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EXAMINING CULTURAL INFLUENCES ON DIETARY BEHAVIORS AMONG  
MEXICAN AMERICANS WITH LOW ACCULTURATION

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THESIS

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A thesis submitted in partial fulfillment of the  
requirements for the degree of Master of Science in Nutrition and Food Systems in the  
College of Agriculture, Food, and Environment  
at the University of Kentucky

By

Austyn Erickson

Lexington, Kentucky

Director: Dr. Julie Plasencia, Professor of Dietetics and Human Nutrition

Lexington, Kentucky

2020

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## ABSTRACT OF THESIS

### EXAMINING CULTURAL INFLUENCES ON DIETARY BEHAVIORS AMONG MEXICAN AMERICANS WITH LOW ACCULTURATION

Mexican Americans represent approximately 63 percent of the total Hispanic population in the US and are disproportionately affected by health disparities related to poor nutrition status. With this community among the fastest growing populations in the US, it is critical to address the health disparities and the relationship between culture and diet to provide evidence-based nutrition interventions that are culturally sensitive to specific communities. The purpose of this cross-sectional exploratory study is to examine the relationship between cultural values and dietary behaviors among a low-income, urban, clinical sample of Mexican Americans using the Mexican American Cultural Values Scale, dietary assessment, anthropometric data, and medical records. The study findings showed a significant positive association between religion cultural values and nopal use for health reasons, as well as a significant positive association between mainstream cultural values and vegetable use for health reasons. Implications for future research include integration of these health beliefs into nutrition interventions and further examination of how health beliefs moderate or mediate the relationship between cultural values and dietary behaviors.

KEYWORDS: [Cultural influences, nutrition, Mexican American, Hispanic/Latino, acculturation, health beliefs]

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04/07/2020  
Date

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AMONG MEXICAN AMERICANS WITH LOW ACCULTURATION

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## **Chapter 1: Introduction**

### **1.1 Background**

Dietary behaviors are shaped by cultural values, beliefs, and traditions, which are important to understand in the context of public health interventions for ethnically diverse communities. Hispanics are disproportionately affected by health disparities related to poor nutrition and weight status.<sup>1-3</sup> Specifically, diet-related chronic diseases are more prevalent among Hispanics compared with other ethnic populations in the US.<sup>4</sup> Obesity and poor nutrition are risk factors in cardiovascular disease (CVD), cancer, and type 2 diabetes mellitus (T2DM).<sup>4-6</sup> Lack of access to health services, sociocultural elements, and effects of acculturation propagate these conditions.<sup>7-10</sup> Hispanics are a heterogeneous population, comprised of subgroups of diverse backgrounds, countries of origin, and dietary behaviors. Mexican Americans represent 63 percent of the total Hispanic population in the US,<sup>11</sup> and are projected to make up nearly 29 percent of the nation's population by 2060.<sup>12</sup>

Public health interventions, medical nutrition therapy, and nutrition education are important to minimize the burden of poor diet on health. In ethnically diverse communities, public health interventions are most effective when resources and approaches are culturally sensitive and incorporate cultural values and beliefs.<sup>13-16</sup> In order to deliver culturally sensitive programming, educators must first know the diversity of culture within a given community and understand how it relates to health behaviors.<sup>14</sup> A unique approach incorporating cultural values and beliefs, specific to Mexican Americans, is needed. Cultural influences perceived as important by Mexican Americans can be described in five categories: family, emotions, beliefs about food, general health

beliefs, and traditional values.<sup>17</sup> How these cultural influences relate to individual dietary behaviors and how these affect health outcomes are yet to be determined. The conceptual framework, Resnicow's Model for Cultural Sensitivity in Public Health frames cultural concepts investigated in the current study.<sup>13</sup> This model identifies surface structure cultural influences, which tend to be observable aspects, such as language preference, information delivery channels, settings, recruitment, and cultural preferences of delivery agent.<sup>13</sup> Of less focus are deep structure cultural influences, which include social support, family involvement, and cultural beliefs on health and food.<sup>13</sup> In most public health interventions, cultural influences are often assumed rather than assessed.

There are several gaps in the research related to this topic. While there is abundant research on outcomes related to culturally sensitive interventions,<sup>18</sup> these studies do not address specific characteristics of culturally adapted nutrition interventions. Further, there is no validated instrument to assess Mexican American cultural influences on diet. There is a scale assessing cultural values among Mexican Americans adolescents and adults, the Mexican American Cultural Values Scale (MACVS) which will be used in this study.<sup>19</sup> The purpose of this cross-sectional exploratory study is to examine the relationship between cultural values and dietary behaviors among Mexican Americans.

## **1.2 Research Questions**

### **Research Question 1:**

How reliable is the Mexican American Cultural Values Scale (MACVS) with a low-income, clinical sample of Mexican American adults in Kentucky?

**Hypothesis:**

The MACVS scale will have an acceptable reliability for use with a low-income, clinical sample of Mexican American adults in Kentucky, Cronbach's alpha of  $>.80$ .

**Research Question 2:**

What is the relationship between cultural values measures from the Mexican American Cultural Values Scale (MACVS) to dietary patterns among a low-income, clinical sample of Mexican American adults in Kentucky?

**Hypothesis:**

We hypothesize that the MACVS will predict dietary patterns such as fat and fiber intake among a low-income, clinical sample of Mexican Americans adults in Kentucky.

**1.3 Significance**

The significance of this research study is that findings will determine the feasibility of using a validated cultural values measure in predicting dietary behaviors. This project has a role in the long-term goal of the development of a reliable measure for culturally influenced dietary behaviors that can be further examined in future dietary interventions. These measures may discern which aspects of culture are most important in the development of effective nutrition interventions to decrease health disparities, improve dietary behaviors, and increase quality of life for Mexican Americans.

## **Chapter 2: Review of Literature**

The subsequent sections of this literature review examine the evidence and rationale for this study. The first section introduces the health disparities of Mexican Americans, specifically the prevalence of diet-related chronic diseases, such as heart disease, cancer, and T2DM. The next section discusses the dietary patterns of Mexican Americans, as well as health beliefs and cultural values unique to the community. Finally, the third section reviews the conceptual model, which evaluates cultural influences related to individual behaviors and how these affect health outcomes.

### **2.1 Mexican American Population in the United States**

According to the United States Census Bureau Population Estimates report from July 1, 2019 Hispanics and Latinos account for 18.3 percent of the nation's total population.<sup>20</sup> It is projected that Hispanics will comprise nearly 29 percent of the nation's population by 2060.<sup>12</sup> The Hispanic population is categorized by many heterogeneous subgroups, each with defining characteristics, such as heritage, country of origin, traditions, and dietary habits. The largest subgroup, Mexican Americans, represents approximately 63 percent of the total Hispanic population in the US.<sup>11</sup> As of 2018, Mexican Americans make up approximately 11 percent of the US population. Hispanics are often categorized as a singular group, which can contribute to false assumptions that they are a homogenous group with regards to culture and diet. Healthcare providers must understand the diversity of culture among subgroups within a given population to provide effective intervention approaches for health behavior change.

## **2.2 Acculturation**

Though broadly defined, acculturation refers to a multidimensional process outlining an individual's adoption of the customs and characteristics of a dominant culture.<sup>21</sup> Acculturation measures aim to “capture the psychological, behavioral, and attitudinal changes that occur when individuals and groups from different cultures come into continuous contact with each other”.<sup>22</sup> Many studies have reported a relationship between aspects of acculturation and health among Mexican Americans.<sup>23-26</sup> Acculturation measures are often used in the prediction of health behaviors and adaptation of culturally appropriate health interventions; however, there are inconsistencies among the markers used for these measures, as well as limitations in use of these instruments, given that they were not developed to predict health or nutrition-related behaviors.

The Mexican American population within the US has a large variation in acculturation level, or adoption of mainstream cultural norms and behaviors, depending on length of time in the US, region of birth, and generation level within family.<sup>24,26</sup>

## **2.3 Prevalence of Diet-Related Diseases**

Recent data shows Mexican Americans are disproportionately encumbered by diet-related diseases, including CVD, T2DM, obesity, and cancer, compared to the total US population.<sup>27,28</sup> A public health focus for Hispanics is cancer because of the high prevalence of risk factors within the population, as well as barriers to optimum health. Cancer is the leading cause of death among Hispanics in the continental US, followed by heart disease.<sup>6</sup> The American Cancer Society states the major modifiable risk factors for specific types of cancers are physical inactivity, being overweight/obese, and a diet high in red and processed meat.<sup>29</sup>

There is evidence of negative health outcomes for Mexican Americans with increased acculturation.<sup>24</sup> Higher body mass index and obesity rates have been observed in those who are more acculturated to the US within the Hispanic population.<sup>25</sup> In a randomly selected, population-based sample of Mexican Americans (n=1,768 participants), there was high prevalence of depression (30%), obesity (33%), and metabolic syndrome (45%).<sup>28</sup> From 2013-2016, the percent of Mexican American adult men with obesity was 44.4, while Mexican American adult women with obesity was 51.3 percent. Obesity is associated with comorbidities, such as CVD, T2DM, hypertension, specific cancers, and sleep apnea.<sup>30</sup> Overweight and obesity predispose to CVD complications, which is a leading cause of death for both the nation, as well as the Hispanic population.<sup>31</sup> In 2009-2010, 45 percent of Mexican American adults had at least one of three risk factors for heart disease: high blood pressure, high cholesterol, and/or smoking.<sup>32</sup>

In addition to heart disease, T2DM is also a concern for Mexican Americans. Specifically, one in seven Mexican American adults is diagnosed with T2DM.<sup>33</sup> Several factors associated with T2DM prevalence among Hispanics include age, ethnicity, years of residence in the US, education, and income.<sup>1</sup> The Hispanic Community Health Study/Study of Latinos (HCHS/SOL) found the prevalence of T2DM among Hispanics was 16.9 percent, compared to 10.2 percent for non-Hispanic whites.<sup>1</sup> Within subgroups, Mexican Americans had a high prevalence of 18.3 percent, while South Americans had a lower prevalence of 10.2 percent.<sup>1</sup> Additionally, it was noted from the study that there was a correlation between length of time lived in the US and the likelihood of developing T2DM.<sup>1</sup> This is a concern for Mexican immigrants as they go through the acculturation

process and adopt the attitudes, values, beliefs, and behaviors of a new culture.<sup>10</sup> There is evidence that suggests diet-related diseases are related to the process of acculturation, as well as adoption of specific health behaviors associated with longer residence in the US.

## **2.4 Dietary Patterns**

Mexican Americans have specific dietary behaviors based on food availability, traditional food beliefs and practices, and perceptions of foods. Herbs, such as garlic, chamomile, wormwood, and aloe vera, are commonly used as treatments for illness.<sup>34</sup> Traditional dietary patterns of Mexican Americans include high intake of fruits and vegetables, whole grains, and legumes<sup>35</sup>, incorporating corn-based dishes cooked with chilies, garlic, onions, herbs, beans, squash, fruits, rice, meats, and lard.<sup>36</sup> This traditional, high fiber diet is associated with positive health outcomes. However, the dietary patterns of Mexican Americans with increased duration of US residence show adoption of a Western diet, with higher consumption of processed foods, refined carbohydrates, and sugar.<sup>35</sup>

It is necessary to recognize differences in dietary habits among Hispanic subgroups because studies have demonstrated that proper nutrition has a significant impact in preventing chronic disease.<sup>37-39</sup> Previous studies have established the association between dietary factors and deaths from heart disease, stroke, and T2DM.<sup>37,39,40</sup> A study by Siega-Riz et al. examined food-group and nutrient-density intakes by Hispanic subgroups: Cuban, Dominican, Mexican, Puerto Rican, Central American, and South American.<sup>2</sup> The results showed subgroups' diets varied by total energy, macronutrients, micronutrients, and alcohol consumption.<sup>2</sup> The study found that Mexican Americans had increased intake of vitamin C, calcium, and fiber compared to



the other subgroups in the study.<sup>2</sup> Additionally, Mexican Americans had the highest intake of all grains, with more servings of grains from refined sources (4.4 servings) compared to whole grains (2.8 servings).<sup>2</sup> Variations within dietary intakes among Hispanics are influenced by cultural beliefs and values, socioeconomic status, age at immigration, and geographic location.<sup>10,25</sup> More ethnic-specific research is needed to support the idea that variance in dietary patterns may explain diet-related chronic diseases among subgroups.

As acculturation levels increase, there is an inverse correlation with physical activity<sup>41</sup> and dietary quality, notably a higher consumption of alcohol and decreased consumption of fiber.<sup>10,42</sup> A study found acculturation of Mexican Americans to mainstream culture increases consumption of foods high in saturated fats and sugar, as well as salty snacks, pizza, and French fries.<sup>42</sup> Similar studies have compared the diets of Mexican Americans in the US with different levels of acculturation, supporting an inverse relationship between acculturation status and diet quality.<sup>23,42</sup> A recent study on timing and duration of immigration among Mexican Americans found that migration during childhood is associated with a decrease in diet quality compared to those who arrived to the US as adults.<sup>42</sup> Additionally, the same study found that duration of US residence was not associated with worse diet quality, which contradicts previous research. Further research is needed to explore how timing of immigration and acculturation influence dietary patterns among Mexican Americans.

## **2.5 Mexican American Health Beliefs and Values**

Culture is a key factor in how people make food choices. Social scientists argue, “food, together with air and water, is the stuff of life, and it is the basic foundation of

culture and society.”<sup>43</sup> Geographical, social, psychological, religious, economical, and political factors have a role in development of a cultural diet.<sup>44</sup> Studies have identified cultural influences perceived as important by Mexican Americans, such as language, the role of family, religion, and alternative healing for healthcare treatment.<sup>3</sup> Additional cultural influences include health beliefs, such as traditional food beliefs and practices.<sup>3</sup> Mexican Americans may use alternative treatments by *curanderos*, or healers. Studies show that Hispanics have preferences for herbs, rituals, and home remedies in place or in addition to western medicine prescribed by healthcare providers.<sup>45</sup> Health beliefs can affect how an individual may seek care or practice self-care management, understanding which and how these health beliefs are associated with health outcomes will increase our understanding of the role of culture in health outcomes.

Several important cultural values held by Mexican Americans include *familismo*, religion, and traditional gender roles attitudes.<sup>7,19</sup> *Familismo* is the belief that family needs take priority over individual needs.<sup>46</sup> Often times, important decisions are consulted with the entire family and may override recommendations by a healthcare provider.<sup>47</sup> This may influence a patient’s adherence to behavior change recommendations. Within the family, there are specific gender roles called *marianismo* and *machismo*.<sup>48</sup> *Marianismo* is characterized as a traditional female role with child raising duties in the family.<sup>48</sup> A qualitative study on the cultural belief of *marianismo* found that female participants perceived their role in the family to be above their own self-care needs, which can lower the priority of addressing their own health needs.<sup>49</sup> The other traditional gender role, *machismo*, is described as the male role of authority and power,<sup>48</sup> which can reinforce the authority within the family.

