The University of Southern Mississippi

The Aquila Digital Community

Spring 5-2011

Examining Dietary Acculturation in Hispanic Males Residing in South Mississippi

Diana Katherine Cuy Castellanos
University of Southern Mississippi

The University of Southern Mississippi

EXAMINING DIETARY ACCULTURATION IN HISPANIC MALES

RESIDING IN SOUTHERN MISSISSIPPI

by

Diana Katherine Cuy Castellanos

Abstract of a Dissertation
Submitted to the Graduate School
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

May 2011

ABSTRACT

EXAMINING DIETARY ACCULTURATION IN HISPANIC MALES

RESIDING IN SOUTHERN MISSISSIPPI

by Diana Katherine Cuy Castellanos

May 2011

This study explored dietary behavior in terms of dietary intake, dietary intake change and dietary contributing factors in a sample of Hispanic males residing in southern Mississippi that are at various stages of the acculturation process. Grounded theory and the bidimensional acculturation model were incorporated to identify the dietary factors and assess acculturation in each participant. Qualitative and quantitative measures were used in data collection. Qualitative measurements included Semi-structured interviews, a focus group, and photovoice with group interviews. The ARSMA-II, Marginality Scale, Fruit/Vegetable and Fat Food Screeners, a psychosocial dietary questionnaire, and the New Vital Signs Food Label for Health Literacy were quantitative instruments used to examine acculturation and dietary behavior. All interviews and questionnaires were interviewer-administered in either Spanish or English as specified by the participant. Grounded theory drove the data analysis. First, the ARSMA-II and Marginality scale scores were determined for each participant, and each participant was placed into one of four bidimensional acculturation groups. Second, three trained qualitative coders, used open, axial, and selective coding to extract codes, identify themes and main themes, draw connections between themes and identify and define core categories. Ill-defined and unclear themes were identified during this process, leading to

the photovoice and group interviews which were used to clarify ill-defined themes. Constant comparison was used to incorporate the quantitative data into the qualitative data findings and compare data across groups. Dietary patterns and contributing factors for each acculturation group were identified and compared across groups, and a dietary acculturation conceptual framework was proposed. Information gained can be used to inform nutrition practice and nutrition intervention development relevant to Hispanic males.

The University of Southern Mississippi

EXAMINING DIETARY ACCULTURATION IN HISPANIC MALES

RESIDING IN SOUTHERN MISSISSIPPI

by

Diana Katherine Cuy Castellanos

A Dissertation
Submitted to the Graduate School
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

Approved:

Dr. Carol Connell

_____
Director

Dr. Kathy Yadrick

_____

Dr. Jamie Zoellner

_____

Dr. Laura Downey

_____

Mrs. Susan Graham-Kresge

_____

Dr. Susan A. Siltanen

_____
Dean of the Graduate School

May 2011

ACKNOWLEDGMENTS

I truly believe that God blessed me these past four years by placing incredible people with incredible talents and wisdom in my life. They have shared these talents and wisdom with me openly, and for that I am forever grateful. First, I would like to offer my gratitude to Dr. Carol Connell for her support, mentorship, direction and encouragement during this dissertation process. I will be forever grateful to her for walking alongside of me and being that calm, silent voice pushing me forward. Words do not express how grateful I am to her for all the time and energy she put into this paper and study. I thank Dr. Kathy Yadrick for challenging me to be a better researcher, student, teacher and person; and for always believing in and fighting for me. She has been my fearless leader for four years, and I will continue to carry the skills she has taught me to my next phase of life. To my mentors and friends in Community Health Sciences, Dr. Laura Downey and Mrs. Susan Graham-Kresge, the wisdom I have gained from these women about academia and beyond will stay with me throughout the years. I am forever grateful for their mentorship, words of encouragement and endless hours spent preparing for this study and reviewing this paper. They are my breath of fresh air and have been my teachers as well as my cheerleaders throughout this process. I extend my appreciation to Dr. Jamie Zoellner, who has been an incredible asset from the very beginning of this process in guiding, advising, and reviewing the study and this paper. To Rolando Mendez and Alex Castillo for the many hours of data collection and analysis they dedicated to this study and for all the laughter in the midst of it. They have encouraged me as well as taught me so much. Furthermore, a special thanks to Rebecca Holland for editing this paper and doing it with a servant's heart. To my participants, I want to extend my

iv

appreciation for sharing their time and lives with me. Finally, to all the staff and faculty in The Department of Nutrition and Food Systems at the University of Southern Mississippi for always being an encouragement and assisting me in so many ways during this study. They have been such an integral part of my life these past four years

To my husband, Oswaldo Cuy Castellanos, for supporting and encouraging me as I went after this goal, for bringing me joy, making me laugh, continuously supporting me and for being my strength. God gave me my "media naranja." To two of my biggest supporters in my life my parents, Tim and Trudy Bucey, I am so grateful to them for continuing to love and support me and for being proud of me. To my brother and sister, for helping me to follow my heart and for always reminding me of who I am and who God has made me to be. I thank God for blessing and uplifting me and never giving up on me.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

