

The Influence of Parental Acculturation  
on Parents' Likelihood to Serve Fruits, Vegetables, and Sugar Sweetened Beverages

During Family Meals

by

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## ABSTRACT

**Objectives.** To determine the association between parental level of acculturation using the Anglo Orientation Subscale (AOS) and the Mexican Orientation Subscale (MOS) derived from the Acculturating Rating Scale for Mexican Americans-II (ARSMA II) and their likelihood of serving green salad, vegetables, fruit, 100% fruit juice, and sugar-sweetened beverages during family meals.

**Methods.** A sample of Hispanic parents of 6th, 7th, or 8th-grade adolescents ( $n=447$ ;  $39.8\pm 6.8$  years; 89.7% female) enrolled in a parenting intervention promoting healthy nutrition and substance use prevention. Parents completed baseline surveys to self-report whether they had family meals or not, acculturation-related questions, and the frequency with which they serve green salad, vegetables, fruit, 100% fruit juice, and sugar-sweetened beverages (SSB) during family meals. Associations between parental acculturation level and their likelihood of serving green salad, vegetables, fruit, 100% fruit juice and sugar-sweetened beverages during meal times were assessed with Spearman's rank correlations.

**Results.** There was a positive correlation between a higher level of acculturation on the Mexican Orientation Subscale (MOS) scale and the frequency of serving SSB during family meals ( $p=.006$ ). There was a positive correlation between a higher level of acculturation on the Anglo Orientation Subscale (AOS) with the frequency of parents serving green salad ( $p<.001$ ), vegetables ( $p<.001$ ), and 100% fruit juice ( $p=.025$ ) during family meals.

Conclusion. Findings suggest that a higher Mexican orientation is associated with serving more sugar-sweetened beverages, and a higher Anglo orientation is associated with serving more green salad, vegetables, and 100% fruit juice to adolescents during family meals. Further research is needed to understand how the association of parental acculturation, home food environment, family meals, and socioeconomic status impact what they serve during family meals to their adolescents. A better understanding of what is served would help develop more evidence-based interventions that could help improve adolescents' diet, which could help curb down obesity prevalence.

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# CHAPTER 1

## INTRODUCTION

As of 2020, over 62 million Hispanics live in the United States and are the largest and fastest-growing minority group.<sup>1</sup> Hispanics are becoming a group of concern because they face higher rates of obesity compared to other ethnic/racial groups.<sup>2-4</sup> Obesity is now considered a disease that increases the risk of other chronic illnesses such as type 2 diabetes, metabolic syndrome, dyslipidemia, and cardiovascular disease.<sup>4-9</sup> Obesity has become a public health concern for the general population,<sup>5,6</sup> yet it affects the Hispanic population the most.<sup>3,10,11</sup> Of concern, the prevalence of obesity during 2017-2018 in Hispanic adolescents was 25.6% compared to 16.1% in non-Hispanic whites.<sup>12,13</sup> Along with obesity, metabolic syndrome is also affecting Mexican Americans in the United States at higher rates<sup>14</sup>. According to Johnson and colleagues,<sup>15</sup> Hispanic adolescents had a higher prevalence rate for metabolic syndrome of 11.2% compared to non-Hispanic whites at 8.9%.<sup>15</sup> Hispanic adolescents are developing risk factors at much earlier ages than previous generations, thus placing them at risk for early disease development.<sup>16-18</sup> In the past, these were comorbidities that were considered to be only of adults<sup>5</sup>, yet in 2018 it was projected that approximately 210,000 new cases of type 2 diabetes were children and adolescents under the age of 20.<sup>11</sup> From the new cases of type 2 diabetes in children and adolescents, the highest increase in prevalence rates were seen in non-Hispanic Blacks and Hispanics.<sup>19</sup>

The risk for chronic illnesses among Hispanics in the United States is often exacerbated by social determinants of health such as socio-economic status,<sup>20-22</sup>



education level,<sup>20,23</sup> level of acculturation,<sup>22</sup> and socio-cultural factors.<sup>7,8</sup> Several studies have found an association between acculturation and weight status in adolescents.<sup>24</sup> The results from a study that measured acculturation by generational status in Hispanic adolescents found that second and third-generation adolescents had higher probabilities of being overweight and obesity compared to first-generation adolescents.<sup>25</sup> Adolescents from second and third-generation groups ate less fruit, vegetables, grains, and meats and consumed more sugar-sweetened beverages.<sup>25</sup> Lifestyle behaviors that also depend on socio-economic and cultural factors, such as dietary intake and quality, further contribute to chronic illness risk.<sup>26</sup> Studies have associated poor diet quality in adolescence with chronic illnesses, morbidity, and mortality among adults.<sup>27</sup> Studies have looked at how acculturation impacts dietary intake of adults, children and to a limited degree adolescents, but not how parental level of acculturation influences the diet of adolescents. With obesity prevalence highest in Hispanic children and adolescents, there is a need to find out how parental acculturation impacts adolescents' diet quality to help lower the levels of obesity in Hispanic adolescents and decrease the risk of chronic disease.

Dietary patterns are established early on in life during childhood and adolescence and generally continue unto adulthood.<sup>28</sup> Studies have shown that regardless of sex, race, or ethnicity, adolescents score poorly on a healthy diet.<sup>17</sup> According to the Dietary Guidelines for Americans (DGA), adolescents overconsume sodium, fat, and added sugars.<sup>28</sup> As part of a healthy dietary intake for adolescents, the DGA recommends that a balanced diet should consist of nutrient-dense foods and beverages from all food groups within recommended amounts and calorie limits.<sup>28</sup> It is recommended that foods and beverages with higher added sugar content, sodium, and saturated fat be limited.<sup>28</sup>

Most of the fat consumed by youth between the ages of 2-18 comes from grain-based desserts, pizza, and fried potatoes, and much of the added sugar adolescents consume is from sugar-sweetened beverages, grain-based desserts, candy, and other sweet snacks.<sup>29</sup> Snack consumption accounts for approximately 10.27% of adolescents' total caloric daily intake.<sup>30</sup> A study by Banfield and colleagues<sup>31</sup> found that as age increases, adolescents tend to eat less whole fruit, dairy, and whole grains. The diet of adolescents between the ages of 12 and 19 years is found to be poor and ranks low on the Healthy Eating Index (HEI).<sup>31</sup> Similar findings have been documented for Hispanic children and adolescents, suggesting that they have lower consumption of whole grains and dairy compared to non-Hispanic whites.<sup>27</sup>

Socio-economic factors affect access to healthy food in all populations in general.<sup>32</sup> A study by Gangrade and colleagues<sup>30</sup> found that adolescents from lower-income families consume meaningfully more calories from higher-added sugar snacks than adolescents from high-income households. Mexican families tend to have a lower socio-economic status compared to non-Hispanic white families, which has been shown to impact the dietary quality and intake of children and adolescents.<sup>33</sup> Research has shown that socioeconomic status affects the dietary intake of adolescents, yet the impact of parental acculturation on the dietary intake of adolescents has yet to be looked at.

The home food environment is associated with dietary quality and plays a vital role in the dietary intake of adolescents in general.<sup>34</sup> A study that measured the association between home food environment and fruit and vegetable intake found that increased availability of healthy foods increased fruit and vegetable consumption by adolescents.<sup>35</sup> In addition to the home food environment, positive parent modeling has

been associated with higher fruit and vegetable intake and decreased consumption of sugar-sweetened beverages and snacks in adolescents.<sup>34</sup> Environmental factors such as accessibility to grocery stores,<sup>36</sup> living structures, family schedules, home food environment, and family meals impact the diet quality of Hispanics.<sup>37</sup> More than half of the Hispanic adolescents who participated in a study that examined high and low healthy home food availability and healthy and unhealthy parental modeling and restriction fell in the low healthy home food availability category.<sup>34</sup> In the conceptualized healthiest family eating environment profile, which was a combination of home healthy food availability, high level of healthy parental modeling, and low use of food restriction, only 6.1% of Hispanic adolescents fell in this category compared to 12.8% of white adolescents. The home food environments were different by adolescents' race and ethnicity and impacted by the family's socioeconomic status.<sup>34</sup> Such category was associated with a lower intake of daily fruits and vegetables, increased intake of empty caloric foods, and increased intake of sugar-sweetened beverages.<sup>34</sup> Another important environmental factor that affects adolescents' dietary intake in general is family schedules. As children grow and become, adolescents' schedules tend to change due to increased activities, homework, and additional responsibilities, which leads adolescents to eat more times outside of their homes. As adolescents increase eating out, their intake of many essential micronutrients like choline, vitamin D, potassium, magnesium fiber, phosphorus, folate and iron decreased.<sup>38</sup> Adolescence is a stage of life where food autonomy begins to take place, making this an ideal point in time to learn a healthy dietary intake.<sup>39</sup> This is why it is critical to understand what impact parental acculturation has on the diet of Hispanic adolescents.