There are other health beliefs among Mexican Americans that are thought to have an effect on disease onset or treatment. *Susto* is translated as “fright”, causing intense emotions after a traumatic event.<sup>50</sup> For example, *susto* is thought to cause the onset of T2DM.<sup>51</sup> Another health belief, *fatalismo*, is the belief that life events are beyond one’s control, which can be a potential barrier for early detection of disease and unwillingness to seek treatment.<sup>52</sup> It is unclear to what extent *fatalismo* deters Mexican Americans from seeking care and from whom. Alternative treatments and natural therapies are commonly used for health reasons.<sup>34,53</sup> One example of a particular food associated with the health belief of curing T2DM is the nopal cactus.<sup>53</sup> It is common among Mexican Americans to consume the pads of the cactus or in a juice form for a perceived health benefit.

Research examining the gender roles among Mexican Americans in relation to psychological well-being has been associated with higher levels of depression, anxiety and anger for men.<sup>54</sup> Mental health is important to address in this community because evidence shows a reciprocal link between depression and obesity.<sup>55</sup> There is a gap in research for understanding how Mexican American cultural beliefs (*familismo*, *fatalismo*, *susto*, *marianismo*, *machismo*) impact food choices.

## **2.6 Assessment of Cultural Values among Mexican Americans**

Examining how cultural values and beliefs are related to diet is the first step in understanding the relationship between diet and cultural values and beliefs so that healthcare providers can make predictions about how these concepts may influence health outcomes. Several tools exist that assess Hispanic cultural values and beliefs. One study adapted a diabetes-related health belief instrument for use with a sample of Mexican Americans diagnosed with T2DM.<sup>56</sup> The Hispanic Community Health Study

developed the HCHS/SOL Sociocultural Questionnaire with sections measuring fatalism, identity, religion, and perceived discrimination.<sup>1</sup> Another study used a measure of ecocultural domains (combination of ecological and cultural elements) to measure health outcomes of in a sample of 26 Hispanic and 29 non-Hispanic white veteran primary care patients with T2DM.<sup>57</sup> Finally, the scale used to assess cultural values in the current study is the Mexican American Cultural Values Scale (MACVS) validated with Mexican American adolescents and adults.<sup>19</sup> The MACVS was selected for this study because it included nine subscales related to family values, religion, and gender roles, among others. The other scales reviewed were not as broad on values assessed; therefore, the MACVS provided an opportunity to look at these values more broadly.

## **2.7 Gaps in Literature**

There is a gap of knowledge on how cultural values and beliefs influence dietary behaviors. Few studies have been identified specifically for the Mexican American community on this topic. In a review of the literature addressing culture and its influence on the diet of Mexican Americans, the limited number of articles required extrapolation from studies related to other Hispanic groups.<sup>58</sup> This knowledge is needed to individualize recommendations for medical nutritional therapy for Mexican Americans with diet-related chronic disease, such as T2DM, CVD, and cancer. There have been studies on cultural influences using psychometric analyses<sup>3,59</sup> as well as on acculturation of Mexican Americans.<sup>42,60</sup> However, there is not a validated instrument that combines the two concepts of cultural influences on diet and acculturation into one measurement. Also, there are inconsistent measures of acculturation used between studies.<sup>61-63</sup>

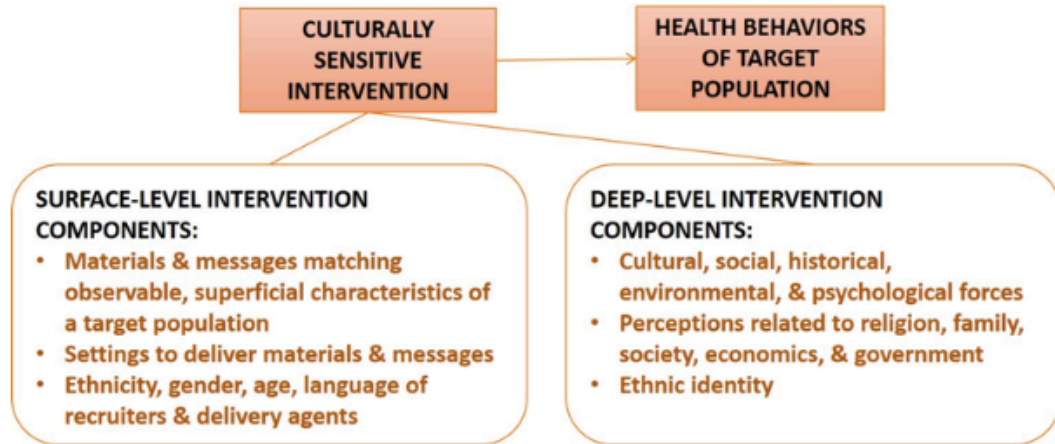
## 2.8 Conceptual Framework

### *Resnicow's Model for Cultural Sensitivity in Public Health*

Cultural sensitivity is defined as the extent to which cultural norms, beliefs, and values of a target population are incorporated into the design, implementation, and evaluation of a targeted health intervention.<sup>13</sup> The purpose of the study is to examine the relationship between cultural values and dietary behaviors among Mexican Americans. A reliable measure for culturally influenced dietary behaviors to use for improving cultural sensitivity in health interventions is needed. The conceptual framework for this study expands on Resnicow's model for cultural sensitivity in public health.<sup>13</sup>

Resnicow and colleagues established a cultural sensitivity model for adapting evidenced-based interventions to serve ethnically diverse communities. The framework was developed to portray the levels of cultural components which aim to change health behaviors of target populations. The first level is surface structure, which involves "observable, superficial characteristics of a target population".<sup>13</sup> Cultural influences that are categorized into surface structures include intervention channels, settings, delivery, and food preferences.<sup>13</sup> Conversely, deep structure influences are more subjective, requiring "understanding of cultural social, historical, environmental, and psychological forces that influence the target health behaviors in the target population" and are difficult to measure.<sup>13</sup> Cultural influences of deep structure include core cultural values, as well as perceptions of how religion, family, society, financial burdens, and government may affect behavior.<sup>13</sup> Public health interventions often incorporate surface level structures into culturally sensitive programs; however, deep level structures are often excluded due to the lack of measurements available to evaluate them.<sup>3</sup> Figure 2.1 shows the culturally

sensitive framework in public health incorporating both surface-level and deep-level intervention components, which influence health behaviors of the target population.



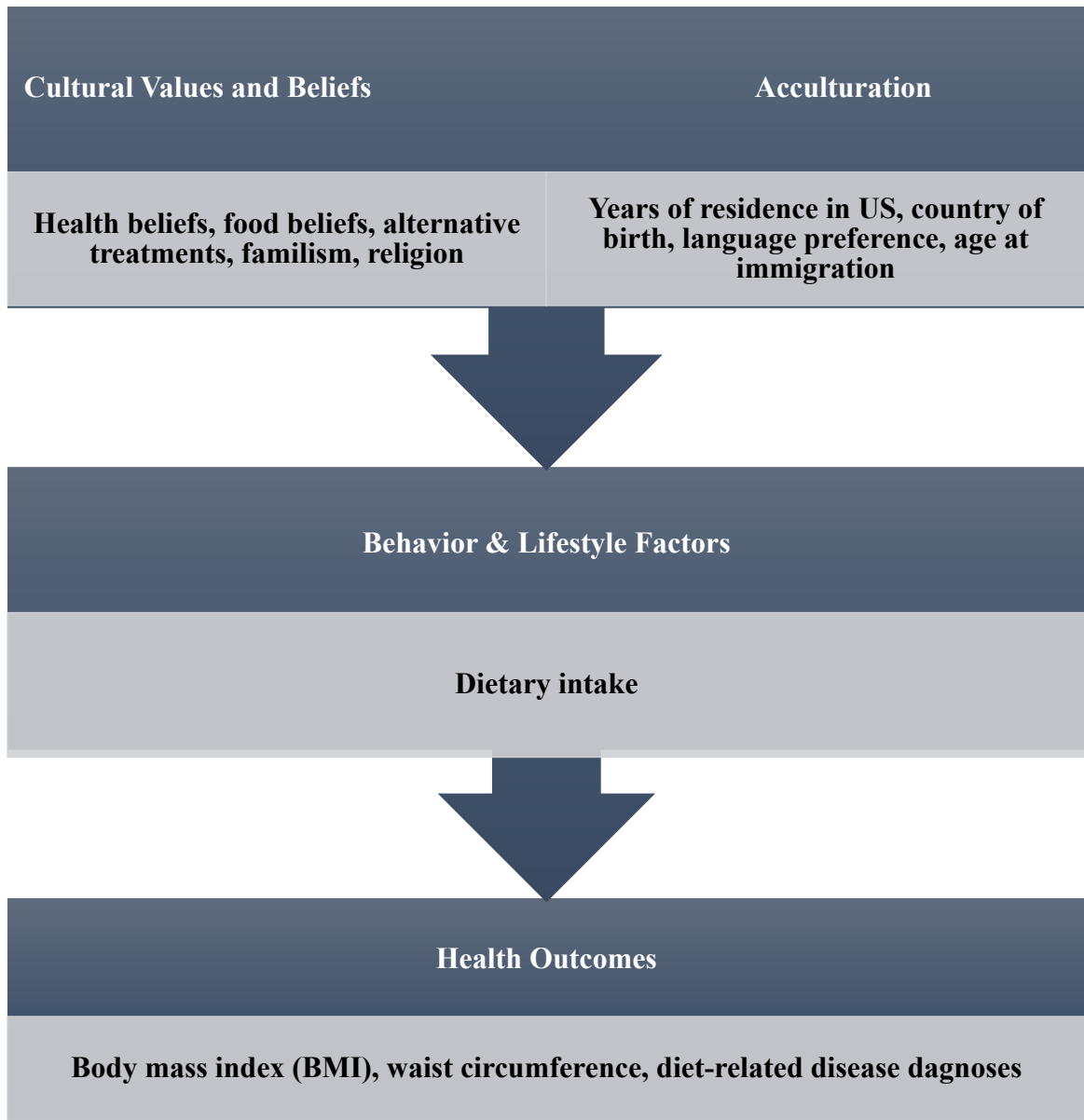
Adapted from the culturally sensitive framework in public health of Resnicow, Baranowski, Ahluwalia and Braithwaite 1999.

**Figure 2. 1 Representation of the framework for surface and deep level cultural elements from the Resnicow et al. cultural sensitivity framework in public health.<sup>13</sup>**

### *Conceptual Model for Thesis*

Using Resnicow’s model for cultural sensitivity, we have a better understanding of culture to adapt communication and delivery in medical nutritional therapy and health intervention programs targeting Mexican Americans. According to Resnicow’s Model, culturally adapted public health interventions may be better received and perceived barriers may be more easily overcome, as well as initiate positive behavior changes and improve health outcomes when incorporating deep-level components.<sup>13</sup> This framework was utilized because it contains constructs that may enhance understanding of cultural influences that affect dietary behaviors.

The focus for this study is diet; therefore, Figure 2.2 portrays the adapted model for the current study displaying how culture plays a role in dietary behaviors, which influence health outcomes. Although there are several deep and surface level components, for the purpose of this study, we focused and collected measures on acculturation for the surface level components, including years of residence in US, country of birth, language preference, age at immigration. For the deep-level components, we focused on cultural values and beliefs, collecting data relating to health beliefs, food beliefs, alternative treatments, familism, and religion. We assessed the dietary intake for the behavior and lifestyle component of the model. Finally, we measured health outcomes of Body Mass Index (BMI), waist circumference, and diet-related disease diagnoses.



**Figure 2. 2 Conceptual Model for Thesis: Adapted from Resnicow’s model for cultural sensitivity in public health<sup>23</sup>**



## **Chapter 3: Methods**

### **3.1 Research Design**

The University of Kentucky Institutional Review Board approved the study design prior to the start of the project (Appendix A). The study used a cross-sectional, exploratory design to provide insight into cultural influences on dietary behaviors of the Hispanic/Latino community in an urban location of Louisville, Kentucky.

### **3.2 Setting**

The research site, Family Health Centers, Inc. (FHC), is a not-for-profit community health center providing a variety of services, including primary care, behavioral health, dental, women's health, pediatrics, pharmacy. Individuals are able to use any single or combination of services. FHC clinics serve primarily low-income patients without regard to the ability to pay or insurance status, offering a sliding-fee scale. Additionally, there are language and refugee services, providing interpreters and healthcare to the ethnically diverse community of the Louisville Metro area. The Chief Administration Officer of FHC assisted the research team in identifying three of eight clinics in the network that serve a high proportion of Hispanic/Latino patients. The sites used for the study included the clinic locations at Portland, East Broadway, and Iroquois.

### **3.3 Participant Recruitment**

Prior to onsite data collection, study posters were placed in strategic locations at the clinic including waiting rooms, pharmacy, and elevators (Appendix B). Once onsite, the recruitment of participants were as follows: 1) Study flyers were placed at check-in and seating areas of the clinic, 2) Research team invited patients who were identified by the clinic staff as Hispanic to learn about the study after they checked in for their

appointments, 3) If the participant agreed, they were provided additional information and the opportunity to participate, 4) Researchers obtained informed consent for those willing to participate (Appendix C). Researchers were identifiable by wearing University of Kentucky shirts and name tags.

### **3.4 Sample**

A convenience sample of approximately 350 Hispanic/Latino participants in a clinical setting were recruited, 235 agreed to participate, and 214 completed the study. Inclusion criteria were participants aged 18 years or older, non-institutionalized, independently living, self-identifying as Hispanic/Latino or related ethnic subgroups, and self-identifying as a patient of FHC. Exclusion criteria were participants less than 18 years of age, institutionalized, unable to make their own decision, pregnant women, self-identification as non-Hispanic ethnic groups, or a non-patient of FHC. Potential participants reasons for declining to participate include not having enough time, not feeling well, not a patient of FHC, not interested, or were pregnant.

To accomplish the aims for the current study, we focused on Mexican Americans in the sample. From the 214 participants, 89 (41.6%) identified as Mexican American. Of these, we had complete records for 86 participants. A complete record included a signed consent form, survey, anthropometric assessment, and 24-hour dietary recall assessment.

### **3.5 Procedures**

All study information, instruments, and communications were available in both Spanish and English languages, depending on the preference of the participant. Between May 29, 2019 and August 19, 2019, completed data records were collected from 214 participants. After obtaining informed consent, participants first completed a 66-item

survey (Appendix D) administered through an interview format unless the participant asked to complete on their own. Next, the 24-hour dietary recall assessment was completed in an interview format using food models for physical representation of serving sizes (Appendix E). Thirdly, anthropometric data of height, weight, and waist circumference were collected (Appendix F). After completion of participation in the study, participants received a gift card incentive valued at \$35. The data collection process varied in time length from 25 to 90 minutes due to several reasons. Many participants were at the clinic with young children who they were caring for while completing the data collection. Also, some participants chose to begin the study prior to their appointment, and then returned to complete the remaining sections after their appointment. Following completion of data collection of all participants, the participant medical data were extracted using electronic medical records (EMR), complying with HIPAA policies and Institutional Review Board protocol, with the assistance of the FHC director (Appendix G).