Figure

LIST OF ABBREVIATIONS

ANGMAR – Anglo Marginalization

AOS – Anglo-Orientation Scale

ARSMA-II - Acculturation Rating Scale for Mexican-Americans - II

BAS – Bidimensional Acculturation Scale

BFV – Berries, Fruits and Vegetables

CDC – Center for Disease Control

CVD – Cardiovascular Disease

CI – Confidence Interval

GT – Grounded Theory

HC – High Carbohydrate

HF – High Fat

HHANES – Hispanic Health and Nutrition Examination Survey

HOS – Hispanic Orientation Scale

HP – High Protein

LE – Low Energy

ICE – US Immigration and Customs Enforcement

IRB – Institutional Review Board

M – Mean

MAMAR –Mexican or Hispanic – American Marginalization

MEXMAR – Mexican or Hipsanic Marginaliztion

MOS – Mexican Orientation Scale

NHANES – National Health and Nutrition Examination Survey

NHIS – National Health Interview Survey

NHS – Nurses' Heart Study

NHW – Non-Hispanic White

NVS – New Vital Signs Food Label for Health Literacy

PR – Primary Researcher

PRE – Predisposing, Reinforcing, Enabling

RA – Research Assistant

SES – Socioeconomic Status

SSI – Semi-structured Interview

TOFHLA – Test of Functional Health Literacy in Adults

US – United States

CHAPTER I

INTRODUCTION

The Hispanic population is the fastest growing and largest minority population in

the United States (US).This population consists of individuals from different Latin

American countries which include; Mexico, Guatemala, El Salvador, Honduras, Belize,

Nicaragua, Costa Rica, Panama, Puerto Rica, Dominican Republic, Cuba, Paraguay,

Chile, Peru, Columbia, Brazil, Argentina, Uruguay, Ecuador, Venezuela, and Spain (US

Census Bureau, 2007). While the majority of the US Hispanic population resides in

southwestern states, southeastern states such as Mississippi are experiencing an influx of

persons of Hispanic descent with the majority being Mexican and male (US Census

Bureau, 2009).

Statement of the Problem

Acculturation occurs when a minority person "adopts the cultural patterns of a

host group" (Satia-Abouta, 2003, p. 73).Dietary acculturation is defined in the same way

but occurs when a person adopts the dietary patterns of a host group. The traditional

Mexican, South and Central American and Caribbean diet consists of poultry, fish, beans,

cocoa, tomatoes, corn, peas and squash and is typically high in fiber, fruits and vegetables

(Loftas et al., 1995; McArther, Anguiano & Nocetti, 2001; Kittler & Sucher, 1998). The

diet in the US is commonly termed the Western diet and consists mainly of refined foods

and ingredients, fatty meats, salt and dairy products (Cordain et al., 2005). The diet is

typically low in fiber and some vitamins and minerals but high in saturated fat and *trans*

fat and has been indicated as a risk factor for some chronic diseases (Rissanen,

Voutilainen, Salonen, Kaplan, & Salonen, 2003). Mississippi has a lower intake of fruits

and vegetables when compared to the national average (18% compared to 24%;Center of Disease Control [CDC], 2009). A low intake of fruits and vegetables has been associated with a poor diet and high rates of obesity (Bazzano, Serdula, & Liu, 2003), both of which are higher in Mississippi compared to the rest of the nation (CDC 2009; Champagne et al., 2004). Therefore, dietary acculturation in Hispanic men residing in Mississippi may indicate a notable decrease in dietary quality.

Different socio-demographic, cultural, psychosocial and environmental factors may influence the degree to which one adopts the dietary habits of his or her new environment. Changes in psychosocial and environmental factors that may occur after migration and influence dietary intake are outlined by Sabia-Abouta (2003) and include diet and disease related behavior, knowledge and attitudes, taste preference, traditional value, shopping, restaurants, and food purchasing and preparation (Figure 1). In this present study, the researcher explored factors that influence dietary acculturation in Hispanic men living in southern Mississippi. The ultimate purpose of this study was to identify the dietary patterns and the dietary contributing factors that influenced dietary patterns in the study population across differing acculturation groups. The identified dietary patterns and contributing factors were compared to the proposed dietary acculturation model developed by Satia-Abouta (2003) and a dietary acculturation conceptual framework specific to the Hispanic population was identified.

Research Questions

Dietary contributing factors that influenced dietary intake in first- or second-generation Hispanic males living in southern Mississippi from Mexico, Central or South America or the Caribbean through interpretation of the population's dietary perceptions

were identified and described. The interpretive paradigm was used to seek understanding

of dietary behavior from the view point of the research population. In conjunction with

the paradigm, different models and frameworks were incorporated to guide data

collection, analysis and interpretation. The models and frameworks used were the dietary

acculturation model (Sabia-Abouta, 2003), grounded theory (GT) (Glaser, 2007) and the

bidimensional acculturation model (Berry, 1997).The following were the research

questions as proposed by the researcher.