The location in the United States where Hispanics live can determine the availability of traditional food products.<sup>40</sup> A lack of access to traditional ingredients and how accessible and affordable these are may have a dietary impact on Hispanics living in the United States.<sup>41</sup> This may impact more first-generation Hispanics because they are in the process of learning new and different dietary patterns in addition to changes in their environment that may lead to changes in food procurement and preparation.<sup>42</sup>

Acculturation is modifying an individual's, group's, or people's culture by adapting to or borrowing traits from the dominant culture.<sup>43</sup> Acculturation is a critical socio-cultural factor influencing dietary behaviors within the Hispanic community. It has been suggested that Hispanics lose their dietary customs and preferences when adopting the prevalent diet of the United States.<sup>37</sup> However, acculturation to the United States diet has been associated with both positive and negative dietary characteristics among Mexican Americans'.<sup>44</sup> The positive aspects of increased acculturation were the increased intake of whole grains, lean meats, and non-fat dairy.<sup>44</sup> Negative aspects of increased acculturation were the increased intake of desserts, salty snacks, pizza, and French fries.<sup>44</sup> In a study that looked at the association between acculturation status in children and their consumption of sugar-sweetened beverages did not find a significant association between the two.<sup>45</sup> In contrast, specific to adolescents, greater acculturation has been associated with greater consumption of sugar-sweetened beverages.<sup>46</sup> In addition, a study that compared the impact of acculturational status in Mexican-American adolescents found that their snack intake was lower compared to non-Hispanic White adolescents.<sup>47</sup>

The dietary behaviors of adolescents are influenced by many family-level factors, including parental acculturation, home food environment, parental feeding practices, and the frequency of family meals at home, as well as how these factors may interact. For instance, it has been documented that less-acculturated first-generation Mexican mothers use practices aligning with an authoritarian feeding style, such as using food as a reward and pressuring their children to eat.<sup>48</sup> In contrast, U.S.-born Mexican mothers who were more acculturated had more indulgent feeding practices.<sup>48</sup> Indulgent feeding practices are those where youth are provided with little structure and insufficient guidance and direction from parents related to dietary intake.<sup>48</sup> Similarly, parental feeding practices that are high controlling (rules and limits, monitoring, and pressure to eat) compared to parents in the low controlling category have been linked to obesogenic dietary intake in Hispanic preadolescents and adolescents.<sup>49</sup> In contrast, low parental behavioral control during family meals in less acculturated families seems to negatively affect the dietary decisions Hispanic adolescents make.<sup>50</sup> This type of parental control during family meals has been associated with increased obesity in adolescents.<sup>50</sup> Food-related practices impact the dietary intake of adolescents and may also increase or decrease the frequency of family meals.<sup>51</sup>

Family meals have a positive impact on adolescents in supporting healthy dietary intake.<sup>52,53</sup> A cross-sectional study demonstrated that family meal frequency during adolescence forecasted a greater consumption of fruits, vegetables, and less sugar-sweetened beverages in young adulthood.<sup>54</sup> More frequent family meals have also been proven to decrease the intake of snack foods in adolescents reducing their empty caloric intake.<sup>52</sup> A study that looked at Hispanic father/adolescent dyads and examined parental

practices, such as involvement in meal planning and frequency of family meals, did not find an association between family meal frequency and the dietary intake of adolescents.<sup>55</sup> Instead, it found that fruit and vegetable intake was higher in adolescents when made available in the home food environment.<sup>55</sup> In the same study, parental intake modeling of fruits and vegetables increased vegetable and fruit intake in adolescents; furthermore, the study found that the intake of sugar-sweetened beverages, snacks, and fast food decreased when fathers set limits and made it less available.<sup>55</sup>

Multiple studies have looked at adult acculturation, child acculturation, and adolescent acculturation regarding dietary intake. Still, none have addressed how parental level of acculturation and whether there is a greater orientation to the Anglo or Mexican culture is associated with the likelihood of offering fruits, vegetables, and sugar-sweetened beverages during mealtimes. Understanding how parental acculturation is associated with what foods are served during family mealtimes can help inform evidence-based learning opportunities for parents. Study results can bring a new perspective on how the parental level of acculturation influences adolescent dietary intake, could improve adolescent health, and could reduce obesity and the risk of chronic disease associated with it.

## **Purpose of The Study**

There is limited information on how parental acculturation is associated with the dietary quality of adolescents as it relates to the frequency in which parents offer fruits, vegetables, salad, 100% fruit juice, and sugar-sweetened beverages to their adolescents during family meals. Therefore, the purpose of the proposed study is to assess whether the level of parental acculturation is associated with parents offering fruits, vegetables, and sugar-sweetened beverages during family meals in Hispanic families with middle school-aged adolescent children. This is important to increase evidence-based prevention education programs for parents related to healthy feeding practices to decrease the incidence of chronic illnesses in adolescence.

## **Research Aims and Hypotheses**

- **Research Aim 1:** Assess the association between parental acculturation and the frequency with which fruits, salad, vegetables, and sugar-sweetened beverages are served as part of family meals.

*Research Question:* Does Parental acculturation influence their likelihood to serve fruits, vegetables, and sugar-sweetened beverages during family meals?

- **H1:** Hispanic parents of adolescent children with a lower Anglo acculturation orientation will serve fruits during family meals more frequently.
- **H2:** Hispanic parents of adolescent children with a lower Anglo acculturation orientation will serve vegetables and salad more frequently.

- **H3:** Hispanic parents of adolescent children with a lower Anglo acculturation orientation will serve sugar-sweetened beverages during family meals less frequently.
- **H4:** Hispanic parents of adolescent children with a lower Anglo acculturation orientation will serve 100% fruit juice during family meals more frequently.

### **Definition of Terms**

- **Hispanics:** Individuals who are Mexican, Mexican-American, and or any other Hispanic group.
- **Home food environment:** Accessibility and availability of healthy and unhealthy foods in the home.
- **Parenting practices:** Interactions that parents have with their children related to food consumption expectations.
- **Family meals:** Meals that are prepared and consumed at home.
- **Acculturation:** This is the modification of an individual's, group's, or people's culture by adapting to or borrowing traits from the dominant culture<sup>43</sup>.
- **Adolescents:** Youth between the ages of 10 through 19 years old.

### **Delimitations**

- Participants in the study were Hispanic families with adolescents in middle school.



- Participating families resided in the greater Phoenix metropolitan area of Arizona in the United States.
- The families were recruited from Title I Schools with >60% Hispanic students.

### **Limitations**

- Relatively limited sample size
- Cross-sectional study – only looking at one point in time; not able to determine causation; only able to look at associations between variables
- Fruit, vegetable, and sugar-sweetened beverage information collected through surveys – self-reported; subjective (did not quantify), subject to biases (social desirability, reporting/recall)
- Acculturation assessed via survey; self-reported; measured through the use of language – does not explore all dimensions or factors that could contribute to acculturation; does not measure dietary acculturation.

## CHAPTER 2

### REVIEW OF LITERATURE

#### **Introduction**

This literature review will look at the research regarding lifestyle-related risk factors in the Hispanic community, especially the impact they have on adolescents. Chronic illnesses, dietary intake, and the impact acculturation have on dietary intake. The role of home food environment, parent feeding practices and family meals on dietary intake in adolescents. It will also look at research defining what impacts adolescents' fruit, vegetable, and sugar-sweetened beverages intake.

#### **Health concerns among the Hispanic population**

The term Hispanic, Latino, Mexican, and Mexican-American will be used interchangeably since not one term is used exclusively in research studies. The most recent population figures of 2019 from the United States Census estimate that 60.5 million Hispanics live in the United States.<sup>1</sup> The Hispanic population in the United States is more vulnerable to poorer health outcomes due to many lifestyle-related risk factors, including diet.

#### **Chronic Illnesses**

Chronic illnesses disproportionately affect Hispanic adults and adolescents. Chronic illnesses like type 2 diabetes, metabolic syndrome, dyslipidemia, cardiovascular disease, and obesity are taking a toll on this population.<sup>4,7,9,10</sup>

## **Type 2 Diabetes**

Type 2 diabetes is increasing exponentially in the Hispanic community.<sup>9</sup> It was estimated in 2018 that Hispanics were 1.3 times more likely to die of diabetes than non-Hispanic whites.<sup>9</sup> The populations with the highest diagnosed rates of type 2 diabetes are Native Americans, Alaskan Natives, and Hispanics.<sup>10</sup> In 2018, it was estimated that approximately 210,000 new cases of type 2 diabetes were children and adolescents under 20 years of age.<sup>11</sup> Across all ages, the incidence and prevalence of type 2 diabetes is higher in the Hispanic population<sup>7</sup> with 16.7% in men and 17.2% in women.<sup>56</sup>

## **Metabolic Syndrome**

Metabolic syndrome has the highest incidence among Mexican Americans in the United States.<sup>14</sup> Prevalence of metabolic syndrome is measured through five contributing risk factors, size of waist circumference, triglycerides level, high-density lipoprotein cholesterol (HDL-C) level, blood pressure, and fasting glucose of  $\geq 100$  mg/dL or on medication therapy.<sup>14,57</sup> In adolescents, the same five risk factors are measured to determine metabolic syndrome.<sup>57</sup> Some studies show that Hispanic adolescents in the United States have a higher risk for metabolic syndrome. Still, these numbers vary since not all studies use the same criteria to define metabolic syndrome in adolescence.<sup>57</sup> It is considered that metabolic syndrome in adolescence can lead to cardiovascular disease (CVD) in adulthood.<sup>57</sup>

## **Dyslipidemia**

CVD is one of the leading causes of adult deaths in the United States<sup>58</sup> and the leading death cause of Hispanics in the United States.<sup>22</sup> Therefore, it is recommended that children and adolescents be screened for risk factors associated with CVD.<sup>58</sup> Studies have found a correlation between unhealthy levels of dyslipidemia and CVD.<sup>59</sup> There is a high prevalence of dyslipidemia among Hispanic adults residing in the United States.<sup>22</sup> Factors like socio-economic status, acculturation, and education have a big impact on dyslipidemia levels in Hispanics.<sup>22</sup> In children and adolescents, the prevalence of high total cholesterol and low high-density lipoprotein (HDL) cholesterol in the United States is 7.4%.<sup>58</sup> Hispanic children and adolescents had the lowest prevalence of high total cholesterol of 6.3%, yet they had the highest percentage with low high-density lipoprotein cholesterol at 15.6% and had the highest percentage with a minimum of one abnormal cholesterol measure of 22.3%.<sup>58</sup>