### **3.6 Measures**

#### ***Cultural Influences***

Perceptions of cultural values were collected using a 50-item validated instrument, the MACVS.<sup>5</sup> The MACVS was selected for this study due to having reliability and validity on cultural values with Mexican American adolescents and adults.<sup>68</sup> Although values specific to health and food beliefs were not part of the scale, using this scale was feasible, rather than developing an instrument.

Within the MACVS, there are nine values themes corresponding to specific scales. Six scales reflect values associated with Mexican and Mexican American culture

(i.e., Familism Support, Familism Obligations, Familism Referents, Respect, Religion, and Traditional Gender Roles), while three scales reflect contemporary mainstream American values (i.e., Material Success, Independence and Self-Reliance, and Competition and Personal Achievement.)<sup>19</sup> The Familism Support scale had six items, the Familism Obligation Scale had five items, the Familism Referents had five items, the Respect scale had eight items, the Religion scale had seven items, the Traditional Gender Roles had five items, the Material Success scale had five items, the Independence and Self-Reliance had five items, and the Competition and Personal Achievement had four items. Each item was rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

High scores indicated stronger cultural values. Subscales were calculated using averages of item responses. Further, the subscale of Contemporary Mainstream values was calculated using an average of the three subscale scores from Material Success, Independence & Self-Reliance, and Competition and Personal Achievement. These subscales include statements reflecting the prioritization of earning money over other activities, gaining self-sufficiency, and separating oneself from others by competition and personal achievement, respectively. An example of an item within the Material Success subscale states, “Children should be taught that is it important to have a lot of money”.<sup>19</sup>

The subscale of Mexican American values was calculated using an average of the six subscale scores from Familism Support, Familism Obligations, Familism Referent, Respect, Religion, and Traditional Gender Roles. These subscales reflect the desirability to main close relationships with family, importance of care-giving, reliance on interpersonal reflection to define the self, importance for children to defer to parents on

decisions, spiritual beliefs and faith in a higher power, and differential expectations for males and females within the household, respectively. An example of an item within the Religion subscale states, “One’s belief in God gives inner strength and meaning to life”.<sup>19</sup>

### ***Demographics***

In addition to the MACVS, a 16-item demographic and general health and food preferences survey were collected. Demographic questions included age, number of years in the US, number of years in Kentucky, years of education, where education was completed, country of ethnic origin, household members, marital status, employment status, and income status. Additional questions were asked about traditional and American food perceptions, alternative health treatments, and supplement use.<sup>3,17</sup>

Education systems were compared between the US and Mexico to determine the level of education completed, which was converted to the US system for consistency. Participants were categorized into groups of less than high school education, high school education or equivalent, or greater than high school education. As the research site provided sliding-fee scales and served a low-income community, participants were presumably low-income status. A question was included in the demographic section to assess the perception of financial status. Supplemental Nutrition Assistance Program (SNAP) eligibility was not assessed because the Kentucky Nutrition Education Program and Cooperative Extension provide materials and classes at FHC related to nutrition and health education, so it was assumed that a majority of participants were SNAP eligible.

### ***Acculturation***

Acculturation status was assessed using a method based on proxy markers of nativity, years lived in the US, and language preference.<sup>61</sup> First, a score of 0-3 was

assigned for the nativity combined with years in US (3 = US born, 2 = foreign born and lived in the US  $\geq$  20 years, 1 = foreign born and lived in the US 10-19 years, and 0 = foreign born and lived in the US < 10 years). Then, a score of 0-2 was assigned to language preference based on the language of preference the participant used to participant in the study (2 = English, 1 = English and Spanish, 0 = Spanish). The two scores were then summed for the acculturation score, ranging from zero (least acculturated) to five (most acculturated).<sup>65</sup> Participants were categorized into two groups based on the distribution of the summary acculturation score: scores of 0-1 and 2-5.

### ***Diet***

Dietary data was collected using 24-hour dietary recall assessment using United States Department of Agriculture five-step multiple-pass method.<sup>6,65</sup> Data collection researchers were trained by a research dietitian. The 24-hour dietary recalls were conducted as an interview with participants, using food models for assistance in estimating portion sizes. Additional questions were asked at this time, including how many times per week meals are eaten with family, how many times per week breakfast is consumed, whether the participant had problems digesting milk, and whether the recall was perceived as a normal day. The 24-hour recall assessment was only collected once at the time of completion of the study for each participant due to logistics and limited resources available for the study.<sup>66</sup>

### ***Anthropometrics***

Anthropometric assessments of height, weight and waist circumference were also collected using Seca 213 portable stadiometer, a Seca 874 DR weight scale, and Gulick II tape measure. Researchers were trained using National Health and Nutrition Examination

Survey methods. All measurements were measured twice and then averaged. If there were differences between the first two measurements, a third measure was taken to confirm reliability, which was also included in the average. These assessments were either performed in a private room or behind privacy screens, depending on the clinic site and available space. BMI was calculated using weight and height using  $\text{weight(kg)}/[\text{height(m)}]^2$ . The last component of data collection involved extraction of the most recent diet-related health indicators from medical records within the last 12 months, such as glycated hemoglobin, cholesterol levels, blood pressure, and any diet-related medical diagnoses including, T2DM, CVD, overweight or obese weight classification, renal disease, cancer, eye disease, neuropathy, and hypertension.

### **3.7 Analyses**

The 24-hour dietary recalls were entered into the 2017 Nutrition Data System for Research (NDSR) program, maintained by the University of Minnesota Nutrition Coordinating Center. The NDSR is a nutrition assessment analysis program for dietary analysis of macronutrients and micronutrients. Food groups were analyzed from the output of the NDSR Food Group Serving Count Systems, which included nine major food categories and 168 sub-categories. The Nutrition Coordinating Center reference serving sizes are based on the recommendations by the Dietary Guidelines for Americans and the Food and Drug Administration.<sup>67</sup> Macronutrients and total energy intake between usual and unusual reported intake were compared using one-way analysis of variance (ANOVA). The analysis showed no differences between those reporting usual intake and those reporting unusual intake for total energy intake, dietary fiber, fat, folate, carbohydrates, saturated fatty acids, total sugars, calories from carbohydrate, calories

from fat, and calories from protein; therefore, all participants' recalls (n=86) were included in the analyses.

To examine data for sociodemographic variables, anthropometrics, medical diagnoses, and MACVS scores, we conducted the following analyses. Descriptive statistics were analyzed to describe the study sample characteristics, presented as means or proportions. We used chi-square tests to examine differences among categorical variables (gender, language preference, educational status, employment status, perceived financial status) and ANOVA for testing differences between groups for continuous variables (age, years lived in the US, and years lived in Kentucky). Reliability testing was completed for the MACVS with Cronbach's alpha. Next, we used a correlation matrix to examine the cultural values assessed in the MACVS with the dietary patterns, specifically examining macronutrients (carbohydrate, fat, and protein) and other nutrients of interest (fiber, saturated fats, and whole grains). Finally, to further examine the second research question, we explored linear regression models to investigate whether these cultural values influence dietary behaviors.

To conduct the regression analyses, the percentages of Dietary Guidelines for Americans (DGA) met for each participant were calculated for each food group: vegetables, fruits, dairy, protein, whole grains, and refined grains. The recommendations of the DGA were calculated based on age and gender. Each participant was assigned their corresponding calorie intake and food group equivalents recommendations based on age, gender, and activity level. A sedentary activity level was used for a conservative estimate, as we did not collect data on physical activity levels. From the EMR records, participation in physical activity was only recorded for two participants. The remaining



participants either did not answer the question in their intake forms, or the data was presumably not entered. We were not able to perform an analysis with EMR diet-related diagnoses due to incomplete records.

An additional analysis reviewed the relationship between alternative treatments associated with health beliefs and the MACVS. An odds ratio was used to quantify the strength of association between the alternative treatments and the individual MACVS subscales. From the survey, there was an open-ended question asking, “What alternative treatments do you use for health reasons, if any?”. These questions generated responses including teas, nopal, aloe vera, herbs, smoothies, and vegetables.

## **Chapter 4: Results**

### **4.1 Sociodemographic Characteristics**

The study included a total of 86 Mexican American participants after removing three participants that had missing data (either date of birth or an incomplete survey). Sample characteristics are presented by acculturation groups in Table 4.1. The mean age among the total participants was 38 years, ranging from 18 to 67 years. The majority of participants were female, accounting for 77 percent of the sample. Participants were presumably low-income since the health clinic served a low-income community. Also, the majority had a perceived financial status of having either less than enough money or very less money (54.6%), were married or in a domestic partnership (75.6%) and had less than a high school education (61.6%).

The overall acculturation of the sample was low with a mean of 1.57 out of five, and a median of one. Fifty-four percent had low acculturation (score of 0-1), while 40 percent had medium acculturation (score of 2-5). There were four participants with a

score of four, two participants with a score of five, and 10 participants with a score of three, therefore scores of 2-5 were collapsed. Very few participants were considered to have high acculturation. The low acculturation group had a mean age at immigration of 27.83 years and the medium acculturation group had a mean age at immigration of 16.57 years. Of the 19 male participants, a majority were categorized into the medium acculturation group (68.4%). In contrast, the majority of female participants had low acculturation (59.7%). Significant differences were seen among acculturation groups for employment status as a homemaker, years lived in Kentucky, and years lived in the US. More participants in the low acculturation group reported homemaker as their employment status compared to the medium acculturation group. It was anticipated that the medium acculturation group would have increased years of living in both US and Kentucky compared to the low acculturation group because the years lived in the US was a variable in determining the acculturation score.

**Table 4. 1 Sociodemographic characteristics among Mexican Americans by acculturation groups**

Variable and category	All (n=86)		Low Acculturation (n= 46)		Medium Acculturation (n= 40)	
	mean or n	SD or %	mean or n	SD or %	mean or n	SD or %
Gender n(%)						
Female	67	77.9	40	87.0	27	67.5
Language preference n(%)						
English	9	10.5	0	0.0	9	22.5
Spanish	60	69.8	44	95.7	16	40.0
Both English & Spanish	17	19.8	2	4.3	15	37.5
Education Status n(%)						
Less than high school	53.0	61.6	30	65.2	23	57.5
High school	22.0	25.6	14	30.4	8	20.0
Greater than high school	11.0	12.8	2	4.3	9	22.5
Marital Status n(%)						
Single	10	75.6	7	15.2	3	7.5
Married/Living with partner	65	11.6	33	71.7	32	80.0
Separated/divorced/widowed	11	12.8	6	13.0	5	12.5
Employment n(%)						
Employed full-time	26	30.2	9	19.6	17	42.5
Employed part-time	22	25.6	12	26.1	10	25.0
Homemaker <sup>a</sup>	25	29.1	20	43.5	5	12.5
Disabled/Unable to work/Retired/Student/Unemployed	13	15.1	5	10.9	8	20.0
Perceived Financial Status n(%)						
Very less money	21	24.4	13	28.3	8	20.0
Less than enough money	26	30.2	17	37.0	9	22.5
Enough money	37	43.0	15	32.6	22	55.0
More than enough money	2	2.3	1	2.2	1	2.5
Age (years) mean(SD)	38.0	11.1				
Years lived in US mean(SD) <sup>b</sup>	16.2	8.1	11.2	6.0	21.96	6.1
Years lived in KY mean(SD) <sup>c</sup>	11.1	7.2	8.2	5.8	14.54	7.3
Age at immigration (years) mean(SD)	22.9	10.7	27.8	8.9	16.57	9.5

\*Data are expressed as means ± SD unless indicated

<sup>a</sup>Chi-square test (p-value<0.05)

<sup>b</sup>One-way ANOVA (p<0.05)

<sup>c</sup>One-way ANOVA (p<0.05)

## 4.2 Anthropometric Characteristics

Anthropometric information is displayed in Table 4.2. The mean BMI for all participants was 31.0 and 51 percent had a BMI category of obese ( $>30.0 \text{ kg/m}^2$ ). The medium acculturation group had a mean BMI of 31.62 (SD  $\pm 7.0$ ), while the low acculturation group had a mean BMI of 30.5 (SD  $\pm 4.8$ ). Comparing waist circumference by gender, the majority of females had a high waist circumference of greater than 35 inches (77.3%), whereas the majority of males had a normal waist circumference of equal to or greater than 40 inches (68.4%). There were no significant differences between acculturation groups for anthropometric characteristics.

**Table 4. 2 Anthropometric characteristics among Mexican Americans by acculturation groups**

Variable and category	All (n=86)		Low Acculturation (n= 46)		Medium Acculturation (n= 40)	
	mean or n	SD or %	mean or n	SD or %	mean or n	SD or %
Body Mass Index (BMI) (kg/m <sup>2</sup> ) mean(SD)	31.0	5.9	30.5	4.8	31.62	7.0
BMI Classification n(%)						
Normal (18.5-24.9 kg/m <sup>2</sup> )	11	12.8	4	8.7	7	17.5
Overweight (25-29.9 kg/m <sup>2</sup> )	31	36.1	21	45.7	10	25.0
Obese ( $>30 \text{ kg/m}^2$ )	44	51.2	21	45.7	23	57.5
Waist Circumference Classification n(%) <sup>a</sup>						
Normal (female) (<35 inches)	15	17.6	11.0	23.9	4	10.0
High (female) (>35 inches)	51	60.0	28.0	60.9	23	57.5
Normal (male) (<40 inches)	13	15.3	5.0	10.9	8	20.0
High (male) (>40 inches)	6	7.1	1.0	2.2	5	12.5

<sup>a</sup>n=85

## 4.3 Clinical Status of Sample

Of the 86 participants used in the statistical analyses, a variable number of participants had diagnoses and lab values recorded in the EMR data, shown in Tables 4.3

and 4.4. Though it was a requirement to be a patient of the clinic in order to participate in the study for collection of EMR data, some patients of the clinic may have only used specific services of the clinic, which limited the data available. For example, a patient may have used FHC for dental services, but not for primary physician care; therefore, there would not be laboratory assessment results available. Additionally, only the most recent data from the previous 12 months was requested.

The EMR data provided physician diagnoses of eye disease, heart disease, hypertension, renal disease, neuropathy, cancer, overweight or obese, and T2DM. Fourteen participants had a diagnosis of T2DM, which was 16.7 percent of the sample. The mean hemoglobin A1c was seven percent, although it is unclear if any were taking hypoglycemic agents. One participant had a diagnosis of CVD, while two participants had a diagnosis of hypertension. Ten participants had a weight classification of overweight or obese. Though there was limited EMR data available, it appears from the lack of diet-related diagnoses that the majority of participants were in adequate health.