1. What are the differences in dietary patterns of Hispanic males across

    bidimensional acculturation groups?
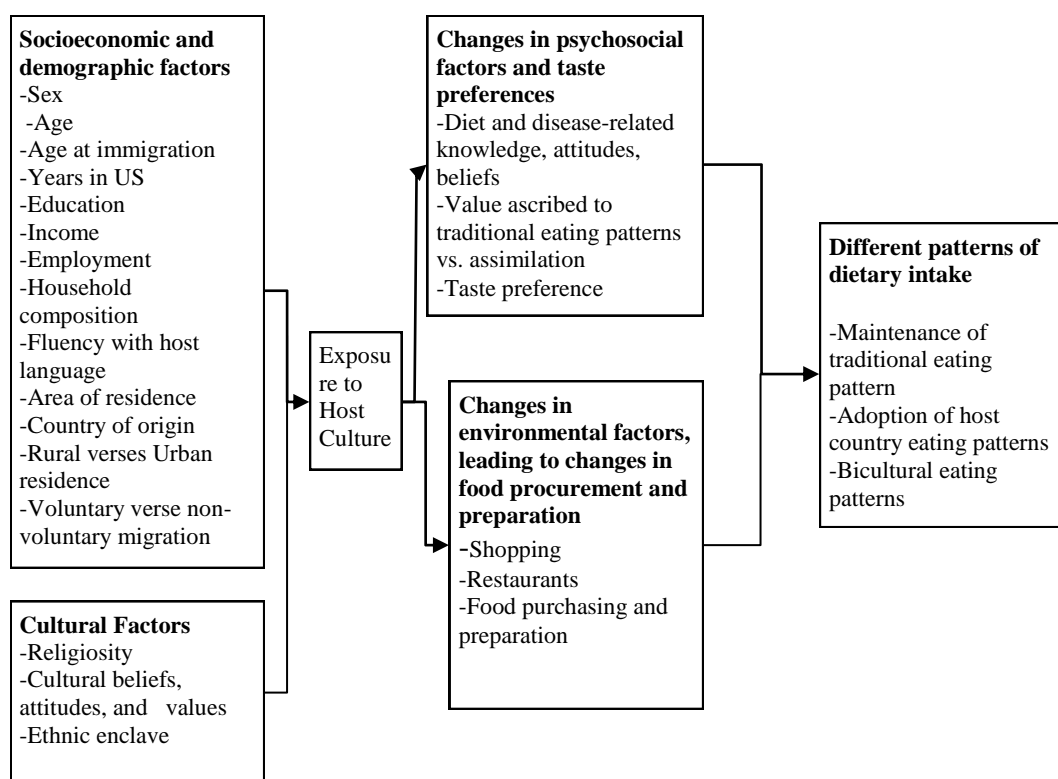
*Figure 1.*Proposed Dietary Acculturation Model. Source: Satia-abouta, J.(2003*).
Dietary acculturation: Definition, process, assessment, and implication.
International Journal of Human Ecology, 4*(1), 71-86.

2. What mediating factors influence dietary patterns across acculturation groups?

3. What are the differences and similarities in mediating factors across the acculturation groups?

4. What dietary changes have occurred since immigrating to the US and/or Mississippi or leaving the childhood home?

Significance

This study was significant due to its unique timing. There has been an influx of Hispanic men into Mississippi over the past 6 years. The Hispanic population grew 30% between 2002 and 2008 while the overall Mississippi population only grew 5% (US Census Bureau, 2002, 2008). The Hispanic Health Paradox suggests that although this population has a lower education and income level they appear to be healthier than the other ethnic groups residing in the US (Franzini, Riddle, & Keddie, 2001). However, as Hispanic immigrants spend more time in the US; this paradox fades. Also, specifically in urban areas throughout Latin America, there have been changes in foods systems and these systems are beginning to more closely resemble the US food system (Bermudez & Tucker, 2003). This study allowed for the examination of dietary acculturation in Hispanic males coming from a traditional and/or changing system in Mexican, Central or South American or Caribbean food system into the US food system.

The findings may be used in healthcare practice to better serve the study population. The results of this study could potentially influence policy around Hispanic health and health practice. By exploring dietary factors and changes in factors that occur during the immigration and acculturation process, policy makers can assess and create policy that promotes retention of healthy Hispanic dietary behaviors and the adoption of

healthy dietary behaviors from the host culture. Furthermore, it can help guide intervention development that addresses specific issues that deter this population from healthy traditional Hispanic dietary patterns to less healthy alternatives. Lastly, this research can provide health practitioners who work with the Hispanic population information on factors involved with their dietary patterns to better counsel and address the needs of their clients.

Assumptions

1. All participants have an equal interpretation of the questions presented to them.

2. All participant answers were congruent to their true perceptions.

3. All participants followed the photovoice protocol accurately and equally.

4. The instruments used accurately measured what they were intended to measure.

5. The final analysis and interpretation correctly reflected the participants' comments and answers.

Definition of Terms

- Acculturation: Process by which a "group adopts the cultural patterns of a host group" (Sabia-Abouta, 2003, p. 73).

- Bidimensional acculturation: The degree to which an immigrant (a) maintains his or her traditional cultural values and norms and b) has contact and participates within his or her new host culture (Berry, 1997).

- Dietary acculturation: Process by which a "migrating group adopts the dietary patterns of their new environment" (Sabia-Abouta, 2003, p. 74).

- Dietary pattern: "The habitual consumption of certain foods that represent a combination of foods and nutrients" (Gao et al., 2003, p.3636).

- Food environment: "Virtually all potential determinants of what people eat that are not clearly individual factors such as, cognitions, attitudes, beliefs and skills" (Glanz, 2009, p. S93).

- Hispanic: A person of Mexican, Guatemalan, El Salvadorian, Honduran, Belizean, Nicaraguan, Costa Rican, Panamanian, Puerto Rican, Dominican, Cuban, Paraguayan, Chilean, Peruvian, Columbian, Brazilian, Argentinean, Uruguayan, Ecuadorian, or Venezuelan descent (CDC, 2007).

- Nutrition Transition: A shift in dietary patterns from traditional diets to diets comprised of highly processed and refined foods which then leads to shifts in disease states (Popkin, 1993).

- Psychosocial: "Involving aspects of both social and psychological behavior" (Stedman's Medical Dictionary, 2008, p. 1292).

- Traditional Hispanic Dietary Pattern: A diet that consists mainly of chili, lard, cactus, coffee, rice, poultry, fish, meat, beans, cocoa, tomatoes, corn, peas and squash and is typically high in fiber, fruits and vegetables (Goody & Drago, 2009; Kittler & Sucher, 1998; Loftas et al. 1995; McArther, Anguiano & Nocetti, 2001).