## **Cardiovascular disease**

The Hispanic population is the minority group that is growing the fastest in the United States,<sup>60</sup> yet there is a major gap in research studies to understand Cardiovascular health (CVH) in Hispanics.<sup>26,61</sup> The seven health factors that impact the status of CVH are smoking, body mass index, healthy diet, physical activity, total cholesterol, blood pressure, and fasting blood glucose.<sup>17,26,61</sup> From the seven health factors, high BMI is a significant factor that continues to highly impacts Hispanics.<sup>26</sup> Literature shows that regardless of sex or race/ethnicity, adolescents, for the most part, score within normal BMI guidelines, yet they score poorly on healthy diet<sup>17</sup>. Culturally

focused efforts<sup>26,60</sup> on diet improvement could help in reducing BMI and optimizing CVH among Hispanics.<sup>26</sup> Optimal CVH must be promoted from early childhood through adolescence and through adulthood.<sup>17,61</sup> Preventing CVH risk factors through adulthood decreases the likelihood of CVD risks and increases life expectancy.<sup>17</sup> Acculturation and time spent in the United States are also associated with the increase in the prevalence of CVD.<sup>8</sup>

## **Obesity**

Obesity in adults and adolescents continues to increase,<sup>3,5,62</sup> becoming a public health concern.<sup>5,6</sup> Prevalence of obesity in adults in the United States is 39.8%, and in youth is 18.5%.<sup>3</sup> The prevalence of obesity by race group is higher among Hispanic adults and youth.<sup>3</sup> Literature states that obesity is carried on from childhood to adulthood.<sup>5,6,16</sup> Childhood obesity is a risk factor that increases the likelihood of comorbidities like, type 2 diabetes, dyslipidemia, heart disease, hypertension, and more,<sup>6</sup> that before were considered as comorbidities in adults only.<sup>5</sup>

## **Dietary Behavior in Hispanics**

Studies have shown that diet quality is associated with chronic illnesses, morbidity, and mortality among adults.<sup>27</sup> The prevalence of chronic illnesses in Hispanics is increasing in part due to dietary behaviors.<sup>26</sup> Unhealthy dietary behaviors in adults are established during childhood and adolescence.<sup>28</sup>

## **Adults**

According to the Dietary Guidelines 2020-2025, the current dietary intake of adults between the ages of 19-30 is suboptimal, with a Healthy Eating Index Score (HEIS) of 56 on a scale of 0-100.<sup>28</sup> This HEIS indicates a low intake of the recommended amounts of fruits, vegetables, dairy, legumes, and whole grains from both males and females and an exceeding percentage in consumption of added sugars, saturated fat, and sodium.<sup>28</sup> As for adults between the ages of 31-59 years of age they have a HEIS of 59 out of 100; this group ranks low on vegetable, fruit, dairy, legumes, and whole grain intake for both males and females and low on protein intake for females and exceed in the consumption of added sugars, saturated fat, and sodium.<sup>28</sup> The U.S. Department of Agriculture (USDA) uses the Healthy Eating Index to determine the diet quality of foods and how well they align with important recommendations from Dietary guidelines for Americans.<sup>63</sup>

Studies that measured the Hispanic population's intake using the HEIS in accordance with the Dietary Guidelines found that Hispanics had a better quality diet.<sup>27</sup> Hispanics adults achieved a higher score in consumption of fruits, vegetables, beans, legumes, and meat and a lower score on milk and whole grains compared to non-Hispanic white and non-Hispanic black.<sup>27</sup> Yet other studies showed Hispanic adults had a poor intake of fruits and vegetables compared to white adults.<sup>64</sup>

## **Adolescents**

Eating habits are formed during youth and adolescence, which is a critical growing stage where unhealthy dietary intake can lead to chronic illnesses in adulthood.<sup>6,28</sup> Current HEIS is 52 out of 100 for youth between the ages of 9-13 and 51 for adolescents between the ages of 14-18.<sup>28</sup> Youth, both males, and females between the ages of 9-13, rank low in the intake of vegetables, fruits, dairy, protein, whole grains, and males rank low on the intake of legumes.<sup>28</sup> This group exceeds the intake percentage of added sugars, saturated fat, and sodium intake.<sup>28</sup> Adolescents between the ages of 14-18, males and females rank low on the intake of vegetables, fruit, dairy, legumes, and whole grains, and females rank low on the intake of protein and exceed the intake percentage of added sugars, saturated fat and sodium.<sup>28</sup>

In a study done where it compared HEIS scores between different race/ethnicity groups, it was found that Hispanic youth had higher HEIS for fruit, vegetables, dark green and orange vegetables, legumes, meat, and sodium intake.<sup>27</sup> Yet Hispanic youth had a lower score than non-Hispanic white in the consumption of whole grains and milk.<sup>27</sup>

### **Dietary recommendations for adults and adolescents**

Adults should follow dietary patterns made up of nutrient-dense foods and beverages that fit their budget, are appropriate for their culture, and meet their preferences.<sup>28</sup> The recommendation is that adults consume nutrient-dense foods for their vitamin and mineral content and little added sugar, sodium, and saturated fats.<sup>28</sup> Foods and beverages with high sugar content, sodium, and saturated fat should be limited for all the population in general.<sup>28</sup> For adolescents, like for adults, it is recommended that they

consume nutrient-dense foods from all food groups.<sup>28</sup> Adolescents should consume between 1,400 and 2,600 calories per day depending on gender, activity level, weight, and height.<sup>28</sup> From the recommended caloric intake for adolescents, 85% should be comprised of five food groups, vegetables, whole fruits, whole grains, non-fat dairy, and lean meats.<sup>28</sup>

<b>Food Group</b>	<b>Definitions</b>	<b>Representative food types</b>
<b>Fruits and vegetables (F/V)</b>	Whole fruit and 100% juice, whole vegetables and 100% vegetable juice; F/V in salads, soups, stews, stir-fry, and similar mixed dishes; excluding fried F/V	Fruit juice, vegetable juice, apples, oranges, bananas, berries, avocado, broccoli, collards, romaine, carrots, winter and summer squash, sweet potatoes, salsa, tomato sauce, puree and paste, white potatoes, corn, lima beans, legumes, beets, cabbage
<b>Sweets and savory snacks</b>	High-energy, low-nutrient-dense solid snack type foods	Apple and banana chips, potato/corn/rice/chips, crackers, cheese puffs, cakes, cookies, pies, pastries, doughnuts, snack bars, popcorn, fried pork rinds, candy,
<b>High-calorie beverages (nondairy excluding 100% fruit juice)</b>	High-energy drinks – Those that contained sugar (caloric sweeteners). High-calorie beverages inclusion criteria based on CDC definition, except sweetened milks or milk alternatives were not included because of presence of protein and other nutrients	Flavored carbonated or noncarbonated soft drinks (soda); fruit drinks, punches, sports drinks; tea and coffee with added sugar; energy drinks

**Figure 1.** Description of food groups – Diagram adapted from: Couch S.C., Home Food Environment in Relation to Children's Diet Quality and Weight Status<sup>65</sup>

### **Dietary influencing factors**

Dietary intake is influenced and affected by a variety of factors such as socio-economic status,<sup>20,32,33</sup> education,<sup>23</sup> acculturation,<sup>22,37</sup> cultural factors like traditional diets<sup>37</sup>, and environmental factors.<sup>37</sup>

Socio-economic status (SES) affects access to healthy food<sup>32</sup> and food in general. Research shows that SES continues to be lower in families of Mexican origin.<sup>33</sup> Studies



have shown that socio-economic status, education, and level of acculturation have an impact on the dietary intake of children.<sup>33</sup> Poor dietary intake has been associated with lower SES and is seen as more prevalent in third-generation children of Mexican descent versus first and second-generation children.<sup>33</sup>

### **Education**

A study found that the combination of SES and the education level of the mother impacts what they feed their children to the degree that macro and micronutrient deficiencies have been observed in these children.<sup>66</sup> Children of mothers with less education showed higher levels of anemia and iron (not statistically significant) deficiency.<sup>66</sup> Another study found that education did play a role in the diet quality of individuals.<sup>27</sup> Individuals with college-level education had higher HEIS for whole fruit, vegetables, and whole grains compared to all other education levels.<sup>27</sup> Having less than a high school education reflected a lower HEIS score for oils and higher for saturated fats and sodium in comparison with all other education levels.<sup>27</sup>

### **Cultural factors and traditional diets**

Maintaining and preserving traditional foods is an important cultural factor for the Hispanic population.<sup>67</sup> Cultural factors of maintaining and preserving Hispanic diets have been regarded as positive behavior against chronic illnesses. Traditional Mexican diets are a combination of Native Mesoamerican foods and Hispanic foods.<sup>68</sup> A traditional Mexican diet consists of beans, corn tortillas, traditional Mexican soups, traditional mixed dishes, citrus fruits, vegetables including cactus pads, jicama,

animal fats, full-fat milk, and drinks made of fruits, flowers, sugar, and water.<sup>68</sup> Other common foods in the traditional Mexican diet are tomatoes, chiles, squash, and chocolate drinks.<sup>69</sup> A traditional Mexican diet is composed of fresh produce, which may not always be available in the United States due to environmental factors.