**Table 4. 3 Diet-Related Diagnoses from Electronic Medical Records among Mexican Americans (n=86)**

<b>Diagnosis</b>	<b>Number Diagnosed</b>	<b>Percent of sample</b>
Eye Disease	0	0.0%
Heart Disease	1	1.2%
Hypertension	2	2.4%
Renal Disease	0	0.0%
Neuropathy	0	0.0%
Cancer	0	0.0%
Overweight/Obese	10	11.9%
Type 2 Diabetes Mellitus	14	16.7%

**Table 4. 4 Laboratory Assessment Values from Electronic Medical Records among Mexican Americans (n=86)**

<b>Variable</b>	<b>Number of Participants with Recent Values</b>	<b>Mean</b>	<b>SD</b>
Hemoglobin A1c	28	7.0	2.6
LDL Cholesterol	37	103.6	30.1
HDL Cholesterol	40	53.1	35.7
Total Cholesterol	40	183.9	45.4
Triglycerides	40	173.6	141.7
Systolic Blood Pressure	76	113.5	13.8
Diastolic Blood Pressure	76	72.6	9.3

#### **4.4 Dietary Patterns and Recommendations**

Based on dietary intake data from the 24-hour dietary recall, participants consumed an average of 1544.6 kcal per day (SD  $\pm$  628.18) with an average macronutrient distribution of 48.8 percent carbohydrate, 32.2 percent fat, and 18.9 percent protein, Table 4.5. The mean macronutrient distributions were within recommended ranges according to the DGA and Dietary Reference Intakes (DRI). The mean dietary fiber intake for the sample was 17.3 grams (SD  $\pm$  10.2), less than the recommended amount of 25-38 grams. Added sugars were consumed an average of 41.0 g per day. Food group equivalents appeared to either meet or be close to reaching recommendations, with the exception of dairy. The dairy cup equivalents consumed among the total sample was 1.1 (SD  $\pm$  1.2), lower than the three cup equivalent recommendation.

**Table 4. 5 Mean energy, selected nutrients, & food group intakes among Mexican Americans by acculturation groups**

Variable and category <sup>a</sup>	All (n=86)		
	mean	SD	
<b>Total Energy (kcal)</b>	1544.6	628.2	
<b>Carbohydrates (% kcal)</b>	48.8	12.9	
<b>Fat (% kcal)</b>	32.2	9.4	
<b>Protein (% kcal)</b>	18.9	6.1	
<b>Added Sugars (by Total Sugars) (g)</b>	41.0	35.5	
<b>Saturated Fatty Acids (% kcal)</b>	10.5	3.5	
<b>Total Dietary Fiber (g)</b>	17.3	10.2	
<b>Total Dietary Folate Equivalents (mcg)</b>	334.1	212.4	
<b>Vitamin B12 (mcg)</b>	3.9	3.0	
<b>Vitamin B6 (mg)</b>	1.7	1.0	
<b>Dietary Guidelines for Americans Food Groups</b>			<b>Recommendations<sup>b</sup></b>
<b>Fruit (cup equivalents)</b>	1.7	0.2	2.0 – 3.5
<b>Vegetables (cup equivalents)</b>	2.6	0.3	1.5 – 2.0
<b>Dairy (cup equivalents)</b>	1.1	1.2	3.0
<b>Protein (ounce equivalents)</b>	5.3	0.5	5.0 – 6.5
<b>Whole Grains (ounce equivalents)</b>	3.0	3.2	3.0 – 4.5
<b>Refined Grains (ounce equivalents)</b>	2.9	2.3	2.0 – 4.5

<sup>a</sup>Data are expressed as means ± SD unless indicated otherwise

<sup>b</sup>DGA recommendations for food groups based on range of 1,600-2,600 calorie diet

#### **4.5 Cultural Values**

The scores from the MACVS are displayed in Table 4.6. The Mexican American values mean score was 3.99 (SD ± 0.46), while the Contemporary Mainstream values mean score was 3.09 (SD ± 0.68). The subscale with the lowest score among the sample was Material Success with a mean score of 2.00 (SD ± 0.77), and the subscale with the highest score among the sample was Familism Support with a mean score of 4.52 (SD ± 0.49). There was a significant difference among acculturation groups for the Traditional

Gender Roles subscale, with the low acculturation group having a higher score compared to the medium acculturation group.

**Table 4. 6 Mexican American Cultural Values Scale scores among Mexican Americans by acculturation groups (n=86)**

	All (n=86)		Low Acculturation (n= 46)		Medium Acculturation (n= 40)	
	mean	SD	mean	SD	mean	SD
<b>Mexican American Values Subscales</b>						
Religion	4.48	0.72	4.58	0.51	4.37	0.90
Familism Support	4.52	0.49	4.52	0.46	4.53	0.54
Familism Obligations	4.11	0.66	4.20	0.67	4.01	0.63
Familism Referents	4.05	0.59	4.13	0.55	3.96	0.62
Respect	3.92	0.43	3.97	0.39	3.85	0.47
Traditional Gender Roles <sup>a</sup>	2.88	0.91	3.07	0.88	2.66	0.90
<b>Mainstream Values Subscales</b>						
Material Success	2.00	0.77	2.04	0.74	1.96	0.81
Independence & Self-Reliance	3.84	0.74	3.76	0.75	3.93	0.73
Competition & Personal Achievement	3.43	0.96	3.43	0.96	3.43	0.97
<b>Overall Mexican American values</b>	3.99	0.46	3.08	0.67	3.10	0.70
<b>Overall Contemporary Mainstream values</b>	3.09	0.68	4.08	0.41	3.89	0.51

\*Data are expressed as means  $\pm$  SD unless indicated otherwise

<sup>a</sup>One-way ANOVA ( $p < 0.05$ )

The reliability of the MACVS was tested for internal consistency using Cronbach's alpha. The results of the test are shown in Table 4.7. The MACVS as an entire instrument with all 50 items has a Cronbach's alpha of 0.92. The internal consistency coefficient for the contemporary Mainstream values subscales is .75, and the Mexican American values subscales is .80. The individual subscale coefficient Cronbach's alpha for the study sample range from the lowest of 0.55 for Familism Referents to the highest of 0.87 for Religion. The subscales and overall scales have acceptable reliability, indicating strong internal reliability. Though there are five subscales, Familism Support, Familism Obligations, Familism Referents, Independence



& Self-Reliance, and Competition & Personal Achievement, that have low individual coefficients of less than 0.70.

**Table 4. 7 Reliability of Mexican American Cultural Values Scale among Mexican Americans using Cronbach’s Alpha (n=86)**

<b>Mexican American Cultural Values Scale (MACVS) Subscales</b>	<b>Number of Items</b>	<b>Cronbach’s Alpha</b>
MACVS – all subscales	50	0.92
Mexican American values	36	0.80
Contemporary Mainstream values	14	0.75
Subscales		
Religion	7	0.87
Familism Support	6	0.67
Familism Obligations	5	0.65
Familism Referents	5	0.55
Respect	8	0.73
Traditional Gender Roles	5	0.73
Material Success	5	0.75
Independence & Self-Reliance	5	0.62
Competition & Personal Achievement	4	0.67

To examine bivariate relationships between MACVS subscales and diet, a correlation matrix was reviewed between subscales and nutrients (Appendix H). Table 4.8 includes both unadjusted and adjusted models for the linear regression examining the relationship between the percentage of DGA food groups met and the MACVS subscales. Model 1 was an unadjusted regression and Model 2 regressions were adjusted for acculturation scores, age, gender, marital status, and years of education completed. The percentage of DGAs met for fruit equivalents was positively associated with the subscales of Religion, Traditional Gender Roles, and Mexican American values, predicting that as the score of each of these subscales increase, the percent of DGA fruit equivalents met increase by 0.22, 0.24, and 0.24, respectively. However, after adjusting for covariates in Model 2, the relationships were no longer significant. Another

association found in the unadjusted model was the negative association between the percentage of DGAs refined grain equivalents met with the Familism Referents subscale, predicting that as the score of Familism Referents increase, the percentage of refined grain equivalents met decreases. This relationship was not significant in Model 2, after adjusting for the covariates.

**Table 4. 8 Linear regression comparing percentage of Dietary Guidelines for Americans met to the Mexican American Cultural Values Scale (n=86)**

MACVS Subscales	Vegetable Equivalents		Fruit Equivalents		Dairy Equivalents		Protein Equivalents		Whole Grain Equivalents		Refined Grain Equivalents	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
<b>Familism Support</b>	0.12	0.15	0.16	0.17	0.11	0.11	-0.05	-0.06	-0.09	-0.09	-0.10	-0.08
<b>Familism Obligations</b>	-0.05	-0.001	0.07	0.07	0.05	0.07	-0.05	-0.05	0.001	-0.02	-0.05	-0.03
<b>Familism Referents</b>	0.04	0.06	0.19	0.13	-0.08	-0.03	-0.08	-0.09	0.01	0.02	-0.24*	-0.21
<b>Respect</b>	-0.03	0.01	0.14	0.14	0.03	0.05	-0.04	-0.06	0.07	0.04	-0.06	-0.05
<b>Religion</b>	-0.07	-0.05	0.22*	0.15	-0.14	-0.04	0.05	0.12	0.11	0.11	-0.09	0.01
<b>Traditional Gender Roles</b>	-0.11	-0.06	0.24*	0.17	-0.19	-0.11	0.02	0.01	-0.001	-0.04	-0.13	-0.06
<b>MA values</b>	-0.04	0.02	0.24*	0.19	-0.08	0.004	-0.02	-0.02	0.03	0.005	-0.16	-0.09
<b>Material Success</b>	-0.01	0.02	0.19	0.13	-0.10	-0.05	0.15	0.14	0.02	0.004	-0.09	-0.04
<b>Independence &amp; Self-Reliance</b>	-0.03	-0.04	0.19	0.21	0.06	0.04	0.14	0.12	-0.10	-0.10	-0.05	-0.06
<b>Competition &amp; Personal Achievement</b>	-0.13	-0.09	0.13	0.07	-0.01	0.06	0.16	0.13	-0.06	-0.10	-0.17	-0.15
<b>Contemporary Mainstream values</b>	-0.08	-0.05	0.20	0.16	-0.02	0.02	0.18	0.16	-0.06	-0.08	-0.13	-0.11

Model 1: unadjusted bivariate linear regression

Model 2: adjusted for acculturation score, age, gender, marital status, and years of schooling completed

\* p<0.05

The relationship between alternative treatments and MACVS was also investigated. Resnicow's model for public health interventions provides a framework that includes cultural beliefs. We explored health beliefs and beliefs about foods within two questions in our study survey that asked participants to report a behavior (alternative treatments used) and incorporated a health belief component (for health reasons). Among the most frequently reported foods used for health reasons were consuming nopal, garlic, herbs, smoothies, and vegetables. We examined if these foods were associated with the cultural values surveyed.

Table 4.9 displays the odds ratios and 95 percent confidence intervals of participants' use of five alternative treatments for health reasons, including nopal, garlic, herbs, smoothies, and vegetables with both unadjusted and adjusted models. There was a significant positive association with the Religion subscale and the use of nopal cactus. Those who scored higher on the Religion values subscale were 2.9 times more likely to report using nopal cactus for health reasons. Similarly, there was a positive significant association with participants reporting the use of vegetables and the Material Success subscale. Those who had higher scores for the Material Success subscale were 3.1 times more likely to report using vegetables for health reasons.

**Table 4. 9 Odds of Using Alternative Treatments for Health Reasons and Cultural Values among Mexican Americans**

MACVS Subscale	Nopal Use				Garlic Use			
	Model 1		Model 2		Model 1		Model 2	
	Odds Ratio	Confidence Interval	Odds Ratio	Confidence Interval	Odds Ratio	Confidence Interval	Odds Ratio	Confidence Interval
<b>Familism Support</b>	0.73	[-1.21 - 0.57]	0.75	[-1.35 - 0.78]	0.71	[-1.22 - 0.53]	0.78	[-1.19 - 0.69]
<b>Familism Obligations</b>	0.75	[-0.95 - 0.38]	0.87	[-0.92 - 0.65]	1.08	[-0.58 - 0.74]	1.13	[-0.61 - 0.85]
<b>Familism Referents</b>	0.70	[-1.10 - 0.39]	0.57	[-1.55 - 0.43]	0.74	[-1.04 - 0.44]	0.62	[-1.35 - 0.41]
<b>Respect</b>	0.75	[-1.31 - 0.73]	1.07	[-1.12 - 1.26]	0.62	[-1.48 - 0.53]	0.63	[-1.54 - 0.62]
<b>Religion</b>	2.73*	0.23 - 1.78]	2.86*	[0.07 - 2.04]	2.13	[-0.05 - 1.57]	2.10	[-0.19 - 1.67]
<b>Traditional Gender Roles</b>	1.50	[-0.09 - 0.90]	1.39	[-0.29 - 0.96]	1.03	[-0.45 - 0.51]	1.07	[-0.52 - 0.65]
<b>MA values</b>	1.38	[-0.62 - 1.26]	1.39	[-0.88 - 1.54]	1.08	[-0.87 - 1.01]	1.05	[-1.06 - 1.15]
<b>Material Success</b>	1.14	[-0.44 - 0.70]	0.89	[-0.77 - 0.55]	0.97	[-0.60 - 0.53]	1.07	[-0.56 - 0.70]
<b>Independence &amp; Self-reliance</b>	0.71	[-0.95 - 0.26]	0.65	[-1.18 - 0.32]	0.77	[-0.85 - 0.32]	0.80	[-0.87 - 0.42]
<b>Competition &amp; Personal Achievement</b>	1.09	[-0.37 - 0.53]	0.97	[-0.60 - 0.53]	0.83	[-0.64 - 0.26]	0.85	[-0.68 - 0.35]
<b>Contemporary Mainstream values</b>	0.98	[-0.66 - 0.61]	0.78	[-1.03 - 0.55]	0.78	[-0.89 - 0.40]	0.85	[-0.88 - 0.55]

Model 1: Unadjusted model; n=86

Model 2: Adjusted model controlling for perceived income, age, gender, marital status, age at immigration, and years of education; n=82 from removal of those born in US

95% confidence interval

\*\* p<0.01, \* p<0.05

**Table 4.9 Odds of Using Alternative Treatments for Health Reasons and Cultural Values among Mexican Americans (continued)**

MACVS Subscales	Smoothie Use				Vegetable Use			
	Model 1		Model 2		Model 1		Model 2	
	Odds Ratio	Confidence Interval	Odds Ratio	Confidence Interval	Odds Ratio	Confidence Interval	Odds Ratio	Confidence Interval
<b>Familism Support</b>	2.93	[-0.45 - 2.60]	2.81	[-0.62 - 2.68]	1.26	[-0.85 - 1.32]	1.47	[-0.79 - 1.56]
<b>Familism Obligations</b>	0.97	[-0.96 - 0.90]	0.90	[-1.12 - 0.90]	1.10	[-0.70 - 0.90]	1.36	[-0.61 - 1.22]
<b>Familism Referents</b>	0.68	[-1.43 - 0.65]	0.67	[-1.59 - 0.78]	1.56	[-0.50 - 1.36]	2.48	[-0.25 - 2.07]
<b>Respect</b>	1.66	[-1.04 - 2.05]	1.48	[-1.20 - 1.98]	2.54	[-0.47 - 2.33]	3.43	[-0.28 - 2.74]
<b>Religion</b>	0.94	[-0.88 - 0.75]	0.64	[-1.42 - 0.54]	1.60	[-0.47 - 1.41]	2.00	[-0.41 - 1.79]
<b>Traditional Gender Roles</b>	1.55	[-0.25 - 1.12]	1.61	[-0.44 - 1.40]	1.39	[-0.25 - 0.91]	1.81	[-0.18 - 1.37]
<b>MA values</b>	1.47	[-0.98 - 1.75]	1.21	[-1.43 - 1.82]	2.03	[-0.49 - 1.90]	3.71	[-0.23 - 2.85]
<b>Material Success</b>	1.90	[-0.12 - 1.40]	2.00	[-0.16 - 1.54]	2.50**	[0.23 - 1.60]	3.15**	[0.35 - 1.94]
<b>Independence &amp; Self-reliance</b>	1.38	[-0.55 - 1.20]	1.21	[-0.75 - 1.13]	1.09	[-0.62 - 0.80]	1.17	[-0.61 - 0.93]
<b>Competition &amp; Personal Achievement</b>	1.42	[-0.34 - 1.03]	1.36	[-0.49 - 1.09]	1.58	[-0.14 - 1.06]	1.67	[-0.16 - 1.19]
<b>Contemporary Mainstream values</b>	1.93	[-0.29 - 1.60]	1.85	[-0.46 - 1.69]	2.14	[-0.06 - 1.58]	2.54	[-0.01 - 1.87]