- Western dietary pattern: A diet that consists mainly of refined foods, fatty meats, salt and dairy products (Cordain et al., 2005).

CHAPTER II

LITERATURE REVIEW

The Hispanic Population in the US

The Hispanic population is defined as persons of Mexican, Guatemalan, El Salvadorian, Honduran, Belizean, Nicaraguan, Costa Rican, Panamanian, Puerto Rican, Dominican, Cuban, Paraguayan, Chilean, Peruvian, Columbian, Brazilian, Argentinean, Uruguayan, Ecuadorian, Venezuelan or Spanish descent (US Census Bureau, 2007). In this paper, "Hispanic" will be used to indicate a person who was born in or whose heritage is from one of the countries previously mentioned unless the article being described used a different terminology or a particular geological subgroup.

The Hispanic population is the fastest growing minority population in the US (US Census Bureau, 2009) at a rate of 24.3% between 2000 and 2006; three times more than the overall US population (US Census Bureau, 2007). In 2009, Hispanics made up 15.8% of the total US population with 64% of the Hispanic population being of Mexican origin (US Census Bureau, 2009). The majority of Hispanics reside in the southwestern US, although the Hispanic population is increasing in all regions. Also, almost half of the Hispanics living in the US were born outside of the US. Only 2.2% of the population in Mississippi is Hispanic, but the growth rate of Hispanics in this state is 30% compared to only 6% growth for the overall state population (US Census Bureau, 2009). Table 1 outlines socioeconomic and demographics of the Hispanic population in the US and in Mississippi and compares these populations to the overall US and Mississippi populations. The Hispanic Mississippi population is majority male and between the ages of 18 and 64.

According to the US Census Bureau (2007), in the US Hispanics have an average income that is 70% of non-Hispanic whites and the lowest rate of adults with a high school diploma (54%) amongst racial groups. The rate of Hispanic males with a high school diploma residing in Mississippi is even lower than that of Hispanic males in the US. Also, over one-third of the Hispanic population does not speak English "well" in the US and in Mississippi. (Does not speak English "well" was determined by the participants response to a self-reported English ability question that was on a Likert type scale; speaks English "very well", "well", "not well", "not at all"; US Census Bureau, 2002). The poverty rate for Hispanics is almost twice as high as the total US population's rate and is higher for Hispanics living in Mississippi although in this state the percent of Hispanics receiving food stamps is less than the Hispanic national average.

Hispanic Health

Health disparities are reported in the Hispanic population residing in the US (Elder, Ayala, Parra-Medina & Talavera, 2009). Discrimination, legal status, lack of health care access and health insurance and language may be factors that lead to such health disparities (Elder et al., 2009). Hispanics residing in the US, specifically Mexican Americans, have a disproportionately higher rate of diabetes (12.4% to 6.4%) and are more likely to be obese when compared to non-Hispanic White males (NHW), but have a lower prevalence of some cancers, heart disease and stroke (CDC, 2009). Hispanic males have a higher prevalence of stomach and liver cancers when compared to NHW males and have the highest prevalence of metabolic syndrome when compared to the US population (Ford, Giles & Dietz, 2002).

Table 1

Demographic Variables of Hispanics Residing in the US and Mississippi

	Total US Population	Total US Hispanic population	Total Mississippi population	Total Mississippi Hispanic Population
Male Median Age	36.4	27.3	35.1	25.4
Male	50.5%	53%	49%	60.5%
Married; males over 15	52.6%	48.7%	50.6%	46.8%
Education (male)				
Less than high school diploma	16%	40.1%	22%	40.5%
High school diploma or higher	83.5%	58.5%	76.5%	54.2%
Foreign Born	12.5%	40.0%	1.7%	44.0%
Males	54.6%	66.7%	50.3%	53.9%
Females	45.4%	33.3%	49.7%	46.1%
Not US citizen	7%	29%	1.0%	34%
Language Spoken at Home				
English only	80.5%	21.9%	96.6%	33.4%
Speak English less than "well"	8.6%	39.1%	1.3%	40.7%
Occupation				
Construction/ service	29.6%	58.5%	46.0%	72.9%

Table – (continued).

	Total US Population	Total US Hispanic population	Total Mississippi population	Total Mississippi Hispanic Population
Food Stamp benefits	7.9%	13.1%	15.0%	8.5%
Per capita income	26,178	15,190	18,820	14,741
Poverty Rate				
People 18 to 64 years old	11.9%	17.9%	18.0%	22.5%

*Note.*US Census Bureau.(2007). *American Community Survey 3-year estimates, 2005-2007.* [Data File].

Angel, Angel and Hill (2008) compared the health status of older Mexicans in the US (n=2734) to older Mexicans in Mexico (n=3875). Mexicans residing in Mexico had higher depressive symptoms but a lower BMI and smoking rate and reported diagnosis of arthritis, diabetes, heart disease or cancer than US Mexican residents. Also, Mexicans living in the US with health insurance reported a higher incidence of the chronic diseases than did those without health insurance. One explanation of this difference is that many without health insurance or those living in Mexico may go undiagnosed due to lack of health care access.

The effects of migration on disease risk factors have been examined. Some studies have indicated that with migration comes the adoption of western diet and lifestyle habits which, over time, increases morbidity and mortality from aforementioned chronic diseases. Wei, Valdez, Mitchell, Haffner, Stern and Hazuda (1996) administered a two-phase longitudinal study with 3735 US-born Mexican-Americans, foreign-born Mexican-Americans, and Non-Hispanic White participants. The researchers examined

mortality and morbidity rates over time in these three populations. The US-born

Mexican-American population had a significantly higher mortality rate among men and

women over the age of 45 when compared to foreign-born Mexican-American men and

women and Non-Hispanic men and women at $p < .05$. The authors conclude that there

may be "a healthy migrant" affect and/or that acculturation may contribute to a

decreasing health status after migration.