### **Eating away from home – fast food**

Another factor that contributes to excessive caloric intake in adolescents is the consumption of fast food.<sup>70</sup> A study done based on two 24-hour dietary recalls showed that children who ate at fast food restaurants consumed 126 more calories a day, and adolescents had an increased consumption of 316 more calories a day.<sup>70</sup> Food consumption at fast food and full-service restaurants also increased the intake of sugar-sweetened beverages by children and adolescents.<sup>70</sup> Adolescents who are more frequently at fast food restaurants had a greater consumption of sugar-sweetened beverages, soda, and a decreased consumption of milk.<sup>70</sup> In a qualitative study done to examine factors that promoted fast food consumption, adolescents reported they opt for fast food restaurants versus eating at home because fast food restaurants are easily accessible, have a variety of food, they are affordable, and they provide entertainment by eating out with friends.<sup>71</sup> Another study that looked at the association between food insecurity and fast food consumption in adolescents found a relationship between higher food insecurity and higher consumption of fast food.<sup>72</sup> Similar findings have been noted in previous studies.<sup>72</sup>

### **Home food environments**

The home food environment is important in establishing healthy eating dietary patterns in youth. A study with parents and adolescents between the ages of 12 and 18 that looked at the home food environment and its association with fruit and vegetable intake found that the availability of more healthy and less unhealthy foods at home was associated with fruit and vegetable intake in adolescents.<sup>35</sup> Adolescents reported a daily intake of fruits and vegetables between 3.3 and 3.6 servings daily.<sup>35</sup> In a cross-sectional study that looked at how home food environment facilitated the associations between parental fruit, vegetable, and breakfast intake, rules about fruits and vegetables and availability of fruits and vegetables at home found that rules about fruit consumption and its availability at home were associated with higher intake of fruit a day by the children.<sup>73</sup> A study that examined the association between parenting practices and fruit and vegetable intake in adolescents during different types of family meal frequency found that increased availability of fruits and vegetables at home increased fruit and vegetable intake by adolescents.<sup>53</sup> This study also found an association between increased fruit and vegetable intake by adolescents to the increased frequency of family meals and favorable parenting practices.<sup>53</sup>

### **Acculturation**

Acculturation is the modification of an individual, group, or people's culture by adapting to or borrowing traits from the dominant culture.<sup>43</sup> Acculturation is a major source of dietary change in the Hispanic population.<sup>37</sup>

### **General impact of acculturation on diet**

Hispanics tend to lose their dietary customs and preferences when adopting the prevalent diets of the United States.<sup>37</sup> Higher acculturation is associated with lower HEIS in Hispanics of all ages<sup>74</sup> and with a poorer diet quality.<sup>44,75</sup> In a study done with Hispanic adults, it showed that increased acculturation resulted in a decrease of daily consumption of fruits and vegetables and less acculturation resulted in more fruit and vegetable consumption.<sup>40</sup> Positive and negative aspects of acculturation to the United States diet were found in a study that examined food acculturation on Mexican Americans' diets.<sup>44</sup> Positive aspects of increased acculturation in individuals were seen with a higher intake of lean meat and fish, high-fiber bread, and lower intake of low-fiber bread compared to less acculturated individuals.<sup>44</sup> A negative aspect of increased acculturation in individuals was the increased intake of desserts, salty snacks, pizza, and French fries.<sup>44</sup>

In adolescents, as acculturation increases, so does their consumption of SSBs.<sup>46</sup> Acculturation can also determine the quality of snack intake in adolescents affecting diet quality.<sup>47</sup> In a cross-sectional study, adolescents between the ages of 12-19 were divided into four acculturation groups, non-Hispanic white, US-born child with a US-Born parent, US-born child with a Mexico-born parent, and Mexico-born child, and from the four groups, the non-Hispanic white had poorer diet quality compared to the US-born adolescent with Mexico-born parent and Mexico-born adolescent.<sup>47</sup> Non-Hispanic white adolescents had a greater daily calorie intake coming from snack foods than all of the other generational groups.<sup>47</sup> Snack portions for this adolescent group were bigger and mainly came from savory snacks, crackers, bars, sweet bakery products, candy, desserts and secondly from SSB's.<sup>47</sup>

### **Acculturation in parents – Does acculturation have an impact on their feeding practices**

In a randomized trial of parent-child dyads, it was found that as parents become more acculturated, they achieve greater control over their children's eating practices, and they tend to pressure their children to eat without hunger.<sup>76</sup> In a different study, the opposite is stated, less parental acculturation is synonymous with greater control over children's eating practices.<sup>77</sup>

### **Acculturation in youth – Perception of what parents feed them**

A study that examined the relationship between acculturation, ethnic identity, and dietary quality in Hispanic adolescents found no difference in HEIS among acculturation levels but did find a difference among adolescents that had more of an integrated acculturative status; they had better whole grain and empty calorie scores compared to those less assimilated.<sup>78</sup>

### **Acculturation impact on fruit and vegetable consumption in youth**

Results from National representative surveys have shown that greater acculturation equals a lower dietary quality in Hispanics.<sup>75,79</sup> Studies have also shown that acculturation in Hispanics is linked to a lower intake of fruits and vegetables and increased consumption of fats and sugar-sweetened beverages.<sup>79</sup>

### **The relationship between acculturation and obesity in youth**

Several studies have found an association between acculturation and weight status in adolescents.<sup>24</sup> The results from a study that measured acculturation by generation status in adolescents found that second and third-generation adolescents had higher probabilities of overweight and obesity compared to first-generation adolescents.<sup>25</sup> Both adolescent groups from the second and third generations ate less fruit, vegetables, grains, and meats and more sugar-sweetened beverages.<sup>25</sup> A study that measured the association between acculturation, parental feeding practices, and youths' dietary behaviors in Hispanic parent and child dyads considered overweight or obese found that as parents become more acculturated, they have greater control over their child's feeding practices.<sup>80</sup> Meaning, as parental acculturation increased, they pressured their children to eat even without hunger and finish all the food on their plates.<sup>80</sup> These parents also used sweets as rewards for good behavior.<sup>80</sup>

### **Family meals**

With changing schedules, it is challenging for adolescents to find time to eat meals together due to involvement in extracurricular activities and social lifestyles.<sup>52,71</sup> The number of children who eat family dinners goes down with age.<sup>27</sup> In a randomized control trial with adolescents, it was shown that adolescents who eat breakfast with their family between 1-3 times a week and are involved in the preparation show a more positive attitude regarding the importance of meal time, structure, and interactions.<sup>81</sup> The study also showed that Hispanic adolescents shared meals more often with their families than non-Hispanic white adolescents.<sup>81</sup>

### **Impact on health - Weight status of youth and obesity**

In a cross-sectional and 5-year longitudinal study, there was no association found between family meals and overweight status in adolescents.<sup>82</sup> In an exploratory study done with adolescents from public middle schools and high schools found an association between family meals with positive interactions and a lower body mass index (BMI) in adolescents<sup>83</sup>. The lower BMI was also attributed to the fact that adolescents ate more vegetables during family meals.<sup>83</sup>

### **The role of family meals in improving youth diet**

A study that examined the relationship between the frequency of family meals and diet quality in children ages 0 to 17 years found that adolescents who participated in a minimum of five family meals a week had better consumption rates of fruits and vegetables than those who participated in less than five family meals per week.<sup>84</sup> This study concluded that family meals play an important role in the diet quality of youth by increasing fruit and vegetable intake and decreasing sugar-sweetened beverage consumption among all age groups of youth.<sup>84</sup> An increase in family meals has been associated with a healthier diet overall in adolescents.<sup>52,54,83</sup>

### **Rules during meals**

Family meal time can be an excellent opportunity for parents to model good eating practices and a time to socialize.<sup>85</sup> In a study that looked at family meal frequency, and the family mealtime environment, particularly the importance of rules and satisfaction with family meals, concluded that regardless of the structure set by parents

during mealtimes, whether or not adolescents were allowed to watch TV while eating, having good manners at the dinner table, or expected to follow the rules during mealtime, both adolescents and parents agreed that eating meals together was important.<sup>85</sup> Both adolescents and parents reported high levels of communication and the perception of enjoyment of family meals.<sup>85</sup>

### **Parenting Practices**

Several studies compare parenting styles and their effects on eating practices among adolescents.<sup>76,77,86</sup> A study that looked to see if acculturation and ethnicity moderated the relationships between family meals and weight status maintenance and change in adolescence found that low levels of parental behavioral control at home were associated with unhealthy weight status for less acculturated Hispanic adolescents.<sup>50</sup> In a systematic review and meta-analysis that examined the influence of parents on child food consumption behavior looked at different parenting practices as to how they correlate to child food consumption behavior.<sup>87</sup> The study found that parental restrictive guidance is associated with both healthy and unhealthy food consumption among children.<sup>87</sup> Restrictive guidance is the frequency with which parents set limits, rules, or restrictions regarding food consumption.<sup>87</sup> Parental modeling practice has a significant impact on child food intake and can go either way depending on what food intake modeling is demonstrated by parents, healthy or unhealthy.<sup>87</sup> Parental control can have a positive impact on dietary intake by youth; parental control refers to foods available<sup>87</sup>. Pressure to eat parental practice had mixed results.<sup>87</sup> Another study also found a positive



association between parent modeling and higher daily consumption of fruits and vegetables and lower consumption of sugar-sweetened beverages.<sup>34</sup>

### **Foods provided during meals**

Family meals have a positive impact on adolescents in supporting healthy dietary intake.<sup>52</sup> In a cross-sectional study, it was shown that family meal frequency during adolescence forecasted a greater consumption of fruits, vegetables, and less sugar-sweetened beverages in young adulthood.<sup>54</sup> The frequency of family meals has demonstrated a decrease in consumption of sugar-sweetened beverages (SSB) during the meals and an increase in consumption of fruits and vegetables.<sup>52</sup>

### **Conclusion**

The literature so far has shown that the Hispanic population suffers tremendously of chronic illnesses due to multiple lifestyle variables, with diet being a key factor. Adolescence is a crucial period during an individual's life where healthy dietary practices can be learned and maintained through adulthood, decreasing the incidence of chronic illnesses. Parental acculturation is one of many factors that affect the quality of diet among Hispanics. Overall, home food environment and parental feeding practices play a huge role on adolescents' dietary intake. Family meals have been shown to have a positive impact on fruit and vegetable consumption among children of all ages. Family meals tied with modeling practices from parents can improve the dietary intake in adolescents. Family meals can also be considered a protective factor against obesity in adolescents.