Model 1: Unadjusted model; n=86

Model 2: Adjusted model controlling for perceived income, age, gender, marital status, age at immigration, and years of education; n=82 from removal of those born in US

95% confidence interval

\*\* p<0.01, \* p<0.05

**Table 4.9 Odds of Using Alternative Treatments for Health Reasons and Cultural Values among Mexican Americans (continued)**

MACVS Subscales	Herb Use			
	Model 1		Model 2	
	Odds Ratio	Confidence Interval	Odds Ratio	Confidence Interval
<b>Familism Support</b>	0.55	[-1.50 - 0.31]	0.60	[-1.54 - 0.50]
<b>Familism Obligations</b>	1.01	[-0.68 - 0.70]	0.96	[-0.85 - 0.76]
<b>Familism Referents</b>	0.81	[-0.98 - 0.56]	0.71	[-1.28 - 0.60]
<b>Respect</b>	0.43	[-1.90 - 0.19]	0.33	[-2.29 - 0.09]
<b>Religion</b>	1.05	[-0.59 - 0.69]	0.98	[-0.82 - 0.78]
<b>Traditional Gender Roles</b>	1.10	[-0.41 - 0.59]	1.46	[-0.31 - 1.07]
<b>MA values</b>	0.81	[-1.20 - 0.77]	0.80	[-1.42 - 0.98]
<b>Material Success</b>	0.98	[-0.61 - 0.57]	1.17	[-0.53 - 0.84]
<b>Independence &amp; Self-reliance</b>	0.76	[-0.89 - 0.33]	0.72	[-1.03 - 0.38]
<b>Competition &amp; Personal Achievement</b>	0.64	[-0.92 - 0.04]	0.72	[-0.89 - 0.22]
<b>Contemporary Mainstream values</b>	0.66	[-1.10 - 0.27]	0.75	[-1.06 - 0.49]

Model 1: Unadjusted model; n=86

Model 2: Adjusted model controlling for perceived income, age, gender, marital status, age at immigration, and years of education; n=82 from removal of those born in US

95% confidence interval

\*\* p<0.01, \* p<0.05

## **Chapter 5: Discussion**

This study assessed the cultural influences on dietary patterns among the largest subgroup of Hispanics/Latinos in the US, the Mexican American community. We examined if and how culture influences dietary behaviors among Mexican Americans.

### **5.1 Sociodemographic Characteristics**

There are similarities in sociodemographic characteristics, such as a low socioeconomic status, in the present study compared to others conducted in varying geographic regions in the US.<sup>23,42</sup> However, an important difference is observed in the acculturation status. The present study sample was predominantly low-income, recently immigrated to the US within a mean of 16.9 years, and with low to medium acculturation. A majority of Mexican-origin Hispanics in the US are concentrated in California and Texas.<sup>68</sup> It was not until the 1990s when central Kentucky saw a significant increase in Hispanic population due to employment opportunities in the tobacco industry, as well as the low cost of living.<sup>69</sup> Accordingly, Mexican Americans in Kentucky are overall less acculturated compared to communities located in California and Texas and provide a unique community for researchers to investigate dietary acculturation patterns.

### **5.2 Diabetes Diagnoses and Anthropometric Characteristics**

From the results of anthropometric and EMR data, there is some concern for the Mexican American community in Kentucky. EMR data was used to examine physician diagnoses. Nearly 17 percent of our sample had a diagnosis of T2DM. This is a lower prevalence compared to estimates from the Centers for Disease Control and Prevention's 2017 National Diabetes Statistics Report showing the projection of half of Hispanic Americans to develop T2DM within their lifetime, and the Mexican American subgroup



having the highest prevalence among Hispanic population.<sup>70</sup> In a sample of 6,466 Mexican Americans from multiple US cities (Bronx, Chicago, Miami, and San Diego), 18.3 percent had a prevalence of T2DM assessed by objective measures, such as A1C.<sup>1</sup> The mean age of Mexican American participants in this national study was 43 years, which is five years older than the mean age of the present study sample. Among a sample of 1,431 Mexican Americans from the San Antonio Family Heart Study, 34 percent had T2DM.<sup>71</sup>

Our study found 91.4 percent of the low acculturation group to have a BMI classification of overweight or obese (BMI >25). Additionally, 60.9 percent of women in the low acculturation group had a waist circumference characterized as high (>35 inches). Despite recent immigration and low acculturation, the sample showed increased risk for diet-related chronic diseases based on BMI and waist circumference means. The anthropometrics found in the present study are consistent with other studies with Mexican Americans throughout the US. In the San Antonio Family Heart Study, those without T2DM diagnoses presented with a mean waist circumference of 36.3 inches.<sup>71</sup> In the present study, 67.1 percent of participants had a high waist circumference (>35 inches for females, >40 inches for males).

Although EMR data for the study participants was incomplete, it is unclear if this is due to incomplete records, types of services accessed, or if indeed participants are healthier. It is possible that the participants have low prevalence of disease diagnoses due to the young age of the study sample. However, participants presented with overweight and obese weight classification and high waist circumference, making them a high risk

group for diet-related diseases, such as T2DM. The Hispanic/Latino community may be an opportune intervention group for preventing diet-related disease.

### **5.3 Dietary Patterns**

Our study sample had a low level of acculturation in comparison to the MESA study using the same acculturation scale, which had a larger distribution of acculturation.<sup>61</sup> The process of acculturation is complex and multifactorial, which provides challenges for measurement. There have been inconsistent findings among studies assessing the relationship between diet quality and level of acculturation, which in part may be due to inconsistent instruments to measure the level of acculturation.<sup>61-63</sup>

There is evidence from research of the inverse relationship between traditional food consumption and acculturation: traditional foods are consumed less as an individual becomes more acculturated to the US.<sup>72,73</sup> However, the traditional Mexican diet has more healthful qualities, like dietary fiber from beans, compared to the Western diet.<sup>73</sup> Dietary fiber is inversely associated with CVD specific cancers, as well as reduced risk of T2DM.<sup>74</sup> Many acculturation and diet studies show that those with less acculturation consume a less-refined diet with higher intake of dietary fiber. However, there was no association between acculturation and fiber intake, which may be due to the low acculturation of the entire group. Nonetheless, incorporation of traditional foods in a culturally adapted public health intervention is an effective approach when providing nutrition education and counseling with ethnically diverse communities. Future considerations regarding the factors that influence dietary acculturation should include the nutrition transition and socioeconomic status.

A recent study suggests that there is a relationship between the age at migration to the US and the impact on dietary acculturation. An examination of the association between healthy eating among Mexican immigrants and migration in childhood and time in the US showed that an earlier age at immigration had a negative impact on diet quality when compared to using traditional acculturation measures of language preference and length of time in the US.<sup>75</sup> In the study, the mean duration of residence in the US among the sample was 17.28 years. A majority of the sample migrated to the US at the age of 19 or older (67%), with 39 percent arriving to the US at the age of 25 years or older. The researchers found that those who migrated to the US during preschool and school ages between 2 and 11 years old had significantly less healthy diets than those who arrived from age 25 or older.<sup>75</sup> Comparing to the present study, our sample had a mean duration of residence in the US of 16.2 years, as well as a majority age of immigration of 19 years or older (74%) with 43 percent arriving to the US at the age of 25 years or older.

Using Google Maps, the number of grocery stores, convenience stores, gas stations, and liquor stores available within one-half mile of each clinic research site was identified. Portland had one grocery store, two gas stations, three convenience stores, and two liquor stores. East Broadway had one grocery store, three food mart/convenience stores, one gas station, and no liquor stores. Iroquois had five gas stations with convenience stores, one food mart/convenience store, one grocery store, and two liquor stores. The food environment and access to traditional foods was not examined in this study, though it may provide insight to food insecurity among the community, as well as address the reasons for the relatively low energy intake observed in the study.

Several studies have found underreporting of intake from dietary assessments among Mexican Americans, specifically with low-income, overweight or obese women.<sup>76-78</sup> Our study was completed in an urban area that serves low-income Hispanics. In general, diet and acculturation studies in the US make an assumption that immigrants consumed healthier diets prior to migration.<sup>23,24</sup> Consumption of energy dense, processed or fast foods is not limited to the US. Martinez makes the argument that dietary change should be assessed through a transnational perspective to avoid confounding factors, such as food insecurity, socioeconomic status, type of job position, and hours outside of the home.<sup>79</sup>

The nutrition transition refers to the global shift in dietary intake with increased consumption of processed foods high in saturated fat, refined carbohydrates, and added sugars.<sup>79</sup> A study among Mexican adults in 2006 showed an overall low pattern of consumption and expenditure on food prepared away from the home, but it varied greatly by location of residence, education, and socioeconomic status.<sup>80</sup> Therefore, it is important to assess age at immigration, location of residence (rural or urban), regional cuisine, and socioeconomic position prior to relocation to the US.<sup>79</sup> There is currently no instrument that assesses dietary patterns and behaviors prior to relocation from another country. This may be an influential factor that we were unable to assess in the current study. It is particularly important given that Mexico is currently experiencing an epidemiological and nutrition transition.

#### **5.4 Mexican American Cultural Values Scale**

To answer the first research question regarding the reliability of the MACVS with a low-income, clinical sample of Mexican American adults in Kentucky: an acceptable

internal reliability (Cronbach's alpha of 0.92) was established. Several subscales had lower individual coefficients for Cronbach's alpha that may demonstrate the need for rewording in utilizing the same instrument in future studies with a similar community. The results of the scoring of the MACVS among participants found evidence for higher Mexican Americans values when compared with the Contemporary Mainstream values. This signifies that Mexican cultural values were stronger, which could indicate dietary patterns more closely aligned with traditional foods. Interpretation of the regression models from Table 4.6 show that there were no significant findings between the percentage of DGA food group equivalents met and the MACVS. However, there was a significant relationship with specific alternative treatments for health reasons and the MACVS.

### **5.5 Cultural Values and Diet**

The current study found a significant positive relationship between alternative treatments of nopal and vegetables and cultural values. The first finding was as religious cultural values increase, the odds of using nopal for health reasons increase by 2.9. Nopal use among Mexicans is associated with health for blood sugar control and a treatment for T2DM.<sup>53</sup> The development of the Religion subscale in the MACVS was based on spiritual beliefs and faith in a higher power.<sup>19</sup> As the nopal cactus is a symbol of Mexican tradition and culture, which is linked to religious values, this relationship is plausible. The second finding was as cultural values of material success increase, the odds of using vegetables for health reasons increase. The values of material success reflect the prioritization of earning money over other activities.<sup>19</sup> The next step for this study is to

examine the relationship between MACVS subscales and dietary behaviors considering health beliefs as potential moderators or mediators.

The DGA food group equivalents were used instead of the reductionist approach of looking at specific nutrients. A food group explored was dairy consumption, as there was a low mean consumption seen among the sample. In the Siega-Riz study comparing food-group intakes among Hispanics, Mexicans consumed a mean usual intake of 1.7 servings of dairy per day.<sup>2</sup> In another study, mean intake per day of dairy servings among Mexican-born Latino men was 1.9, while Mexican-born Latino women consumed 1.8 servings per day.<sup>81</sup> Comparing to the present study, the mean dairy intake was 1.1 (SD  $\pm$  1.2) cup equivalents. It is possible that underreporting may explain this as cheese and dairy-based creams are often added to foods.

Our sample consumed a mean vegetable intake of 2.6 cup equivalents per day (SD  $\pm$  0.3). In the Siega-Riz study comparing food-group intakes among Hispanics, Mexicans consumed a mean usual intake of 3.4 servings of vegetables per day.<sup>2</sup> According to *What We Eat in America*, National Health and Nutrition Examination Survey 2015-2016, Americans aged 20 years or older consumed a mean amount of 1.55 cup equivalents of vegetables.<sup>82</sup> The mean amounts of vegetables consumed by non-Hispanic White, non-Hispanic Black, non-Hispanic Asian, and Hispanic groups aged 20 years or older were 1.59, 1.34, 1.87, and 1.43 cup equivalents, respectively.<sup>82</sup>

There was a similar finding of a higher consumption of fruit intake among our sample compared with the National Health and Nutrition Examination Survey data. Participants in our study consumed a mean fruit intake of 1.7 cup equivalents per day (SD  $\pm$  0.2). The NHANES data reported that Americans aged 20 years or older consumed a

mean amount of 0.94 cup equivalents of fruit.<sup>82</sup> Comparing by race/ethnicity of adults aged 20 years or older, Hispanics consumed 1.03 cup equivalents of fruit, while non-Hispanic Whites, non-Hispanic Blacks, and non-Hispanic Asians consumed 0.90, 0.87, and 1.26 cup equivalents of fruit, respectively.<sup>82</sup> It is interesting to note that our study participants consumed more fruit and vegetable cup equivalents compared to the national means among all race/ethnicities, as well as specifically with the Hispanic American average intakes.

A nutrient of interest among Mexican Americans is fiber intake. Dietary fiber is inversely associated with cardiovascular disease specific cancers, as well as reduced risk of T2DM.<sup>74</sup> Studies show Mexican Americans with less acculturation consume a higher intake of dietary fiber, more closely aligning with a traditional diet.<sup>42</sup> In the Siega-Riz study comparing food-group intakes among Hispanics, Mexicans consumed a mean fiber intake of 11 grams/1000 calories, which was highest among Hispanic subgroups.<sup>2</sup> In the present study, the mean fiber intake was 17.3 grams daily (11.7 g/1000 calories). The DGA and Dietary Reference Intake recommendations for dietary fiber intake are 25 grams for women and 38 grams for men.<sup>83</sup> Even though our findings show a high consumption of vegetables, the amount of fiber consumed among the study participants was consistent with the Siega-Riz, et. al., study. We believe that the DGA has limitations in interpreting diets of ethnically diverse communities, specifically Mexican Americans who consume legumes as a major dietary component.