Lara, Gamboa, Iya Kahramanian, Morales and Hayes Bautista (2005) reviewed

literature assessing Hispanic health and found that acculturation had a negative effect on

nutrition, exercise, pregnancy, smoking and substance abuse behaviors but had a positive

effect on health care access and use such as general health care use, health insurance

coverage, cancer screening, and preventive care services. Popkin and Udry (1998) used

data from the National Longitudinal Study of Adolescent Health to examine the

difference in weight among 13,783 first, second and third generation Hispanics, Asians,

American-Indian, Non-Hispanic Whites and Non-Hispanic Blacks. Their results indicated

that there was a significant positive correlation ($p <.05$) in obesity between first-

generation (n = 735) and second-generation (n = 1310) Hispanics in which the second-

generation were about 25% more likely to be obese. (This study defined obesity as a BMI

<85%ile). Goel, McCarthy, Phillips and Wee (2004) compared obesity rates of 32,374

foreign-born persons to US born Non-Hispanic Whites, Blacks, Hispanics and Asians.

The US-born population had a 22% obesity rate compared to a 19% obesity rate in the

foreign-born population. The researchers examined this increase in foreign-born

participants over five year increments and found that there is a significant difference in

BMI after residing in the US for ten years or more ($p < .05$).

The Hispanic Paradox is characterized by a low mortality rate in the Hispanic population in the US in midst of low income, education levels, and morbidity factors (Franzini, Ribble, & Keddie, 2001). There have been many theories proposed to explain the paradox but none have been confirmed. The Hispanic subgroups that are experiencing this paradox include infants, older adults, non-acculturated, Mexican American and the foreign born. Gordon-Larsen, Harris, Ward and Popkin, (2003) observed a decrease in the Hispanic paradox as Hispanics spent more time in the US (n=8613).The reason for this paradox is multifactoral and includes social, environmental and genetic factors (Mirsa & Ganda, 2007). Franzini et al. (2001) noted that this is an opportune time to identify cultural aspects of immigrant status that promote health.

<div align="center">Acculturation</div>

Acculturation is defined as "those psychological and social changes that groups and individuals experience when they enter a new and different cultural context" (Cabassa, 2003, p.128). Researchers argue that acculturation is a multifactorial process that affects individuals and groups at different behavioral, attitudinal and cognitive levels (Cuellar, Harris, & Jasso, 1980). Berry (1997) developed an acculturation framework for research that depicts group and individual level factors, across moderating factors, that affect the degree to which one acculturates (Figure 2). The left side of the model indicates group level variables (situational variables) and the right side indicates individual level variables (person variables) that effect acculturation. The top half outlines factors that occur before acculturation and the bottom level outlines factors that occur after acculturation. Hence, the combination of the group and individual and before and after moderating variables influence the overall acculturation structure and process of a person

(as depicted in the center boxes that flow out of group level and through individual level variables). Berry (1997) comments that acculturation is a process that is different for each individual dependent on the variables outlined in the model.

Group Level	Individual Level Variables				
Society of Origin	Moderating Factors Prior to Acculturation				
Political Context	Age, gender, education, pre-acculturation				
Economic Situation	Status, migration, motivation, expectations				
	Cultural distance (Language, religion etc…)				
Demographic Factors					
	Personality (Locus of control, Flexibility)				
Groups Acculturation					
Physical	Acculturation Experience	Appraisal of Experience	Strategies Used	Immediate Effects	Long Term Outcomes
Biological	Life Events	Stressors	Coping	Stress	Adaptation
Economic Social Cultural	Moderating Factors During Acculturation Phase (Length of Time) Acculturation Strategies: Attitudes & Behaviors Coping: Strategies & Resources				
Society of Settlement					
Attitudes	Social Support				
Social Support	Societal Attitudes: Prejudice & Discrimination				

Figure 2. A Framework for acculturation research. *Note:* From. "Immigration, acculturation, and adaptation," by Berry, 1997, *Applied Psychology: An International Review, 46*(1), p. 15.

Marin (1992) describes acculturation in terms of a process across a three level cultural learning process and notes that the process is non-linear. The first level is superficial and includes the changing of diet and media. The second is an intermediate level and includes behaviors that are at the core of an individual's life such as language,

social network and multicultural environments. The third is the significant level and

consists of the adoption and maintenance of values and norms from both cultures.

Acculturation Models

In the literature, there are two different models which have been used to measure

the acculturation process; a unidimensional model and a bidimensional model. The

unidimensional model is a linear model in which an individual is set on a continuum

between identifying with the traditional culture or host culture or somewhere in between

the two (Ryder, Alden, & Paulhus, 2000). Buriel (1993) explains that acculturation is

bidirectional and depending on how much a person retains the indigenous culture and

adopts the host culture determines a person's acculturation level or grouping as shown in