The impact of the family meals what is served and parental feeding practices has a positive benefit on the diet quality of adolescents.

## CHAPTER 3

### METHODS

#### **Study Design**

This study is cross-sectional, analyzing baseline data from a randomized controlled trial that measured the efficacy of Families Preparing the Next Generation Plus (FPNG Plus).<sup>88</sup> FPNG Plus is a parenting intervention program that focuses on promoting healthy nutrition and substance use prevention simultaneously, delivered in middle schools to parents of Hispanic families living in the metro Phoenix area. The parent study design was a 3-arm group cluster randomized controlled trial that compared FPNG Plus, FPNG (substance use prevention only), and the Realizing the American Dream (RAD) as a comparison condition that focuses on academic success.<sup>88</sup> For the current study, secondary data analysis will be conducted on self-reported data from parents who completed the baseline survey. Only the methods relevant to such analysis will be described.

#### **IRB Approval and Consent**

This study was approved by the Institutional Review Board of Arizona State University (Protocol ID:STUDY00006797, Appendix A). All materials related to the study are available in English and Spanish. Participating parents gave written consent to participate in the study and gave permission for an adolescent child to participate. Written assent was obtained from the adolescents as well.

## **Participants and Recruitment**

Parent-adolescent dyads were recruited from schools that met the following eligibility criteria: 1) public schools that offered grades 6<sup>th</sup>-8<sup>th</sup> with a minimum of 65 students per grade level; 2) located in Maricopa County, AZ; 3) student population  $\geq$  60% Hispanic; 4) Title I funding recipient; and 5) willing to offer one of the three programs at the school.<sup>88</sup> Participant recruitment took place via phone call invitations by trained operators from the American Dream Academy community partners using an invitation script provided by the study team and the dissemination of flyers sent home with adolescents from eligible schools.<sup>88</sup> Parents were eligible to participate if they were 18 years of age and older and had a child enrolled in a participating school in any grade level. Eligible adolescents were enrolled in 6<sup>th</sup>-8<sup>th</sup> grade. To participate, parents had to provide written consent (Appendix B).

## **Data Collection**

Parents completed a self-administered survey available in English and Spanish using an electronic tablet (Lenovo tablet) on a Qualtrics (Qualtrics, Provo, UT, USA) platform.<sup>88</sup> If participants did not feel comfortable using an electronic tablet, a Research Assistant helped by reading the questions to the participants.<sup>88</sup> The questions in the survey regarded mealtime environment, dietary intake, family involvement, demographics, and substance use intentions. For this analysis, only responses from parent surveys related to sociodemographic characteristics, acculturation, frequency of serving fruit, vegetables, and sugar-sweetened beverages during family meals, and family meal frequency (Appendix C).

## Measures

### **Parental Acculturation (Independent Variable)**

Parental acculturation was measured using the Anglo orientation subscale (AOS) and Mexican orientation subscale (MOS) from the Acculturating Rating Scale for Mexican Americans-II (ARSMA-II).<sup>89</sup> This rating scale measures acculturation through language use and preference, ethnic identity and classification, cultural heritage, ethnic behaviors, and ethnic interactions.<sup>89</sup> These four factors are organized into two subscales that measure orientation toward the Mexican culture and the Anglo culture. The MOS contains 17 items, while the AOS has 13 items. Each item is scored on a Likert scale from 1 (*not at all*) to 5 (*extremely often or almost always*). For each person, a mean MOS score is computed by summing the scores of the 17 items and dividing by 17. Likewise, a mean AOS score is obtained by summing the 13 items and dividing by 13.

### **Frequency of vegetables, salad, fruits, 100% fruit juice, and sugar-sweetened beverages served during family meals (Dependent Variables)**

Questions related to the frequency with which vegetables, salad, fruits, 100% fruit juice, and sugar-sweetened beverages are served at home during family meals will be derived from the initial parent survey.<sup>90</sup> Questions were asked for frequency. These read as yes/no questions were, "We never eat family dinners (if true, check the box to the left and skip to questions about your diet), and "We eat together as a family." Followed by questions, "Is a green salad served?", "Are vegetables other than potatoes served?", "Is 100% fruit juice served?", "Is fruit (not including juice) served?" and "Are sugar-

sweetened beverages (soda pop, Kool-Aid, etc.) served?". These questions were categorically ranked from 1 to 4, one representing the least frequency of "Never or Rarely" and four representing most frequency "Always."

### **Demographics**

Sociodemographic characteristics of parents, such as age, sex, income, education level, number of people living in the home, and length of time living in the United States, were collected at baseline.

### **Statistical Analysis**

SPSS software, Version 27, was utilized to conduct statistical analyses. Descriptive statistics were carried out for sociodemographic measures. Spearman's rank correlations were used to assess the associations between parental acculturation and the frequency of fruit, vegetables, salad, and sugar-sweetened beverages served during family mealtimes. Variables used for descriptive statistics were income, age, years in the US, and level of education. Statistical significance was considered significant at a p-value of <0.05. Data are shown in a mean of  $\pm$  standard deviation and as a frequency (percentages).

## CHAPTER 4

### RESULTS

Of the 487 parent participants, 40 indicated "We never eat family dinners" or did not provide an answer to the question about family meal frequency. Therefore, only the participants that answered "We eat together as a family" were included in this analysis (n=447).

The characteristics of the participants are outlined in **Table 1**. The mean age of the parents was  $39.8 \pm 6.8$  years. The participants consisted of 401 female parents (89.7%) and 46 male parents (10.3%). Most of the participants were born in Mexico (85.5%), 7.4% were born in other Latin American countries, and 7.2% were born in the United States. The majority of the parents (77.2%) reported living in the United States for more than ten years, and 78.5% reported having the equivalent of a high school or less education. The majority of the parents reported having an income between less than \$10,000 and \$29,999 (69.0%) and having households between 4 and 6 people (74.3%). Parents reported higher levels of Mexican orientation than Anglo orientation. Participants' level of acculturation was  $4.38 \pm 0.64$  on the Mexican Oriented Scale (MOS) and  $2.34 \pm 0.97$  in the American Oriented Scale (AOS).

**Table 1.** Characteristics of Study Participants

<b>Variable</b>	<b>Mean <math>\pm</math> SD</b>	<b>Frequency n (%)<sup>*</sup></b>
<b>Age (years)</b>	39.8 $\pm$ 6.8	
<b>Gender</b>		
Female		401 (89.7)
Male		46 (10.3)
<b>Place of Birth</b>		
Mexico		382 (85.5)
Other Latin American Country		33 (7.4)
United States		32 (7.2)
<b>Years living in the United States</b>		
Less than 1 year		14 (3.2)
1-5 years		39 (8.8)
6-10 years		15 (3.4)
More than 10 years		342 (77.2)
All of my life		33 (7.4)
<b>Education</b>		
Highschool or less		337 (78.5)
Technical or Trade school		41 (9.6)
Some college		16 (3.7)
Four-year college or higher		35 (8.2)
<b>Income</b>		
Less than \$10,000		66 (15.3)
\$10,000-\$19,000		105 (24.4)
\$20,000-\$24,99		71 (16.5)
\$25,000-\$29,999		55 (12.8)
\$30,000-\$49,999		96 (22.3)
\$50,000-\$74,999		29 (6.7)
\$75,000 or more		9 (2.1)
<b>Number of People Living in the Home</b>		
1-3		45 (10.0)
4-6		332 (74.3)
7-9		56 (12.6)
10-14		7 (1.4)
<b>Acculturation</b>		
AOS <sup>a</sup>	2.34 $\pm$ 0.97	
MOS <sup>b</sup>	4.38 $\pm$ 0.64	

<sup>a</sup>Anglo Orientation Subscale (AOS) scored from 1-5.

<sup>b</sup>Mexican Orientation Subscale (MOS) scored from 1-5.



\*Valid percent excluding all missing cases. The participant sample was n=447 (parents).

The frequency with which parents reported serving green salad, vegetables (other than potatoes), fruit (not including juice), 100% fruit juice, and sugar-sweetened beverages (SSB) as part of family meals is shown in **Table 2**. Most participants reported serving these items at family meals only sometimes: green salad (52.9%), vegetables other than potatoes (48.3 %), fruit (not including juice) (44.8%), 100% fruit juice (40.7%), and sugar-sweetened beverages (soda pop, Kool-Aid, etc.; 49.3%). More participants reported never or rarely serving 100% fruit juice and SSB (35.1% and 19.7%, respectively) compared to those who answered always serving them (9.7%, and 10.1%, respectively) during family meals. Fewer participants responded to never or rarely serving vegetables other than potatoes (9.6%) compared to those who answered usually serving them (31.8%) during family meals.

**Table 2.** Parent-reported Frequency of Types of Foods Served as Part of Family Meals

Food Items	Number of parents n (%) *			
	Never/Rarely	Sometimes	Usually	Always
Green salad	89 (21.2)	222 (52.9)	89 (21.2)	20 (4.8)
Vegetables other than potatoes	43 (9.6)	216 (48.3)	142 (31.8)	46 (10.3)
Fruit (not including juice)	75 (16.8)	200 (44.8)	101 (22.6)	68 (15.2)
100% fruit juice	156 (35.1)	181 (40.7)	63 (14.2)	43 (9.7)
Sugar-sweetened beverages (soda pop, Kool-Aid, etc.)	88 (19.7)	220 (49.3)	93 (20.8)	45 (10.1)

\*Valid percent excluding all missing cases.