Individual nations develop their own recommendations for the population based on availability, access, and composition of typical foods consumed.<sup>84</sup> The food-based dietary guidelines developed for use with Mexicans have several differences when

compared to the American MyPlate recommendations.<sup>85</sup> For example, the El Plato del Bien Comer is divided into thirds: fruits and vegetables, cereals, and legumes and animal products (Figure 5.1). In contrast, MyPlate has five components: fruits, vegetables, grains, protein, and dairy (Figure 5.2). Two differences between the two models are dairy and legumes. In the US recommendations, dairy is a separate component. Though there are several nutritional benefits of consuming dairy, low-fat products are recommended in the DGA to minimize saturated fat consumption. One reason for lower consumption of dairy among Hispanics is related to perceptions about lactose intolerance.<sup>86</sup> Hispanics traditionally prefer higher fat dairy foods, especially milk. It is important to note that programs within SNAP, such as Women, Infants, and Children, provide milk, yogurt, and cheese products. It is unknown how many participants from the present study used supplemental nutrition program, though most participants likely were qualified given the low-income community clinic research site.

Additionally, the MyPlate model does not include a specific group for legumes, which is an important component in the Mexican diet and a contributor of dietary fiber. Though legumes would be included in the “Protein” food group of the DGA, it is not a clear representation compared to the Mexican dietary guidelines. These differences may explain dietary choices especially among recent immigrants.



# El Plato del Bien Comer

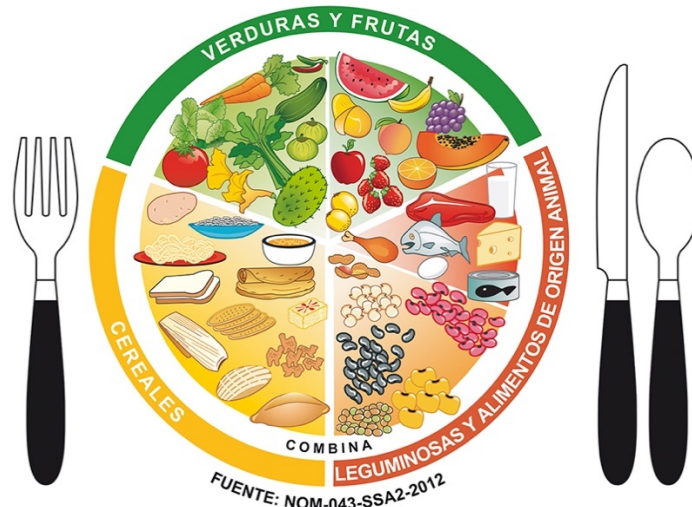


Figure 5. 1 El Plato del Bien Comer as a representation of the Food-Based Dietary Guidelines for Mexico<sup>87</sup>

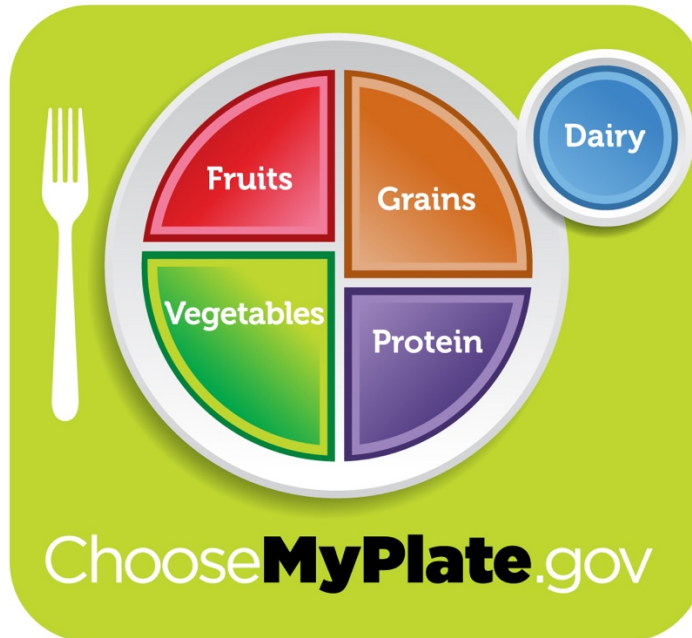


Figure 5. 2 MyPlate as a representation of the Dietary Guidelines for Americans for the US<sup>85</sup>

## 5.6 Strengths and Limitations

Strengths of the study include the use of a validated survey, the MACVS. The MACVS had reliability among the sample of low-income Mexican Americans, evidenced by Cronbach's alpha of 0.92. Another strength was the bilingual research team and inclusion of a Registered Dietitian. During the data collection, researchers administered the surveys in the form of an interview unless the participant asked to complete it on their own. An interview was chosen to reduce concerns of participants with low literacy and reduce the likeliness of missing data due to skipping questions. The interview format also helped reduce survey fatigue. Additionally, the 66-item survey was pilot-tested with three Hispanic individuals to ensure clarity of language in both English and Spanish.

The limitations of this study include the convenience sample recruitment method. Hispanics/Latinos are a hard-to-reach community due to socioeconomic status, fear of immigration authorities, and failure of researchers to understand cultural norms among this community; therefore, we were limited to a community that the study team had access to.<sup>88</sup> The generalizability of the study findings is also limited. The study participants were from an urban location in Kentucky, which may not represent the entire population of Mexican Americans within more rural regions of Kentucky or other geographic locations throughout the US. As previously mentioned, measures were taken to reduce nonresponse error and survey fatigue; however, these may have impacted the results considering the length of time to complete the study that included the survey with 66 items, a 24-hour recall, and anthropometric measurements.

The data from the medical records was incomplete for a large number of participants. Some patients were new to the health clinic or may only be participating in

select services offered by the clinic, such as dental care or women's health. Though physical activity was a variable of interest collected from the EMR, data was missing from most participants' records either because it was not recorded at the visit or it did not get included in the EMR. Because of this potential limitation, the diet-related disease diagnoses among the total sample may be underrepresented.

A limitation of the present study's methods was the single administration of the dietary recall, which cannot account for day-to-day variation. Research guidelines recommend two or more non-consecutive recalls to estimate usual dietary intake distributions.<sup>89</sup> A single administration was chosen due to feasibility with limited resources. Additionally, the setting of the research site may have influenced actual intake among participants if they were ill or fasting for blood tests.

Dietary assessments may not be a representation of a typical diet due to the information being based off of an individual's memory, as well as the underreporting of intake, specifically among low-income Spanish-speaking women.<sup>79</sup> Researchers were trained for collecting the 24-hour dietary recalls through the multiple-pass method; however, there was a statistically significant difference of average energy intake among the three researchers who collected dietary recalls. This may be explained by the experience level using the 24-hour dietary recall among the researchers. Those recalls collected by the research dietitian were higher in calories compared to the others. Another plausible explanation of the lower quality dietary data is that the dietary recall was typically completed at the end of the interview and participants may have experienced survey fatigue. Lastly, some participants came to the clinic with their whole families, which had an external constraint on their time.

The NDSR program was chosen over other nutrition software, such as ASA-24 and Nutritionist Pro specifically for the variety of Hispanic foods. Dietary recall analyses provided challenges as it was not feasible to identify or alter preparation methods of some foods. Additionally, Mexican cuisine varies by region and there were differences in traditional foods (e.g. tamales can be prepared in a corn husk vs. banana leaves) and preparation methods. The NDSR program contained some culturally traditional dishes and foods; however, many commonly consumed items were not available in the database or were differing in ingredients and preparation methods (e.g. *pozole*, types of *caldos*, beverages such as Jarritos). Additionally, it is unknown whether the traditional dishes that were in the database were reflective of Mexican cultural foods and dishes. To assign the nutrient values to unknown ingredients or preparation methods, the NCC uses the nutrient values for the form of food most commonly consumed in the US. Therefore, the variation in preparation methods may misrepresent actual intake in the data. Finally, the DGAs were developed for Americans, which could be a limitation for determining whether the MACVS subscales predict food group consumption.

## **5.7 Implications**

With the Mexican American community among the fastest growing populations in the US, it is critical to address the health disparities and the relationship between culture and dietary behaviors to provide evidence-based culturally sensitive health interventions. This exploratory study provokes additional research to build upon Mexican American beliefs regarding the health benefits of vegetables and nopal. As the MACVS did not predict dietary behaviors, development of a dietary acculturation scale that includes health beliefs and alternative treatments is crucial to continue exploring this relationship

using more advanced methods. Due to the homogeneity of the sample, increased diversity of acculturation, age at immigration, and immigrant generation status would help identify differences in cultural values and diet in future studies. There currently is no measure of dietary acculturation for Mexican Americans; therefore, this study identifies a need for such a tool and inclusion of a measure for capturing the stage of the nutrition transition.<sup>90</sup> Additionally, future research should consider the potential benefits of a multidisciplinary research approach, perhaps including experts in the topics of cultural anthropology, psychology, and sociology to address the complexity and multidimensional factors involved with culture, acculturation, and dietary behaviors.

## **Chapter 6: Conclusion**

The main findings of the study include the positive association between religious values and nopal use for health reasons, as well as the positive association between mainstream values and vegetable use for health reasons. This exploratory study sought to identify the relationship between cultural influences and dietary behaviors. Using the DGA with Mexican Americans provided insight into challenges of assessing dietary intake and cultural values when study participants are recently immigrated or have low acculturation to mainstream culture.

Mexican Americans account for over half of the Hispanic population in the US, which is projected for rapid growth in the next several decades. Due to the increasing prevalence of diet-related chronic disease and health disparities of this community, it is essential for research to determine which cultural influences are most determinant on dietary behaviors. The long-term goal of continued research on this topic is the development of effective nutrition interventions that address relevant cultural

components for Mexican Americans. The scientific contribution from this study is that health beliefs and behaviors about certain foods are culturally informed. Specifically, the use of the nopal cactus for health reasons is consistently named in the literature as having hypoglycemic properties by Mexican Americans. Secondly, our study participants had a high consumption of vegetables (2.6 servings) and a significant association between the belief that vegetables were good for health and material success. Research shows that individuals with higher incomes are more likely to eat fruits and vegetables, but little is known on the perceptions of income and if there are any regards to vegetables as high status foods.

This study provides a foundation for further examination of cultural values and dietary behaviors, specifically those tied to cultural practices such as the use of traditional remedies, alternative healing, and perceptions of health beliefs. One recommendation for future work is to develop a dietary acculturation scale to assess cultural influences on dietary behaviors among this community and a deeper investigation of how health beliefs influence dietary patterns.

## **Chapter 7: Overall Summary**

The present study provided me insight to the limitations and challenges for conducting nutrition related research with ethnic minorities. The limitations discussed in the study will serve future researchers to explore methods on dietary assessments and nutrition data systems. An important takeaway from the study includes my understanding of how culture influences dietary choices among diverse communities. We hope that this will inform healthcare providers' understanding on the influence of culture on health outcomes. Instead of the mindset that cultural differences are a barrier to health, a greatly

improved perspective is thinking of culture as an opportunity to further build relationships with patients to encourage traditional foods and heritage retention.

The study provided me with an opportunity for improving my Spanish language skills. Additionally, the interviews and communication with participants developed my skills of cultural sensitivity, building rapport with patients, and the importance of a thorough dietary assessment. Further, the study provided an example of how translational research is crucial in the development of evidence-based nutrition recommendations. Participation in this study was a significant experience for me as a future Registered Dietitian who will be able to serve ethnic minorities, such as Mexican Americans, in a culturally sensitive manner using evidence-based practices.

## Appendices

### Appendix A: Institutional Review Board Approval Letter



#### Modification Review

Approval Ends:  
5/2/2025

IRB Number:  
47209

TO: Julie Plasencia, PhD, RDN  
Dietetics and Human Nutrition  
PI phone #: 8592574146  
  
PI email: julieplasencia@uky.edu

FROM: Chairperson/Vice Chairperson  
Non Medical Institutional Review Board (IRB)

SUBJECT: Approval of Modification Request

DATE: 5/7/2019

On 5/6/2019, the Non Medical Institutional Review Board approved your request for modifications in your protocol entitled:

#### Cultural Influences on Diet among the Hispanic Community

If your modification request necessitated a change in your approved informed consent/assent form(s), the new IRB approved consent/assent form(s) to be used when enrolling subjects can be found in the "All Attachments" menu item of your E-IRB application. [Note, subjects can only be enrolled using consent/assent forms which have a valid "IRB Approval" stamp unless special waiver has been obtained from the IRB.]

Note that at Continuation Review, you will be asked to submit a brief summary of any modifications approved by the IRB since initial review or the last continuation review, which may impact subject safety or welfare. Please take this approved modification into consideration when preparing your summary.

For information describing investigator responsibilities after obtaining IRB approval, download and read the document "[PI Guidance to Responsibilities, Qualifications, Records and Documentation of Human Subjects Research](#)" available in the online Office of Research Integrity's [IRB Survival Handbook](#). Additional information regarding IRB review, federal regulations, and institutional policies may be found through [ORI's web site](#). If you have questions, need additional information, or would like a paper copy of the above mentioned document, contact the Office of Research Integrity at 859-257-9428.



## Appendix B: Recruitment Flyers - English and Spanish



# Culture is the flavor of food!

Researchers at the University of  
Kentucky want to learn more about  
your culture, food, and health.

You may be eligible to participate if  
You are age 18 or older  
Identify as Hispanic or Latino  
You will receive a \$35 gift card for your participation.

For more information, contact Julie Plasencia  
859.257.4146 or [julieplasencia@uky.edu](mailto:julieplasencia@uky.edu)

*An Equal Opportunity University*

Julie Plasencia  
859-257-4146  
[julieplasencia@uky.edu](mailto:julieplasencia@uky.edu)

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# ¡La comida es el sabor de nuestra cultura!

Investigadores en la Universidad de Kentucky quieren aprender más sobre tu cultura, tu comida y tu salud.

Usted puede participar si usted:

- Tiene 18 años o más
- Se identifica como Hispano o Latino

Recibirá una tarjeta de regalo con valor a \$35 por su participación en el estudio.

Para más información, comuníquese con Julie Plasencia  
859.257.4146 o [julieplasencia@uky.edu](mailto:julieplasencia@uky.edu)



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## Appendix C: Institutional Review Board Consent Form - English

IRB Approval  
5/3/2019  
IRB # 47209  
ID # 140738



### Consent to Participate in a Research Study

#### KEY INFORMATION FOR: Cultural Influences on Health and Diet of Latinos

We are asking you to choose whether or not to volunteer for a research study about cultural influences on health and diet among Hispanics/Latinos. We are asking you because you self-identified as Hispanic or Latino heritage. This page is to give you key information to help you decide whether to participate. We have included detailed information after this page. Ask the research team questions. If you have questions later, the contact information for the research investigator in charge of the study is below.

#### WHAT IS THE STUDY ABOUT AND HOW LONG WILL IT LAST?

We will be collecting your answers to 66 questions, measuring your height, weight and waist circumference, asking you your food intake from the previous day, and collecting information on your medical history from your chart. The information we collect will be on topics such as religion, family roles, family influences, and other details such as your employment, marital status, ethnic heritage and use of alternative treatments for health reasons. This information will help us better understand how culture influences diet and health.

By doing this study, we hope to learn about different aspect of culture that influence food habits and health. Your participation in this research will last about 45-60 minutes.