Figure 3. However, the bidimensional model occurs across two dimensions. Berry (1997)

describes acculturation across two dimensions which does not only look at cultural

maintenance as the bidirectional model by Buriel but also includes an individual's contact

and participation within the host culture (Table 2). Therefore, Berry (1997) indicates that

acculturation possesses two dimensions; a) cultural maintenance and b) contact and

participation. Berry describes cultural maintenance by the extent an individual strives to

maintain his or her original cultural due to his or her perception of importance of those

cultural characteristics. Contact and participation is the "extent that an individual

becomes involved in other cultural groups" (p.9). This model differs from the

unidimensional model for it has two dimensions and is non-linear; with the interaction of

the two dimensions, creating four acculturation strategies or "groups"(Table 2). The four

strategies are: assimilation, integration, separation and marginalization. Assimilation

includes people that have taken on the values and norms of his or her host society and

associate with people of the host society. Integration involves people that have continued to sustain some of his or her societies' values and norms while also adopting some values and norms of his or her host society. An integrated person also has contact with people from both societies. Separation assumes people have rejected the values and norms of the host society and also have very little association with people from the host society but maintaining all or most contact with people of his or her society of origin. Lastly, marginalization includes people who have been forced to accept the norms and values of the host society while being rejected by people of both the persons' original and host societies. Berry explains further that if the dominant society is not the population that is acculturating, and therefore is the host group; it may inhibit the non-dominant group from choosing their acculturation subcategory. For example, instead of an individual choosing to assimilate that individual may be forced into assimilation. The same occurs with separation, if the individual feels forced into separation, separation may turn into segregation. Lastly, marginalization is usually a combination of forced separation and forced assimilation (Berry, 1997).

Overall, literature supports the bidimensional, non-linear, multifactoral model across ethnic groups suggesting that acculturation does not occur on an assimilation continuum (Nguyen & Benet-Martinez, 2007; Ryder et al., 2000). Ryder et al. (2000)compared a unidimensional model to the bidimensional model in three different studies. In study one, the purpose was to investigate the validity and utility of the bidimensional model and compare it to the unidimensional model across personality traits while controlling for demographics among 164 Chinese descendants ranging from 17-23 years old. The second study assessed the models across another domain, self-identity

among 150 university undergraduates of Chinese descent. The study also evaluated and

compared the two models "ability to predict psychosocial adjustment" (p. 53). The final

study replicated study two across a broader acculturating group of 204 undergraduate

students of Chinese descent to evaluate acculturation across interpersonal aspects. In

terms of the two acculturation models, the authors concluded that the "bidimensional

model constitutes a broader and more valid framework for understanding

acculturation…[and that the unidimensional model] offers an incomplete and often

misleading rendering of the acculturation process" (p. 62). The authors also concluded

that the bidimensional model scored better in all four criteria that were measured and that

the two dimensions were reliable, valid, independent and sensitive to group differences.
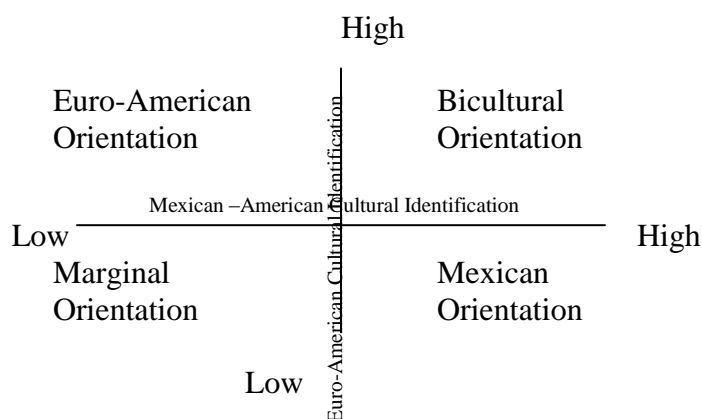
Figure 3.Bidimensional model of acculturation. *Note:* From *"*Acculturation, respect for cultural differences, and biculturalism among three generations of Mexican American and Euro-American school children,*"* by Buriel, 1993, *Journal of Genetic Psychology, 154,* p. 533.

Researchers suggest that acculturation in nutrition and health research should also

be measured using a multidimensional model and/or non-linear model to increase the

sensitivity and accuracy in identifying correlations between acculturation and diet (Lara

et al., 2005; Yeh, Viladrich, Bruning & Roye, 2008). Different bidimensional, non-linear

quantitative instruments have been used to measure acculturation in different behavioral

science fields, although the instruments have not been used extensively in nutrition research. Two of the most common bidimensional scales are the Bidimensional Acculturation Scale (BAS) developed by Marin and Gamba (1996) and the Acculturation Rating Scale for Mexican Americans (ARMSA-II) developed by Cuellar, Arnold and Maldonado (1995) specifically for the Mexican American population. The BAS is based on language and social events while the ARMSA-II is based on six factors of acculturation; language, ethnic interaction, cultural heritage, ethnic pride and identity, generational proximity and ethnic distance, and perceived discrimination. Cabassa (2003) suggests that the ARMSA-II is a better measurement of acculturation for it includes multiple factors that influence the acculturation process (Cabassa, 2003). This researcher also mentions that the ARMSA-II has been restricted to the Mexican-American population but by changing Mexican for another subpopulation can resolve this issue.

<div align="center">Diet</div>

Traditional Hispanic Diet

The traditional Hispanic diet in Latin America consists of chili, lard, cactus, coffee, rice, poultry, fish, meat, legumes, cocoa, tomatoes, corn, peas and squash and is typically high in fiber, fruits and vegetables (Goody & Drago, 2009; Kittler & Sucher, 1998; Loftas et al., 1995; McArther, Anguiano & Nocetti, 2001). In Mexico and Central America as well as in other societies, food practices are dependent on socioeconomic status, geographical regions and family (Goody & Drago, 2009).