**Table 3.** shows Spearman's rank order correlations assessing the relationship between parents' level of acculturation on the MOS and AOS scales and their likelihood of serving salad, vegetables, fruit, 100% fruit juice, and sugar-sweetened beverages during family meals. There was a positive correlation between a higher level of acculturation on the MOS scale and the frequency of serving SSB during family meals. ( $r = .134$ ,  $p = .006$ ). The level of acculturation on the AOS scale was positively correlated with the frequency of parents serving green salad ( $r = .195$ ,  $p < .001$ ), vegetables ( $r = .176$  and  $p < .001$ ), and 100% fruit juice ( $r = .111$ ,  $p = .025$ ) during family meals.

**Table 3.** Correlation and Associations Between Parental Acculturation Level and Parents' Likelihood of Serving These Types of Foods During Family Meals

Served During Family Meals	MOS		AOS	
	Correlation coefficient	<i>P value</i>	Correlation coefficient	<i>P value</i>
Green salad	-.048	.325	.195	<b>&lt;.001</b>
Vegetables other than potatoes	.039	.427	.176	<b>&lt;.001</b>
Fruit (not including juice)	.023	.641	.040	.417
100% fruit juice	.016	.748	.111	<b>.025</b>
Sugar-sweetened beverages (soda pop, Kool-Aid, etc.)	.134	<b>.006</b>	-.013	.795

**[Bold significant values;  $p < 0.05$ ]**

## CHAPTER 5

### DISCUSSION

The purpose of this study was to assess whether the level of parental acculturation is associated with parents offering fruits, salad, vegetables, 100% fruit juice, and sugar-sweetened beverages during family meals among Hispanic families with adolescent children in middle school. This study measured parental acculturation in Hispanic parents by Mexican-oriented subscale MOS and Anglo-oriented subscale AOS (subscales derived from the Acculturation Rating Scale for Mexican Americans-II (ARSMA-II))<sup>91</sup> based on responses to a self-administered survey. Acculturation was measured in relationship to language, ethnic identity, and ethnic interaction.<sup>92</sup> Findings from the current study suggest that parents with a higher orientation on the MOS served more sugar-sweetened beverages, and parents with a higher orientation on the AOS served more green salad, vegetables, and 100% fruit juice during family meals.

Past studies have shown that a variety of factors impact the dietary habits of Hispanics. These include acculturation,<sup>93</sup> in combination with socio-economic status,<sup>30</sup> and home food environment.<sup>35,94,95</sup> Research has shown that less acculturated individuals have a more nutritious dietary intake, and higher acculturation is associated with lower diet quality.<sup>40,75</sup> A study that looked at the association between acculturation and diet quality found that a positive attribute of acculturation was a higher intake of low-fat meat and fish, skimmed milk, high-fiber bread, and a lower intake of low-fiber bread.<sup>44</sup> In contrast, lower acculturation was associated with a higher fruit, vegetable, and legume intake.<sup>44</sup>

Linked to acculturation is the socioeconomic status of Hispanics in the United States and their diet quality.<sup>96</sup> Availability and high cost of foods may dictate the changes in the dietary habits of Hispanics.<sup>97</sup> A study that looked at the dietary intake quality of adolescents based on socioeconomic status found that adolescents from lower socioeconomic status consumed significantly more calories from added sugar than those from higher socioeconomic status.<sup>30</sup> The home food environment may be impacted by the socioeconomic status of the household. And the home food environment plays a major role in the diet quality of adolescents. Studies have shown that the quality of dietary intake in adolescents improves when nutritious foods like fruits and vegetables are made available at home, and dietary quality improves more when parents model healthy eating behaviors.<sup>35,94,95</sup>

This study found that parents with a higher Mexican orientation served more SSB to their adolescents compared to parents with a higher Anglo orientation. In contrast, results from previous studies suggest that greater acculturation is linked to greater SSB consumption.<sup>47,98</sup> However, the consumption of SSBs is a culturally acceptable practice in Mexico. Mexico is one of the main per capita consumers of soft drinks in the world.<sup>99</sup> Moreover, a study that estimated the added sugar intake in the Mexican population found that the primary source came from the consumption of SSBs.<sup>99</sup> Nevertheless, it is important to acknowledge that the current study did not measure the quantity of SSB served by parents to their adolescents or how much SSB they consume during family meals limiting the ability to know whether the reported parenting practices result in actual intake by the adolescents.

There are no studies known that have measured the relationship between parental level of acculturation and the likelihood of serving SSBs to their adolescents during family meals. And very few studies have measured the relationship between SSB consumption related to acculturation in Hispanic adolescents. Given the present study's findings showing that less acculturated parents (higher Mexican orientation) serve more SSBs during family meals, more research is recommended to examine the link.

In regard to the current finding that serving of green salad, vegetables, and 100% fruit juice occurred more among parents with a higher Anglo orientation, the current study contrasted the results of several previous studies. Those studies showed that individuals who are less acculturated consumed more fruits, vegetables and maintained a healthier diet than those that are more acculturated.<sup>68,75,93,100</sup> Several studies have found that diet is negatively impacted by increased acculturation in Hispanics living in the United States.<sup>40,44,75</sup> This difference could be explained by several limitations of the current study, self-reported survey answers, the potential lack of recollection of what was served during family meals, and a possible cultural difference in interpretations of what constitutes a green salad and vegetables for those with higher Mexican orientation.

Previous findings showed acculturation is not the only factor determining what parents serve during family meals; youths' preference for foods also plays a role in what is served.<sup>101</sup> In a study that looked at what made it easier or harder for Hispanic mothers to feed their children a healthy diet found that regardless of their efforts to feed their children traditional foods from their home countries, fruit and vegetables found themselves catering to their children's acquired taste for fast food.<sup>101</sup> This study did not explore adolescents' food preferences for what is served during family meals. Further

research on adolescents' food preferences in association with how it influences what parents serve during family meals may explain why and what parents are serving during family meals and how this influence is impacting the dietary quality and intake of adolescents.

Another important aspect of what influences dietary intake is dietary acculturation. This study only looked at the acculturation of individuals using the ARSMA II, which measures acculturation through the use of language. Dietary acculturation is when individuals adopt eating patterns and or food choices of the host country.<sup>102,103</sup> This study was carried out in Maricopa County, Arizona. Given the close proximity to the Mexican border, the possibility cannot be ruled out that the greater availability of Mexican products in the region may have influenced the degree to which they may have retained dietary practices from Mexico while adapting to the dietary environment in the United States. This may explain the bicultural eating patterns of these individuals in which they are able to maintain traditional eating patterns during some meals and incorporate eating patterns from the host country during other meals or occasions. Understanding the extent to which participants of this study are bicultural and their dietary acculturation could give a better perspective on their dietary practices, including what they are serving during family meals to their adolescents.

Eating out fast food has become a norm for adolescents. This is a time when they become more autonomous and eat fewer meals at home. A study that looked at the association between the frequency of meals prepared away from home, diet quality, and intake of nutrients among adolescents found that Hispanic adolescents rank in second place in eating meals prepared outside the home, despite the fact that close to half of all

the adolescent participants lived in low-income homes.<sup>38</sup> When dietary intake was assessed, it was found that adolescents tend to consume less essential micronutrients when they eat out.<sup>38</sup> In part, this could be attributed to the notion that eating out (fast food) is more affordable than cooking a meal at home.<sup>104,105</sup>

### **Parent-reported Frequency of Types of Foods Served as Part of Family Meals**

Most participants in this study (92%) reported having family meals and reported serving some fruit and vegetable during family meals approximately 50% of the time. According to the U.S. Census in 2021, 90% of Hispanic parents shared family meals with their children more often compared with 86% of non-Hispanic parents.<sup>106</sup> This phenomenon is attributed to familismo (familism), which poses that Hispanics have a strong attachment to nuclear and extended family, show loyalty and respect to elders, and value family-oriented activities, such as sharing meals as a family.<sup>107</sup> Whereas 92% of this study's participants reported having family meals, information regarding the frequency of family meals and whether the adolescent child participated in family meals was not collected.

Family meals can allow parents to model healthy eating behaviors and positive parenting practices in the home environment.<sup>55</sup> A study that included 191 parent and adolescent Hispanic dyads examining food parenting practices, parental meal involvement, and frequency of family meals found that adolescent intake of fruits and vegetables was higher when available at home, and vegetable intake was higher with parental-intake modeling.<sup>55</sup> Overall, positive food parenting practices were associated with a higher intake of healthy foods compared to unhealthy foods by adolescents.<sup>55</sup> A

study examining the relationship between family meal frequency and measures of diet quality found that adolescents who had a minimum of 5 family meals per week were more likely to consume three or more pieces of fruits and vegetables per day.<sup>84</sup>

Consuming more fruits and vegetables during mealtimes are learned behavior that stay with adolescents as they mature into adulthood.<sup>54</sup>

In combination with parent feeding practices, the availability of fruits and vegetables in the home has been shown to increase adolescent fruit and vegetable intake.<sup>53</sup> Research has shown that although the highest predictor of fruit and vegetable consumption among adolescents is family meal frequency, the home food environment with positive food parenting practices is strongly linked to the increased intake of fruit and vegetables among adolescents.<sup>35,53</sup> This study looked at what parents offered their adolescents during family meals, such as green salad, vegetables, fruit, % 100 fruit juice, and SSBs. Yet it did not quantify how much they offered, the frequency with which they offered these foods, and whether these foods were consumed by adolescents.