#### WHAT ARE KEY REASONS YOU MIGHT CHOOSE TO VOLUNTEER FOR THIS STUDY?

With your participation, we may learn what aspects of cultural are important for including in public health interventions for Hispanic and Latinos.

#### WHAT ARE KEY REASONS YOU MIGHT CHOOSE NOT TO VOLUNTEER FOR THIS STUDY?

You may feel uncomfortable answering questions regarding your cultural beliefs and sharing your medical history. You may not want researchers to access Protected Health Information (PHI). If you feel uncomfortable sharing this information, you may choose not to participate. Additionally, exclusion criteria includes participants less than 18 years of age, institutionalized and individuals unable to make own decision, pregnant women, individuals who are not currently seeking healthcare at Family Health Center, Inc., or self-identify as non-Hispanic ethnic group.

#### DO YOU HAVE TO TAKE PART IN THE STUDY?

If you decide to take part in the study, it should be because you really want to volunteer. You will not lose any services, benefits or rights you would normally have if you choose not to volunteer. You can still receive healthcare at Family Health Center, Inc. if you do not participate in the study.

#### WHAT IF YOU HAVE QUESTIONS, SUGGESTIONS OR CONCERNS?

The person in charge of this study is Julie Plasencia of the University of Kentucky, Department of Dietetics and Human Nutrition. If you have questions, suggestions, or concerns regarding this study or you want to withdraw from the study his/her contact information is: [julieplasencia@ukv.edu](mailto:julieplasencia@ukv.edu), 859-257-4146.

If you have any questions, suggestions or concerns about your rights as a volunteer in this research, contact staff in the University of Kentucky (UK) Office of Research Integrity (ORI) between the business hours of 8am and 5pm EST, Monday-Friday at 859-257-9428 or toll free at 1-866-400-9428.

## DETAILED CONSENT:

### ARE THERE REASONS WHY YOU WOULD NOT QUALIFY FOR THIS STUDY?

You would not qualify for this study if you are under 18 years of age, do not identify as Hispanic/Latino, are pregnant, institutionalized, or unable to make your own decision.

### WHERE WILL THE STUDY TAKE PLACE AND WHAT IS THE TOTAL AMOUNT OF TIME INVOLVED?

The research procedures will be conducted at Family Health Centers (Portland, East Broadway, and Iroquois locations). The total amount of time you will be asked to volunteer for this study is approximately 45-60 minutes.

### WHAT WILL YOU BE ASKED TO DO?

You will be asked to complete a survey with 66 questions. The survey asks about food beliefs, cultural values related to family, religion, family roles, and demographics. After the questionnaire, we will measure your height, weight, and waist circumference. Next, we will ask you about your food intake from the previous day. Researchers will also review your medical history and protected health information with your consent.

### WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS?

Risks are minimal for involvement in this study. However, you may feel emotionally uneasy when asked to make judgments based on the questions provided. We do not expect any harm to come upon any participants as a result of participating in this study. There is a risk of potential breach of confidentiality.

### WILL YOU BENEFIT FROM TAKING PART IN THIS STUDY?

You will not gain any personal benefit from taking part in this study.

### IF YOU DON'T WANT TO TAKE PART IN THE STUDY, ARE THERE OTHER CHOICES?

If you do not want to be in the study, there are no other choices except not to take part in the study.

### WHAT WILL IT COST YOU TO PARTICIPATE?

There are no costs associated with taking part in this study.

### WHO WILL SEE THE INFORMATION THAT YOU GIVE?

When we write about or share the results from the study, we will write about the information combined from all the study participants. We will keep your name and other identifying information private.

We will make every effort to prevent anyone who is not on the research team from knowing that you gave us information, or what that information is. We will only identify you with a unique identifier during the collection of data for this study. After the data collection is completed, all potential identifiers will be erased and these will be discarded using University of Kentucky Recycle bins.

You should know that there are some circumstances in which we may have to show your information to other people.

For example, the law may require us to share your information with:

- a court or agencies, if you have a reportable disease/condition;
- authorities, if you report information about a child being abused; or if you pose a danger to yourself or someone else.

UK officials may have access to the data to verify that the study was conducted appropriately.

### CAN YOU CHOOSE TO WITHDRAW FROM THE STUDY EARLY?

You can choose to leave the study at any time. You will not be treated differently if you decide to stop taking part in the study. If you choose to leave the study early, data collected until that point will remain in the study database and may not be removed.

**ARE YOU PARTICIPATING, OR CAN YOU PARTICIPATE, IN ANOTHER RESEARCH STUDY AT THE SAME TIME AS PARTICIPATING IN THIS ONE?**

You may take part in this study if you are currently involved in another research study. It is important to let the investigator/your doctor know if you are in another research study. You should discuss this with the investigator/your doctor before you agree to participate in another research study while you are in this study.

**WILL YOU RECEIVE ANY REWARDS FOR TAKING PART IN THIS STUDY?**

You will receive \$35 gift card for taking part in this study. If you choose to withdraw early from the study, you may choose to return at a later date to complete the study.

**WILL YOU BE GIVEN INDIVIDUAL RESULTS FROM THE RESEARCH TESTS?**

Generally, tests done for research purposes are not meant to provide clinical information. We will not provide you with individual research results.

**WHAT ELSE DO YOU NEED TO KNOW?**

If you volunteer to take part in this study, you will be one of about 250 people to do so.

### INFORMED CONSENT SIGNATURES

This consent includes the following:

- Key Information Page
- Detailed Consent

You will receive a copy of this consent form after it has been signed.

_____ Signature of research subject or, if applicable, research subject's legal representative	_____ Date
_____ Printed name of research subject	
_____ Printed name of [authorized] person obtaining informed consent and HIPAA authorization	_____ Date
_____ Signature of Principal Investigator or Sub/Co-Investigator	

## Appendix D: Mexican American Cultural Values Scale Questionnaire

Participant Name \_\_\_\_\_

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### Part I: Mexican-American Cultural Values Scale (MACVS, Knight, et al.)

English Version	Spanish Version
<p>The next statements are about what people may think or believe. Remember, there are no right or wrong answers. Tell me how much you believe that . . .</p> <p>Response Alternatives            1 = <i>Not at all</i>            2 = <i>A little</i>            3 = <i>Somewhat</i>            4 = <i>Very much</i>            5 = <i>Completely</i></p>	<p>Las siguientes frases son acerca de lo que la gente puede pensar o creer. Recuerda, no hay respuestas correctas o incorrectas. Dime que tanto crees que . . .</p> <p>1 = Nada            2 = Poquito            3 = Algo            4 = Bastante            5 = Completamente</p>
<p>1. One's belief in God gives inner strength and meaning to life. (Religion: .74, .72)</p>	<p>1. La creencia en Dios da fuerza interna y significado a la vida.</p>
<p>2. Parents should teach their children that the family always comes first. (Familism support: .39, .28)</p>	<p>2. Los padres deberían enseñarle a sus hijos que la familia siempre es primero.</p>
<p>3. Children should be taught that it is their duty to care for their parents when their parents get old. (Familism obligation: .41, .42)</p>	<p>3. Se les debería enseñar a los niños que es su obligación cuidar a sus padres cuando ellos envejecan.</p>
<p>4. Children should always do things to make their parents happy. (Familism referent: .46, .39)</p>	<p>4. Los niños siempre deberían hacer las cosas que hagan a sus padres felices.</p>
<p>5. No matter what, children should always treat their parents with respect. (Respect: .46, .46)</p>	<p>5. Sea lo que sea, los niños siempre deberían tratar a sus padres con respeto.</p>
<p>6. Children should be taught that it is important to have a lot of money. (Material success: .52, .59)</p>	<p>6. Se les debería enseñar a los niños que es importante tener mucho dinero.</p>
<p>7. People should learn how to take care of themselves and not depend on others. (Independence and self-reliance: .37, .47)</p>	<p>7. La gente debería aprender cómo cuidarse sola y no depender de otros.</p>
<p>8. God is first; family is second. (Religion: .44, .55)</p>	<p>8. Dios está primero, la familia está segundo.</p>

Participant Name \_\_\_\_\_

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<p>9. Family provides a sense of security because they will always be there for you. (Familism support: .51, .51)</p>	<p>9. La familia provee un sentido de seguridad, porque ellos siempre estarán allí para usted.</p>
<p>10. Children should respect adult relatives as if they were parents. (Respect: .56, .53)</p> <p>11. If a relative is having a hard time financially, one should help them out if possible. (Familism obligation: .52, .51)</p> <p>12. When it comes to important decisions, the family should ask for advice from close relatives. (Familism referent: .47, .49)</p> <p>13. Men should earn most of the money for the family so women can stay home and take care of the children and the home. (Traditional gender roles: .60, .64)</p> <p>14. One must be ready to compete with others to get ahead. (Competition and personal achievement: .52, .71)</p> <p>15. Children should never question their parents' decisions. (Respect: .42, .30)</p> <p>16. Money is the key to happiness. (Material success: .70, .77)</p> <p>17. The most important thing parents can teach their children is to be independent from others. (Independence and self-reliance: .46, .42)</p> <p>18. Parents should teach their children to pray. (Religion: .61, .51)</p> <p>19. Families need to watch over and protect teenage girls more than teenage boys. (Traditional gender roles: .50, .55)</p> <p>20. It is always important to be united as a family. (Familism support: .52, .38)</p>	<p>10. Los niños deberían respetar a familiares adultos como si fueran sus padres.</p> <p>11. Si un pariente está teniendo dificultades económicas, uno debería ayudarlo si puede.</p> <p>12. La familia debería pedir consejos a sus parientes más cercanos cuando se trata de decisiones importantes.</p> <p>13. Los hombres deberían ganar la mayoría del dinero para la familia para que las mujeres puedan quedarse en casa y cuidar a los hijos y el hogar.</p> <p>14. Uno tiene que estar listo para competir con otros si uno quiere salir adelante.</p> <p>15. Los hijos nunca deberían cuestionar las decisiones de los padres.</p> <p>16. El dinero es la clave para la felicidad.</p> <p>17. Lo más importante que los padres pueden enseñarle a sus hijos es que sean independientes de otros.</p> <p>18. Los padres deberían enseñarle a sus hijos a rezar.</p> <p>19. Las familias necesitan vigilar y proteger más a las niñas adolescentes que a los niños adolescentes.</p> <p>20. Siempre es importante estar unidos como familia.</p>



Participant Name \_\_\_\_\_

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21. A person should share their home with relatives if they need a place to stay. (Familism obligation: .44, .43)

21. Uno debería compartir su casa con parientes si ellos necesitan donde quedarse.

Participant Name \_\_\_\_\_

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<p>22. Children should be on their best behavior when visiting the homes of friends or relatives. (Respect: .52, .51)</p> <p>23. Parents should encourage children to do everything better than others. (Competition and personal achievement: .61, .74)</p> <p>24. Owning a lot of nice things makes one very happy. (Material success: .50, .65)</p> <p>25. Children should always honor their parents and never say bad things about them. (Respect: .57, .52)</p> <p>26. As children get older their parents should allow them to make their own decisions. (Independence and self-reliance: .26, .23)</p> <p>27. If everything is taken away, one still has their faith in God. (Religion: .69, .68)</p> <p>28. It is important to have close relationships with aunts/uncles, grandparents, and cousins. (Familism support: .59, .52)</p> <p>29. Older kids should take care of and be role models for their younger brothers and sisters. (Familism obligations: .54, .52)</p> <p>30. Children should be taught to always be good because they represent the family. (Familism reference: .57, .54)</p> <p>31. Children should follow their parents' rules, even if they think the rules are unfair. (Respect: .43, .41)</p> <p>32. It is important for the man to have more power in the family than the woman. (Traditional gender roles: .60, .66)</p> <p>33. Personal achievements are the most important things in life. (Competition and personal achievement: .35, .40)</p>	<p>22. Los niños deberían portarse de la mejor manera cuando visitan las casas de amigos o familiares.</p> <p>23. Los padres deberían animar a los hijos para que hagan todo mejor que los demás.</p> <p>24. Tener muchas cosas buenas lo hace a uno muy feliz.</p> <p>25. Los niños siempre deberían honrar a sus padres y nunca decir cosas malas de ellos.</p> <p>26. Según los niños van creciendo, los padres deberían dejar que ellos tomen sus propias decisiones.</p> <p>27. Si a uno le quitan todo, todavía le queda la fe en Dios.</p> <p>28. Es importante mantener relaciones cercanas con tíos, abuelos y primos.</p> <p>29. Los hermanos grandes deberían cuidar y darles el buen ejemplo a los hermanos y hermanas menores.</p> <p>30. Se le debería enseñar a los niños a que siempre sean buenos porque ellos representan a la familia.</p> <p>31. Los niños deberían seguir las reglas de sus padres, aún cuando piensen que no son justas.</p> <p>32. En la familia es importante que el hombre tenga más poder que la mujer.</p> <p>33. Los logros personales son las cosas más importantes en la vida.</p>
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Participant Name \_\_\_\_\_

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<p>34. The more money one has, the more respect they should get from others. (Material success: .71, .66)</p>	<p>34. Entre más dinero uno tenga, más el respeto que uno debería recibir.</p>
<p>35. When there are problems in life, a person can only count on him or herself. (Independence and self-reliance: .34, .47)</p>	<p>35. Cuando hay problemas en la vida, uno sólo puede contar con sí mismo.</p>
<p>36. It is important to thank God every day for all one has. (Religion: .68, .68)</p>	<p>36. Es importante darle gracias a Dios todos los días por todo lo que tenemos.</p>
<p>37. Holidays and celebrations are important because the whole family comes together. (Familism support: .43, .43)</p>	<p>37. Los días festivos y las celebraciones son importantes porque se reúne toda la familia.</p>
<p>38. Parents should be willing to make great sacrifices to make sure their children have a better life. (Familism obligation: .46, .35)</p>	<p>38. Los padres deberían estar dispuestos a hacer grandes sacrificios para asegurarse que sus hijos tengan una vida mejor.</p>
<p>39. A person should always think about their family when making important decisions. (Familism referent: .48, .46)</p>	<p>39. Uno siempre debería considerar a su familia cuando toma decisiones importantes.</p>
<p>40. It is important for children to understand that their parents should have the final say when decisions are made in the family. (Respect: .46, .45)</p>	<p>40. Es importante que los niños entiendan que sus padres deberían tener la última palabra cuando se toman decisiones en la familia.</p>
<p>41. Parents should teach their children to compete to win. (Competition and personal achievement: .72, .81)</p>	<p>41. Los padres deberían enseñarle a sus hijos a competir para ganar.</p>
<p>42. Mothers are the main people responsible for raising children. (Traditional gender roles: .54, .60)</p>	<p>42. Las madres son la persona principal responsable por la crianza de los hijos.</p>
<p>43. The best way for a person to feel good about him or herself is to have a lot of money. (Material success: .77, .80)</p>	<p>43. La mejor manera de sentirse bien acerca de uno mismo es tener mucho dinero.</p>
<p>44. Parents should encourage children to solve their own problems. (Independence and self-reliance: .40, .47)</p>	<p>44. Los padres deberían animar a sus hijos a que resuelvan sus propios problemas.</p>
<p>45. It is important to follow the Word of God. (Religion: .79, .78)</p>	<p>45. Es importante seguir la palabra de Dios.</p>

Participant Name \_\_\_\_\_

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46. It is important for family members to show their love and affection to one another. (Familism support: .54, .56)	46. Es importante que los miembros de la familia muestren su amor y afecto unos a los otros.
47. It is important to work hard and do one's best because this work reflects on the family. (Familism referent: .48, .51)	47. Es importante trabajar duro y hacer lo mejor que uno pueda porque el trabajo de uno se refleja en la familia.
48. Religion should be an important part of one's life. (Religion: .65, .58)	48. La religión debería ser una parte importante de la vida.
49. Children should always be polite when speaking to any adult. (Respect: .46, .51)	49. Los niños siempre deberían ser amables cuando hablan con cualquier adulto.
50. A wife should always support her husband's decisions, even if she does not agree with him. (Traditional gender roles: .51, .49)	50. Una esposa debería siempre apoyar las decisiones de su esposo, aunque no esté de acuerdo con él.