Table 2

Bidimensional Acculturation Strategies

Variables	Definition
Assimilation (High acculturation)	Individuals adopted values and norms of host culture and reject those of original culture
Separation (Low Acculturation)	Individuals reject values and norms of host culture
Integration (High Biculturation)	Individuals accept values and norms from both cultures – host and origin
Marginalization	Individuals are rejected by both cultures

Note: Adapted from Berry, J.W. (1997). Immigration, acculturation, and adaptation. *Applied Psychology: An International Review, 46*(1), 5-68 and Cabassa, L.J. (2003). Measuring acculturation: Where we are and where we need to go. *Hispanic Journal of Behavioral Sciences, 25,* 127-146.

The traditional Hispanic diet has been correlated with lower mortality from chronic diseases including breast cancer and other cancers, heart disease as well as lower prevalence of obesity when compared to the diet of US-born Hispanics (Huh, Prause, & Dooley, 2008; Murtaugh et al., 2008). Murtaugh et al. (2008) used a case-control design to examine breast cancer risk in pre- and post-menopausal White and Mexican women across different dietary patterns (n = 4746). A dietary history questionnaire and medical and reproductive questionnaire was administered. Each participant was placed into one of five dietary groups; western, traditional Mexican, prudent, Mediterranean, or Dieter. Dietary groups were formed using factor analysis. A traditional Mexican diet was characterized by a diet high in Mexican cheeses, meat dishes, soups, and tomato based sauces. Results indicated that women consuming a traditional Mexican (0.68; 0.55, 0.85; $p < 0.01$) or Mediterranean diet (0.76;0.63, 0.92; $p < 0.01$) had a significant decrease risk

of breast cancer. Huh et al. (2008) used data from the 2000-2001 National Health Interview Survey to examine the impact of immigration on health in the Asian and Hispanic populations. After extracting respondents with missing values, the sample size was 46, 318 participants. The key variables was foreign or US born and ethnicity. Disease, socio-demographic, and mediating variables were assessed. The foreign born respondents had significantly less reported diagnosis ($p< .005$) than the US born respondents. Foreign-born Hispanics had significantly less hypertension than US born Hispanics and Whites (RRR.772, p <.005). Foreign-born Hispanics were significantly less likely ($< .005$, $p< .005$) than their US born Hispanics to have heart disease or cancer but Foreign-born Hispanics had a higher risk of diabetes than US born Hispanics ($p<.05$). The authors concluded that foreign-born immigrants better health outcomes than US born persons.

Contrary to these studies, one study did find differing results (Carrera, Gao, & Tucker, 2007). In this study the data from the NHANES 2001-2002 was used to explore the diet and health outcomes of 835 Mexican-American adults. A single 24-hour recall was administered to each participant to collect dietary intake data. The study divided the participants into one of four categories using cluster analysis depending on their dietary intake; poultry and alcohol, milk and baked products, traditional Mexican, and meat. Diet category in relation to BMI and waist circumference was explored. The results indicated that the traditional Mexican diet group had the highest intake of energy (M=2,211 kcal, $p< .05$) and cholesterol (M=363 mg, $p<.01$) as well as fiber (M=23.3 g, $p < .001$) when compared to the other groups. There was no significant difference between fruit and vegetable intake, BMI and waist circumference in the traditional Mexican group

when compared to the other groups (Carrera et al., 2007). This study is limited in that a single 24-hour recall may not be a valid representation of overall diet quality and dietary intake across different levels of acculturation in each group was not accounted for. Also, categorizing participants may decrease effect size. Lastly, other anthropometrics and disease data was not explored such as blood lipids and disease incidence.

The Western Diet

A Western diet consists mainly of refined foods, fatty meats, salt and dairy products and correlates with nutrition-related chronic diseases such as heart disease and cancer (Cordain et al., 2005). Dietary patterns of people in the US began to change to the Western diet with the industrial revolution of food processing and the domestication of plants and animals (Cordain et al., 2005). Foods that have increased over the past 200 years and provide the majority of the caloric intake in the US include dairy products, refined sugars, refined grains and vegetable oils, salt, and beef. Research suggests that the combination of these foods may increase the risk of chronic diseases (Cordain et al., 2005).

Rissanen et al. (2003) evaluated the diet of 2,682 males ages 42, 48, 54 or 60 at baseline in Finland. The study participants were followed for 12.8 years. The participants were divided into one of five groups along a continuum based on their intake of berries, fruits and vegetables (BFV). The group with the highest intake of BFVs had better blood lipids and higher intakes of fiber, vitamin C and E, folate, ß-carotene and total energy than the other groups. There was a significant inverse relationship between the highest intake group of BFVs and cardiovascular disease mortality and all cause mortality.

Heidemann et al. (2008) used data from the Nurses' Health Study (NHS) to explore the relationship between a Western diet and cardiovascular disease (CVD), cancer and diabetes. The sample included 81,757 women of who had no prior diagnosis or treatment for these diseases as of 1984. The women were followed until 2002. A food frequency questionnaire was administered five times over 18 years. Factor analysis was used to divide the participants into one of two groups; prudent diet group or western diet group, depending on their dietary intake. The prudent diet was defined as a diet high in fruits, vegetables, fish, poultry, and legumes. The Western diet was defined as a diet high in red meat, processed meat, sweets/desserts, french fries and refined sugars. Other factors assessed were body weight, age, cigarette smoking, menopausal status, hormone replacement therapy, history of hypertension and multivitamin supplement use. The results indicated that after age adjustment there was a significant positive correlation between the western diet and CVD, cancer and mortality. Once confounding factors were controlled for there was still a significant positive association for the western diet and CVD among the highest and lowest quintile as well as morality from other causes. CVD was the number one cause of death in the study. In this study, the participants were homogenous in that they were similar across gender, income and education level; therefore, caution needs to be taken in generalizing the results to the overall US population. These studies indicate that populations that adhere to a western diet increase their risk of certain chronic diseases. Mississippi residents overall have a diet that mimics the western diet and in turn has a high rate of obesity, cardiovascular disease and diabetes (CDC, 2009).