Lastly, in the current study, more parents reported never or rarely serving 100% fruit juice or SSB compared to those who reported always serving them. This result is in line with the result from a previous study that assessed adolescent SSB intake in relation to parental food practices.<sup>55</sup> The intake of SSB by adolescents was lower when parents made them less available at home.<sup>55</sup> Limiting the intake of SSB intake in adolescents by parents would significantly decrease their caloric intake. According to the Dietary Guidelines for Americans, the intake of added sugars in adolescents exceeds 79% of the recommended, increasing their caloric intake on average by 293 calories per day.<sup>28</sup> The results of this study are promising as they show that this trend may be changing.



## **Associations Between Parents' Level of Acculturation and Their Likelihood of Serving Salad, Vegetables, Fruit, 100% Fruit Juice, and Sugar-Sweetened Beverages During Family Meals**

The current study is the first known to investigate the association between parental acculturation and the frequency with which salad, vegetables, fruit, 100% fruit juice, and SSBs are served as part of family meals. Prior research suggested that diet is negatively impacted by an increase in acculturation in Hispanics living in the United States.<sup>75,93,108</sup> In contrast, parents with a higher Anglo orientation in the current study reported serving more green salad and vegetables during family meals. However, this study did not quantify the amount of these foods offered by parents or consumed by adolescents. Nevertheless, a study that looked at how acculturation influences diet-related health behaviors in second and third-generation Latinos found that they identified salads as healthy food.<sup>109</sup> Views of healthier and unhealthy foods could possibly impact parents' decisions of what and what not to serve during family meals.

Parental acculturation is not the only factor that impacts dietary intake; socio-economic disparities also play a role in adolescent dietary intake.<sup>30</sup> The majority of the participants in this study had an annual income of less than \$29,999 a year and a family of four or more. According to the United States federal government, a family of 4 with an annual income of \$30,000 or less is considered to be at the federal poverty level.<sup>110</sup> Studies have shown that socio-economic disparities are the main cause of poor dietary intake.<sup>111</sup> A study that looked at grocery purchasing practices by low-income Hispanics showed that many of their food choices were very caloric dense because they were based

on monetary value, not dietary value.<sup>112</sup> This study did not look at whether income impacts parents' likelihood of serving green salad, vegetables, fruit, 100% fruit juice, and SSB. This is a potential area to examine for future research.

### **Strengths and Limitations**

The strengths of this study were that it used a convenient and noninvasive method of data collection for participants. Participants also had the choice of taking the survey in their preferred language, English or Spanish. A well-known and widely utilized tool (the Acculturation Rating Scale for Mexican Americans-II (ARSMA-II), was used to assess the acculturation level of parents.<sup>91</sup> This study looked at an underrepresented population which is the Hispanic community. Lastly, this study provides information on how parental acculturation levels impact their likelihood of serving green salad, vegetables, fruit, 100% fruit juice, and SSBs during family meals.

Limitations of this study include that this was a secondary cross-sectional analysis where the data was gathered through self-administered surveys. This study did not measure adolescent food intake, specifically of the foods (green salad, vegetables, fruit, 100% fruit juice, and SSBs) served during family meals by the parents. Assumptions of adolescent dietary intake were based on what parents offered during family meals. Another limitation was unable to account for the dietary intake of adolescents outside of family meals. This study only looked at one point in time (baseline data) and only at associations between variables; therefore, it was unable to determine causation. Information from participants was gathered through self-report surveys subject to reporting bias, recall bias, social desirability bias, and their interpretation of the

questions. Acculturation was also self-reported and was only measured through the use of language and no other dimensions that could possibly measure it, meaning the measurement could miscalculate the potential acculturation of Hispanics that use mostly Spanish but have adopted more Anglo customs. Dietary acculturation was not measured.

Findings may be limited due to the population sample characteristics and size. The study analyzed a sample of Hispanic parents of adolescents in 6<sup>th</sup>-8<sup>th</sup> grade living and attending school in Maricopa County, Arizona. Therefore, the findings may not be comparable to other findings in other geographic areas. Furthermore, the sample used in this study is very specific and would not apply to the general population.

The lack of heterogeneity in acculturation (i.e., strong Mexican orientation among most participants) and limited sample size could limit the statistical power of the study. Another factor is the response bias and recollection of what parents serve during family meals. Tools used to gather information, even though well validated, cannot prevent reported bias from the participants.

## **Conclusion**

There are gaps in research regarding parent dietary practices and acculturation, with very few studies examining the link between the two. This study found that parents with higher Mexican orientation served more SSBs, and parents with higher Anglo orientation served more green salad, vegetables, and 100% fruit juice during family meals.

Future studies should focus on the connection between the parental level of acculturation and dietary acculturation and how this may impact the dietary quality of

adolescents by measuring the number of actual family meals a week and how many the adolescents participate in. Servings of fruit, vegetables, and SSBs' should be estimated, and how much was consumed by the adolescent. Previous studies have shown that less acculturated Hispanics (those higher on the MOS scale) had better diet quality due to greater consumption of fruits and vegetables. This study did not measure dietary consumption since it only looked at what parents served during family meals and found that parents with a higher Anglo orientation reported serving more green salad and vegetables. We can only assume that adolescents who were served more green salad and vegetables had a higher intake of these. More research is recommended to determine which of these findings is true in the broader Hispanic population. In an effort to reduce the incidence of obesity in Hispanic adolescents, this research is vital to create more effective interventions that address the Hispanic adolescent diet at the individual, group, and community/government levels.

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APPENDIX A  
IRB APPROVAL FORM



APPROVAL FULL BOARD

Sonia Vega-Lopez  
 SNHP: Nutrition  
 602/827-2268  
 Sonia.Vega.Lopez@asu.edu

Dear Sonia Vega-Lopez:

On 9/28/2017 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Multi-level effects of a parenting intervention for enhancing Latino youth health behaviors
Investigator:	Sonia Vega-Lopez
IRB ID:	STUDY00006797
Funding:	Name: HHS-NIH: National Center on Minority Health and Health Disparities (NIMHD), Grant Office ID: FP00011681
Grant Title:	FP00011681;
Grant ID:	FP00011681;
Documents Reviewed:	<ul style="list-style-type: none"> <li>• Focus Group Consent, Category: Consent Form;</li> <li>• FPNG+Protocol-Version1-092117-CLEAN, Category: IRB Protocol;</li> <li>• Safety Net - List of resources-Tracked, Category: Resource list;</li> <li>• Home Food Inventory, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);</li> <li>• FPNG+ Grant Proposal, Category: Grant application;• Survey for Youth, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);</li> <li>• Parent Permission-Tracked, Category: Consent Form;</li> <li>• Adult Consent Control-Clean, Category: Consent Form;</li> </ul>

	<ul style="list-style-type: none"> <li>• Food Frequency Questionnaire for Adults, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);</li> <li>• Parent Permission-Clean, Category: Consent Form;</li> <li>• Safety Net - List of resources-Clean, Category: Resource list;</li> <li>• Results Letter - Adult, Category: Participant materials (specific directions for them);</li> <li>• Focus Group Recruitment Script, Category: Recruitment Materials;</li> <li>• Food Frequency Questionnaire for Youth, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);</li> <li>• Survey for Parents, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);</li> <li>• Letter of Support ADA, Category: Other (to reflect anything not captured above);</li> <li>• Adult Consent FPNG+-Clean, Category: Consent Form;</li> <li>• ADA Call Center Information Session Script Control, Category: Recruitment Materials;</li> <li>• Williams LR CITI_11236361_120817.pdf, Category: Other (to reflect anything not captured above);</li> <li>• Child Assent-Tracked, Category: Consent Form;</li> <li>• ADA Call Center Information Session Script FPNG, Category: Recruitment Materials;</li> <li>• Adult Consent FPNG-Tracked, Category: Consent Form;</li> <li>• Response to Comments from IRB, Category: Other (to reflect anything not captured above);</li> <li>• Focus Group Guide, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);</li> </ul>
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	<ul style="list-style-type: none"><li>• ADA Call Center Information Session Script FPNG+, Category: Recruitment Materials;</li><li>• Adult Consent FPNG+-Tracked, Category: Consent Form;</li><li>• FPNG+ Grant Proposal, Category: Sponsor Attachment;</li><li>• Adult Consent FPNG-Clean, Category: Consent Form;</li><li>• Child Assent-Clean, Category: Consent Form;</li><li>• Adult Consent Control-Tracked, Category: Consent Form;</li><li>• FPNG+Protocol-Version1-092117-Tracked, Category: IRB Protocol;</li><li>• Results Letter - Youth, Category: Participant materials (specific directions for them);</li></ul>
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The IRB approved the protocol from 9/15/2017 to 9/14/2018 inclusive. Before 9/14/2018, you are to submit a completed Continuing Review application and required attachments to request continuing approval or closure.

If continuing review approval is not granted before the expiration date of 9/14/2018 approval of this protocol expires on that date. When consent is appropriate, you must use final, watermarked versions available under the "Documents" tab in ERA-IRB

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Patricia Dustman  
Mary Harthun  
Stephanie Ayers  
Anaid Gonzalez  
Lela Williams  
Leopoldo Hartmann Manrique  
Irma Vega de Luna  
Patricia Dustman  
Flavio Marsiglia  
Gabriel Shaibi  
Meredith Bruening

APPENDIX B  
PARENT CONSENT FORM

**Multi-level effects of a parenting intervention for enhancing Latino youth health behaviors**

Dear Parent:

We are from the School of Nutrition and Health Promotion and the School of Social Work at Arizona State University. We are studying 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> graders' life experiences such as their diet habits and what happens when they encounter alcohol, tobacco, and other drugs, including personal drug use and their response at times when they get into situations that are risky. Parents who participate in the American Dream Academy workshops throughout the Valley are helping us. We are requesting your participation in workshops called ***Families Preparing the New Generation Plus***. During the workshops, you will learn how to reinforce anti-drug norms that are culturally appropriate, how to help strengthen your children, and how to communicate with your child about sensitive topics such as drug use/abuse and other risky behaviors. You will also learn about strategies to improve the quality of your child's diet. The program is specifically designed for parents of 6<sup>th</sup> - 8<sup>th</sup> graders, but all parents are invited and welcome to attend.