**Part II: Cultural Food Beliefs and Demographic Information**

<b>English Version</b>	<b>Spanish Version</b>
51. What are five foods you think of as Hispanic or Latino foods.	51. ¿Qué son cinco comidas que le llegan a la mente cuando piensa en comidas Latina o Hispana?
52. What are five foods you think of as American foods.	52. ¿Qué son cinco comidas que le llegan a la mente cuando piensa en comida Americana?
53. How healthy do you think Hispanic or Latino foods are? a. Not at all healthy b. Slightly healthy c. Moderately healthy d. Very healthy e. Extremely healthy	53. ¿Qué saludable piensa usted que son las comidas Latinas/Hispanas? a. no muy saludable b. un poco saludable c. saludable d. muy saludable e. extremadamente saludable
54. How healthy do you think American foods are? a. Not at all healthy b. Slightly healthy c. Moderately healthy d. Very healthy e. Extremely healthy	54. ¿Qué saludable piensa usted que son las comidas Americanas? a. no muy saludable b. un poco saludable c. saludable d. muy saludable e. extremadamente saludable

Participant Name \_\_\_\_\_

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<p>55. What alternative treatments do you use for health reasons if any? (Prompt: Tea, Herbs, Acupuncture, Massage, etc.)</p> <p>56. Which supplements do you use for health reasons if any? (Prompt: aloe vera, nopales, garlic)</p> <p>57. How many consecutive years have you lived in Kentucky?</p> <p>58. How many consecutive years have you lived in the U.S.?</p> <p>59. What is your country of ethnic origin? (Prompt: Colombia, Cuba, Dominican Republic, Honduras, Mexico, Puerto Rico, El Salvador, Venezuela, USA)</p> <p>60. What language(s) do you prefer to receive health information?</p> <ul style="list-style-type: none"><li>• English</li><li>• Spanish</li><li>• Other (please specify) _____</li></ul> <p>61. With whom do you currently live? Select all that apply.</p> <ul style="list-style-type: none"><li>• Alone</li><li>• With spouse/partner</li><li>• With children</li><li>• With parents</li><li>• With grandparents</li><li>• With other relatives and extended family, such as aunts, uncles, cousins, etc.</li><li>• Friends</li><li>• Other: _____</li></ul> <p>62. What is your marital status?</p> <ul style="list-style-type: none"><li>• Single, never married</li><li>• Married or domestic partnership</li><li>• Widowed</li><li>• Divorced</li><li>• Separated</li></ul> <p>63. What is your employment status?</p>	<p>55. ¿Cuales tratamientos alternativos usa para la salud? (tes, hierbas, acupuntura, masajes, etc.)</p> <p>56. ¿Cuales suplementos usa para su salud? (sábila, nopales, ajo)</p> <p>57. ¿Cuántos años consecutivos ha vivido en Kentucky?</p> <p>58. ¿Cuántos años consecutivos ha vivido en los Estados Unidos?</p> <p>59. ¿Cual es su país de origen/ origen étnico? (Inducir: Colombia, Cuba, Republica Dominicana, Honduras, Mexico, Puerto Rico, El Salvador, Venezuela, Estados Unidos)</p> <p>60. ¿En que idioma prefiere recibir informacion sobre la salud?</p> <ul style="list-style-type: none"><li>• Ingles</li><li>• Espanol</li><li>• Otro: _____</li></ul> <p>61. ¿Con quien vive ahora?</p> <ul style="list-style-type: none"><li>• ___ Solo</li><li>• ___ Con esposa/esposo</li><li>• ___ Con Hijos</li><li>• ___ Con Padres</li><li>• ___ Con Abuelos</li><li>• ___ Con parientes</li><li>• ___ Con amistades</li><li>• ___ Otro (especifique)</li></ul> <p>62. ¿Cual es su estado civil?</p> <ul style="list-style-type: none"><li>• ___ Soltero/a</li><li>• ___ Casado/a</li><li>• ___ Viudo/a</li><li>• ___ Divorciado/a</li><li>• ___ Separado/a</li></ul>
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Participant Name \_\_\_\_\_

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<ul style="list-style-type: none"><li>• Employed full-time in one position (average of 40 hours or more per week)</li><li>• Employed part-time in one position (less than 30 hours per week)</li><li>• Homemaker</li><li>• Unemployed</li><li>• Retired</li><li>• Student</li><li>• Military</li><li>• Disabled, unable to work</li></ul> <p>64. On a scale of 1 (very poor) to 5 (very rich), how would you describe your household's income/money status? (Plasencia)</p> <ul style="list-style-type: none"><li>• Very less money (very poor)</li><li>• Less money</li><li>• Enough money</li><li>• More than enough money</li><li>• Lots of money (very rich)</li></ul> <p>65. What is the highest grade of education you completed?</p> <p>66. Where did you complete your education?</p> <ul style="list-style-type: none"><li>• U.S.</li><li>• Mexico</li><li>• Other (Please specify): _____</li></ul>	<p>63. ¿Cual es su estado de empleo, es</p> <ul style="list-style-type: none"><li>• _____ empleado (tiempo completo, 40 horas o mas)</li><li>• _____ empleado (medio tiempo, menos de 30 horas)</li><li>• _____ incapacitado, no puede trabajar</li><li>• _____ ama de casa</li><li>• _____ desempleado</li><li>• _____ jubilado</li><li>• _____ estudiante</li><li>• _____ deshabilitado(a)</li><li>• _____ Militar</li><li>• _____ Otro (especifique) _____</li></ul> <p>64. ¿En una escala de 1 (muy pobre) a 5 (muy rico), como describe el ingreso de su familia?</p> <ul style="list-style-type: none"><li>• _____ Muy poco dinero (muy pobre)</li><li>• _____ Menos dinero</li><li>• _____ Suficiente dinero</li><li>• _____ Mas que suficiente dinero</li><li>• _____ Mucho dinero (muy rico)</li></ul> <p>65. ¿Cual es el grado mas alto de educación que obtuvo?</p> <p>66. ¿En que país consiguió su educación?</p> <ul style="list-style-type: none"><li>• _____ Estados unidos</li><li>• _____ Mexico</li><li>• _____ Otro _____</li></ul>
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## Appendix E: 24-hour Dietary Recall

Participant Name \_\_\_\_\_

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### 24-Hour Dietary Recall 5-Step Approach

#### Getting started

- Break the ice
- Explain why the assessment is being done
- Reassure the subject this will be kept confidential

#### USDA 5-Step Approach

1. Quick List – Collect a list of foods and beverages consumed the previous day
  - What was the 1st thing you ate after you got up yesterday?
    - Avoid terms like breakfast or lunch
  - Record only food at this time; don't worry about portion sizes until later
  - Allow extra space for adding things later
  - Do NOT interrupt
2. Forgotten Foods – Probe for foods forgotten during the Quick List
  - Your turn to talk
  - Probe with open ended questions (how, what, describe)
  - Don't forget...
    - Condiments
    - Beverages
    - Alcohol
    - "Little bites" of food
  - Frequently missed foods
3. Time & Occasion – Collect time and eating occasion for each food
  - Review the day to them
  - Ask the subject to tell you the time of day each food was eaten
  - Ask if there are additions or corrections
4. Detail Cycle – For each food, collect detailed description, amount, and additions. Review 24-hour day
  - Obtain 4 kinds of info about each food/beverage
  - Kind of food/Beverage
    - Fresh, frozen, canned
    - Skim, 2%, whole
  - Preparation of food
    - Fried or baked
    - Ingredients added
  - Portion size of food
    - Participant may underestimate so use models or examples
    - Make sure EVERY item has some measuring unit
  - How served
    - Butter, gravy, or cream added?
  - If you are not sure about a food, ask the participant to describe it to you
    - For example, Joe tells you he has a Gatorade<sup>®</sup> every morning after breakfast
    - Find out what is a Gatorade<sup>®</sup>...

Participant Name \_\_\_\_\_

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- Is it a drink?
- An energy bar?
- Get details (color, ingredients, etc)
  - Your mom's BBQ is not going to be the same as his/her mom's
- Record dietary supplements or vitamins/minerals
- Record any herbal or home remedies
- 5. Final Probe – Final probe for anything else consumed
  - Remember...
    - Double-check name on each dietary assessment form
    - Check for completeness



Participant Name \_\_\_\_\_

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**24-Hour Recall Sheet**

Q1. How many times/week do you eat meals with your family?

Q2. How many times/week do you eat breakfast?

<b>Time of the Day</b>	<b>Food Items</b>	<b>Amount/Portion</b>	<b>What were you doing?</b>	<b>Where were you eating?</b>

Q3. Do you have a problem with digesting fluid milk?" yes or no

Q4. "Was this a normal day?" yes or no

## Appendix F: Anthropometrics Form

Participant Name \_\_\_\_\_

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### Anthropometric Measurements

Study site: \_\_\_\_\_

Participant ID: \_\_\_\_\_

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

Collected by: \_\_\_\_\_

#### Height (cm)

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

#### Weight

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

#### Waist Circumference

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

## Appendix G: Medical Abstraction Form

Participant Name \_\_\_\_\_

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### MEDICAL DATA ABSTRACTION FORM

Study Site: \_\_\_\_\_

Date Abstracted: \_\_\_\_\_

Assigned I.D.: \_\_\_\_\_

Reviewer: \_\_\_\_\_

Year of Birth: \_\_\_\_\_

Gender: \_\_\_\_\_

Most Recent Date of Exam: \_\_/\_\_/\_\_\_\_

Type of insurance:

\_\_\_\_ None (0)

\_\_\_\_ Medicare (1)

\_\_\_\_ Medicaid (2)

\_\_\_\_ State (3)

\_\_\_\_ Local (4)

\_\_\_\_ Other (specify): \_\_\_\_\_ (5)

Number of clinic visits in the past 12 months \_\_\_\_\_

Number of hospitalizations in the past 12 months \_\_\_\_\_

#### I. Family History:

Diabetes Mellitus

\_\_N(0)

\_\_Y(1)

\_\_Father(1)

\_\_Mother(2)

\_\_Grand Parent (3)

\_\_Sibling(4)

Coronary Art Disease

\_\_N(0)

\_\_Y(1)

\_\_Father(1)

\_\_Mother(2)

\_\_Grand Parent (3)

\_\_Sibling(4)

Participant Name \_\_\_\_\_

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**II. Social History:**

Tobacco

N(0)

Y(1): packs per day \_\_\_\_\_

Alcohol

N (0)

Y (1)

Exercise

N(0)

Y(1)

**III. Physical Examination: (for past year or at least one date prior to most current available)**

Date	Height (feet and inches)	Weight (pounds)

**IV. Laboratory Data: (for past year or at least one date prior to most current available)**

Lab Values	
Date	HbA1c
Date	Blood Pressure Systolic/Diastolic
Date (Fasting/Non-fasting)	Glucose

Cholesterol				
Date	Total	LDL	TG	HDL

**V. Any medical diagnosis noted on chart**

\_\_\_\_\_ High Blood pressure

\_\_\_\_\_ Heart disease

Participant Name \_\_\_\_\_

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- \_\_\_\_\_ Kidney problems
- \_\_\_\_\_ Overweight/Obesity
- \_\_\_\_\_ Eye Problems
- \_\_\_\_\_ Nerve Problems
- \_\_\_\_\_ Type 2 diabetes mellitus
- \_\_\_\_\_ Other (specify): \_\_\_\_\_

## Appendix H: Bivariate Correlation Matrix

**Table: Bivariate correlation matrix for cultural values and specific nutrients**

	Competition & Personal Achievement	Familism Obligations	Familism Referents	Familism Support	Independence & Self-Reliance	Material Success	Religion	Respect	Traditional Gender Roles	Mexican American values	Mainstream values
Energy (kcal)	0.09	-0.02	-0.05	-0.02	0.10	0.12	0.05	0.09	0.05	0.03	0.12
Calories from alcohol	0.06	0.04	-0.09	-0.01	0.08	0.02	0.07	-0.11	-0.09	-0.04	0.07
Calories from carbohydrate	-0.02	0.11	0.11	0.12	0.00	-0.01	0.14	0.13	0.14	0.17	-0.01
Calories from fat	-0.02	-0.16	-0.11	-0.21*	-0.08	-0.02	-0.16	-0.12	-0.17	-0.22*	-0.05
Calories from MUFA	-0.03	-0.13	-0.05	-0.22	-0.09	0.04	-0.10	-0.09	-0.07	-0.15	-0.03
Calories from PUFA	0.09	-0.07	-0.12	-0.14	0.09	0.09	0.00	-0.07	-0.11	-0.12	0.11
Calories from protein	0.08	0.00	-0.05	0.09	0.12	0.04	-0.06	-0.08	-0.02	-0.03	0.10
Calories from SFA	-0.09	-0.16	-0.10	-0.13	-0.15	-0.17	-0.23*	-0.09	-0.22	-0.23*	-0.16
Animal Protein (g)	0.18	0.02	-0.02	0.07	0.18	0.14	0.03	0.02	0.06	0.04	0.20
Total Protein (g)	0.15	0.00	-0.04	0.04	0.16	0.14	0.03	0.01	0.04	0.02	0.18
Vegetable Protein (g)	-0.07	-0.09	-0.10	-0.12	-0.04	0.01	0.04	-0.02	-0.10	-0.09	-0.04
Omega-6:Omega-3 Fatty Acids Ratio	0.12	0.02	-0.05	0.03	0.19	0.08	0.07	0.01	-0.06	0.00	0.15
Added Sugars (g)	0.07	0.04	-0.07	0.07	0.01	0.12	0.03	0.12	0.16	0.09	0.08
Vitamin B12 (mcg)	0.16	0.06	-0.09	0.06	0.11	0.10	0.12	0.01	-0.03	0.03	0.15
Vitamin B6 (mcg)	0.15	0.04	0.01	0.03	0.24*	0.17	0.13	0.06	0.11	0.10	0.22*
Methionine (g)	0.12	-0.03	-0.10	0.01	0.13	0.09	0.02	-0.02	-0.02	-0.03	0.14
Cholesterol (mg)	0.05	-0.05	0.01	-0.01	0.02	-0.03	-0.06	-0.03	-0.09	-0.06	0.02

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