prospective study of food preferences in childhood. *Food Quality and Preference* 2004, 15, 805–818.
140. Steinberg L How to improve the health of american adolescents. *Perspectives on psychological science : a journal of the Association for Psychological Science* 2015, 10, 711–715. [PubMed: 26581723]
141. Crone EA; Dahl RE Understanding adolescence as a period of social-affective engagement and goal flexibility. *Nat Rev Neurosci* 2012, 13, 636–650. [PubMed: 22903221]
142. Savage JS; Fisher JO; Birch LL Parental influence on eating behavior: Conception to adolescence. *The Journal of law, medicine & ethics : a journal of the American Society of Law, Medicine & Ethics* 2007, 35, 22–34.
143. Long-Solis J; Vargas LA Food culture in mexico. Greenwood Press: Westport, CT, 2005.

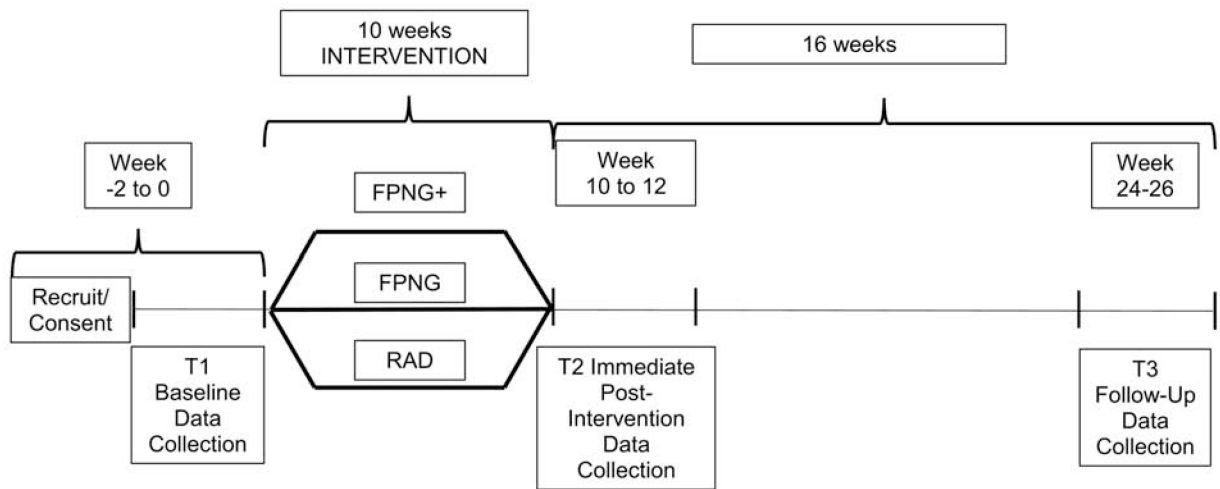


Figure 1.

Three-arm group randomized controlled trial comparing FPNG Plus (substance use prevention and healthy nutrition), FPNG (substance use prevention only), and the *Realizing the American Dream* (RAD) comparison condition (focusing on academic success) on adolescent substance use and nutrition outcomes.

Table 1.

Curricula of intervention programs

Week	Topic	Objectives
RAD (Control)		
1	Introduction	Welcome participants Highlight the importance of being involved in the RAD program
2	You make the difference	Learn about the changes that occur in middle school students Learn how to commit to success and make expectations clear “Success Ladder”
3	Being a partner with your school	Discuss Step 1 of Academic Success Plan Learn how to prepare for a parent-teacher conference Learn how child’s school and the wider school system operate
4	Academic standards and performance requirements	Discuss Step 2 of Academic Success Plan Learn practical ways to help child prepare for standardized tests Learn about requirements, academic standards, high school curriculum, and important terms related to these
5	Communication and discipline	Discuss Step 3 of Academic Success Plan Learn how to use and maintain effective two-way communication with child Establish firm, fair, and consistent discipline
6	Self-esteem and motivation	Discuss Step 4 of Academic Success Plan Learn effective ways to motivate children and build their self-esteem Learn about university admission requirements
7	Reading and responsibility	Discuss Step 5 of Academic Success Plan Learn practical ways to teach children about responsibility Understand how important reading is to overall academic success
8	Your academic success plan	Put Academic Success Plan into action and learn how to maintain it until your child graduates from college
9	Community forum	Provide an opportunity to ask questions to the school principal
10	Graduation	Recognize participants for their work and involvement in the program
Original FPNG		
1	Introduction	Welcome participants Highlight the importance of being involved in the FPNG program
2	You are not alone	Identify parent and family social networks Discuss different roles parents have in raising children Identify goals participants have for their children
3	Introduction to keepin’ it Real	Learn the differences between norms and values Learn about keepin’ it REAL program and practice the strategies Learn the ABCD Problem Solving method
4	Knowing your child’s world	Learn about the stages of adolescent development Discuss how diversity and social environment affect adolescent development
5	Communicating with your child	Identify obstacles and solutions to communication

Week	Topic	Objectives
		Learn to communicate in an effective and positive way Identify pro-social and anti-social behaviors and how parents can promote pro-social behaviors
6	Receiving and giving support	Learn how to ask for and accept help as it relates to raising children Identify the components of a supportive relationship and its role in preventing risky behaviors
7	Managing your child's behavior effectively	Learn about effective behavior management and identifying criteria for establishing rules Make the connection between norms and values and guiding their children's behavior
8	Talking to teens about risky behaviors	Review the prevalence of risk behaviors of adolescents country-wide and state-wide Learn about harm reduction Prepare for sensitive conversations with adolescents
9	Putting it all together	Review concepts from the previous seven sessions through a "Jeopardy"-style review game
10	Graduation	Recognize participants for their work and involvement in the program
FPNG Plus		
1	You are not alone	Identify parent and family social networks Discuss different roles parents have in raising children Identify goals participants have for their children
2	Introduction to <i>keepin' it REAL</i>	Learn the differences between norms and values Learn about <i>keepin' it REAL</i> program and practice the strategies Learn the ABCD Problem Solving method
3	Introduction to nutrition	Learn about MyPlate and current diet recommendations Learn how to read the nutrition facts label Learn how to identify healthy and unhealthy snack options
4	Knowing your child's world	Learn about the stages of adolescent development Discuss how diversity and social environment affect adolescent development
5	Communicating with your child	Identify obstacles and solutions to communication Learn to communicate in an effective and positive way Identify pro-social and anti-social behaviors and how parents can promote pro-social behaviors
6	Parenting and healthy eating	
7	Receiving and giving support	Learn how to ask for and accept help as it relates to raising children Identify the components of a supportive relationship and its role in preventing risky behaviors
8	Managing your child's behavior effectively	Learn about effective behavior management and identifying criteria for establishing rules Make the connection between norms and values and guiding their children's behavior
9	Talking to teens about risky behaviors	Review the prevalence of risk behaviors (including nutrition-related ones) of adolescents country-wide and state-wide Learn about harm reduction Prepare for sensitive conversations with adolescents
10	Putting it all together	Review concepts from the previous nine sessions through a "Jeopardy"-style review game