Three times throughout the academic year, you will be asked to fill out confidential surveys to help us. Each survey takes about 60 minutes. You will be asked about your family practices, family communication, and relationship with your child. All project surveys are voluntary, and there is no impact on your student's schoolwork or academic records. We will only be collecting contact information for tracking and follow-up purposes, or to clarify your diet-related answers if we have questions. Although the contact information form will be part of the survey, once you have taken the survey and it has been uploaded to the main database, we will save your contact information into a separate database from all of the survey answers so that all that is left on the survey is just a unique ID number. People who agree to participate in the surveys will have this unique identification code that links them with their children but not to anyone else. That code will be used throughout the study. Because an identification code is used, your name will not be included on any survey or in any reports. You will receive \$10 for the first survey, \$15 for the second survey, and \$20 for the last survey, to thank you for your time (these may be in cash, physical gift card, or electronic gift card). Parents who attend at least 8 ADA sessions will be eligible to participate in a \$25 gift card raffle. There will be two winners in the AM group, and two in the PM group. Please remember that if you choose not to participate in the research study, you can still attend all of the 2 hour long workshops.

A small number of participants will be randomly selected (by chance) to participate in additional optional data collection in their home every time they complete a survey. If you are selected to participate, a study staff member will visit your home to measure your height, weight, and blood pressure, and to collect a small blood sample from your finger (finger prick to get three to four drops of blood) to measure indicators of diabetes and heart disease risk (HbA1c and cholesterol). The study staff will also ask permission to inventory the foods you keep in your kitchen. This visit is optional and voluntary and will take about 90 minutes. You do not have to agree to this additional visit to be part of the larger study or to participate in the American Dream Academy workshop. If you choose to participate in these three additional visits, you will receive \$20 (may be paid in cash, physical gift card, or electronic gift card) for each visit for a possible total of \$60 for all visits together. If desired, we will share blood pressure and finger prick results with you during this visit. If we find values that may indicate high blood pressure or elevated risk for diabetes or heart disease, we will give you the values and recommend that you discuss those with you doctor. We also ask your permission to complete two phone calls where we will ask you about the foods you ate the previous day.

By filling out the consent form below, you are telling us that you wish to participate in these parent workshop surveys and whether you would agree to participate in the additional data collection in your home. If you choose not to participate, or if you want to stop at any time, there is no penalty—it won't affect you or your child negatively in any way. Your choice will not affect your student's academic records or schoolwork. If you would like to participate, please fill in the spaces below and return the signed form to your facilitator at this meeting.

If you have any questions at any time, please call us at 602-496-0700, and we will be happy to answer them. For more information about us, please visit our website at <http://sirc.asu.edu>. If you have any questions regarding your rights as a research participant, or if you feel that you or your family's personal security has been placed at risk, please contact the Chair of the Human Subjects Institutional Review Board, through the ASU Research Compliance Office, at (480) 965-6788.

***Thank you for your consideration!***

Sincerely,



Sonia Vega-López, Ph.D., Principal Investigator  
Downtown Phoenix Campus, ASU, Phoenix, AZ 85004

**PLEASE READ THIS:**

**Project surveys**

I agree to participate in the three project surveys but understand that I may choose not to participate at any time. I understand that by filling in the spaces below, the information will be used by project staff to keep research project contact information.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Additional data collection at home and by phone**

Please check one of the following options below regarding additional data collection in your home and by phone:

I DO agree to participate in the collection of additional data in my home to measure my height, weight, and blood pressure, to collect a finger prick blood sample, to inventory the foods I keep in my kitchen, and to complete two phone calls about the foods I eat. I understand that I may choose not to participate at any time.

I DO NOT agree to participate in the collection of additional data.

Signature: \_\_\_\_\_





APPENDIX C  
PARENT SURVEY

**1. I am a:**

1. Male
2. Female

**2. What is your date of birth?**

\_\_\_\_ / \_\_\_\_ / \_\_\_\_  
(month) (day) (year)

**6. How many people are living in your home today? \_\_\_\_\_**

**7. What is your best estimate of your households' total annual income?**

- |                        |                        |
|------------------------|------------------------|
| 1. Less than \$10,000  | 5. \$25,000 - \$29,999 |
| 2. \$10,000 - \$14,999 | 6. \$30,000 - \$49,999 |
| 3. \$15,000 - \$19,999 | 7. \$50,000 - \$74,999 |
| 4. \$20,000 - \$24,999 | 8. \$75,000 or more    |

**8. How long have you lived in the United States?**

- |                     |                       |
|---------------------|-----------------------|
| 1. Less than 1 year | 4. More than 10 years |
| 2. 1 – 5 years      | 5. All of my life     |
| 3. 6 – 10 years     |                       |

## YOUR CULTURAL EXPERIENCES

The next set of questions asks you about your family and cultural background. Some of these questions use the term "Anglos." You might more commonly hear the term "Whites" instead of "Anglos," both mean the same thing. Think about the past year, as you answer these questions.

	Not at all	Very little or not very often	Moderately	Much or very often	Extremely often or almost always
<b>77-77.</b> I speak Spanish.	1	2	3	4	5
<b>78-78.</b> I speak English.	1	2	3	4	5
<b>79-79.</b> I enjoy speaking Spanish	1	2	3	4	5
<b>80-80.</b> I associate with Anglos.	1	2	3	4	5
<b>81-81.</b> I enjoy watching TV in Spanish.	1	2	3	4	5

82.52. I enjoy watching movies in English.	1	2	3	4	5
83.53. I enjoy watching movies in Spanish.	1	2	3	4	5
84.54. I enjoy reading (e.g., books) in Spanish.	1	2	3	4	5
85.55. I write (e.g. letters) in English.	1	2	3	4	5
86.56. I think in English.	1	2	3	4	5
87.57. I think in Spanish.	1	2	3	4	5
88.58. My friends are of Anglo origin.	1	2	3	4	5

14

110.8

Think about a typical family dinner at your home...

- We never eat family dinners (If true, check the box to the left and skip to Questions about Your Diet)
- We eat together as a family.

		Never or Rarely	Sometimes	Usually	Always
a.	Is a green salad served?	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
b.	Are vegetables other than potatoes served?	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
c.	Is 100% fruit juice served?	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
d.	Is fruit (not including juice) served?	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
f.	Are sugar-sweetened beverages (soda pop, <u>Kool-aid</u> , etc.) served?	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>

APPENDIX D  
THREE-ARM GROUP DIAGRAM

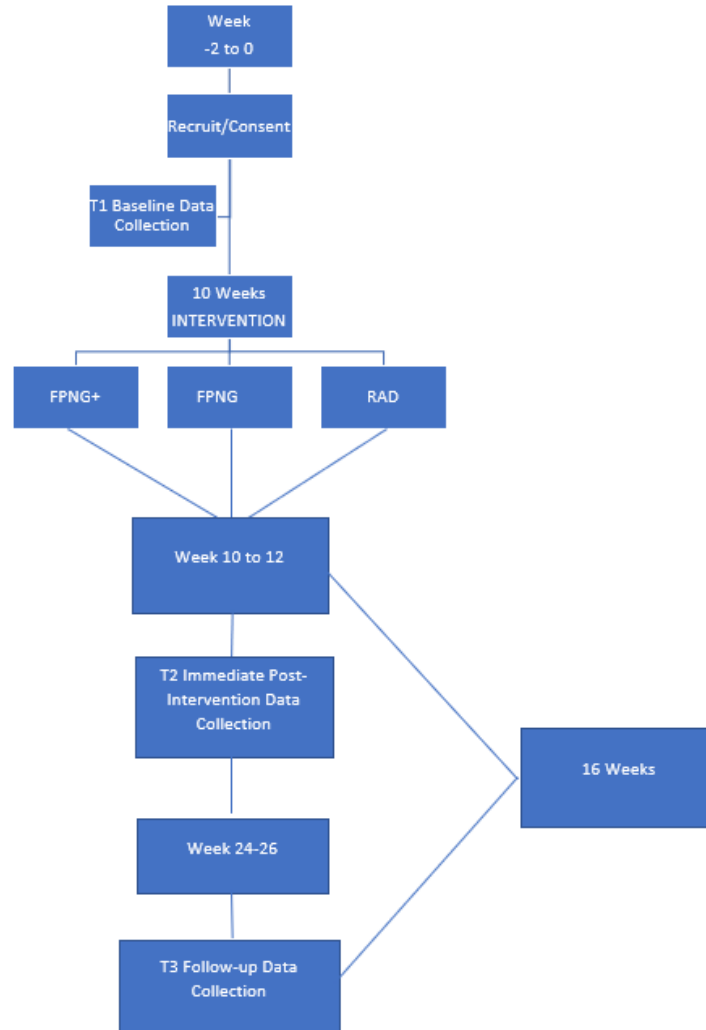


Diagram: Three-arm group randomized controlled trial comparing FPNG Plus (substance use prevention and healthy nutrition), FPNG (substance use prevention only), and RAD (the Realizing the American Dream) comparison condition (focusing on academic success) on adolescent substance use and nutrition outcomes<sup>88</sup>. Diagram adapted from, Vega-López S, Marsiglia FF, Ayers S, et al. Methods and rationale to assess the efficacy of a parenting intervention targeting diet improvement and substance use prevention among Latinx adolescents. *Contemporary Clinical Trials*. 2020;89:105914. doi:10.1016/j.cct.2019.105914.