Mississippi has a lower intake of fruits and vegetables (n = 7697) when compared to the national average (18% compared to 24%; CDC, 2009) and the highest rate of obesity in the US (n = 7507; CDC, 2009). One study compared dietary intake of the Delta population; a rural, poor region along the Mississippi river in Mississippi, Louisiana, and Arkansas, to the US population (Champagne et al., 2004). There were 1,727 households included in the study and one 24-hour dietary recall was collected for one adult in each household chosen. The sample was a stratified random sample selected to be representative of the lower Mississippi Delta. The participants were divided into one of two groups depending on their race; White or African-American. The White population had a higher intake of meat, fat, refined sugars and cholesterol and a lower intake of fiber and some fruits and vegetables compared to the US population whereas the African American population in the Delta had a low consumption of vegetables and most nutrients overall when compared to the national average for African Americans. The authors concluded that the diet in the Delta is worrisome (Champagne et al., 2004) especially when considering the already high rate of chronic diseases in the population (Smith et al., 1999). As other ethnic groups immigrate to Mississippi and begin the acculturation process, their diets may begin to mimic that of the Mississippi population for according to Marin (1992) dietary adaptation occurs in the first phase of the acculturation process.

Nutrition Transition

Currently in Mexico and throughout Latin America dietary patterns are changing rapidly as these countries are experiencing the nutrition transition. The nutrition transition is defined as a shift in dietary patterns from traditional diets to a diet that mimics the

western diet due to changes in environmental and social factors (Popkin, 1993). Popkin

explains that the nutrition transition has led to a shift in disease states such that chronic

diseases have increased and are now the primary causes of mortality in many developing

countries such as Mexico. The diet of many Mexicans and Central Americans has

transitioned from a diet high in corn, tortillas, and beans to one high in fast food,

processed foods and high calorie beverages over the past 10 to 40 years (Baquera et al.,

2008; Bermudez & Tucker, 2004; Ramirez et al., 2003). Baquera et al. used data from the

Mexican Nutrition Survey 1999 and the Mexican Health and Nutrition Survey (n=7464)

to assess high caloric beverage consumption between 1999 and 2006 in Mexican adults.

The results indicated that high calorie drink consumption tripled in Mexican adults from

1999 to 2006 with about 15% of their calories coming from high calorie beverages and

about 94% of the population consuming these beverages. There was also a significant

difference depending on geographical location where people residing in urban areas had a

significantly higher intake of high caloric beverages when compared to people residing in

rural areas (Baquera et al., 2008). Other studies have indicated a difference in dietary

intake dependent on geographical location with people residing in urban areas adhering to

a more westernized diet and those in rural areas retaining the traditional diet (Lerman et

al., 1998; National Research Council, 2002; Yeh et al., 2008).

<div align="center">Dietary Acculturation</div>

The process of a person adopting the diet of his or her new culture is termed

dietary acculturation (Satia-Abouta, 2003). Satia-Abouta outlined factors that influence

the degree that a person of a different culture adopts the dietary practices of his or her

new culture in a Proposed Dietary Acculturation Model (Figure 1). This model was

proposed by Satia-About a through identification of dietary mediating factors in the

literature across Asian and Hispanic groups as well as primary research the author had

done with Korean-American women population. The researcher indicated that the model

may be incomplete. The model has not been used with the Hispanic population. In the

model, the socioeconomic, demographic and cultural factors occur before expose to the

host culture. The psychosocial, taste preference and environmental factors that a person

has and/or comes in contact with in the host culture may influence the degree to which

the person changes his or her dietary intake.

Dietary acculturation has been well documented in Hispanics, especially in the

Mexican subgroup. Different factors that affect the dietary behaviors in Hispanics

residing in the US have been examined and include acculturation level, socioeconomic

status, nutrition knowledge, religion, and psychological and environmental factors.

However, acculturation in the nutrition literature has been measured as a linear process.

Variables used to measure acculturation include language, birth place, time in host

country, and/or heritage pride (Akresh, 2007; Dixon, Sundquist & Winkleby, 2000;

Duffey, Gordon-Larsen, Ayala, & Popkin, 2008; Mazur, Marquis, &Jensen, 2003;

Montez & Eschbach, 2008; Neuhouser, Thompson, Coronado, &Solomon, 2004;

Norman, Castro, Albright & King, 2004).

Norman et al. (2004) showed that the way acculturation is measured effects the

results with regards to dietary patterns. Dietary fat practices were measured in a sample

of 119 Hispanic women residing in California across three different measurements of

acculturation; years spent in the US, language spoken at home and country of birth. This

study indicated that there was no difference between fat use and years living in the US

($p = .38$). Spanish spoken at home had a positive association with bean and pea

consumption ($p<.001$) and being born in the US positively correlates with convenience

food ($p<.001$), chocolate candy ($p =.01$) and salty snack ($p<.001$) consumption. The

combined factors of language and birth place had the strongest association with being

born in the US and English language use in the home being positively associated with

convenience foods ($p< .001$), salty snack ($p<.001$) and overall higher fat ($p=.001$)

consumption. The results indicated that the measurement of acculturation is important in

examining dietary acculturation patterns.

Dietary Intake and Acculturation

A cross-sectional study was completed that examined the energy, nutrient, and

food intakes of Mexican-American women and men across acculturation levels using

data from the Third National Health and Nutrition Examination Survey (NHANES)

(Dixon et al., 2000). The sample included 2,853 Mexican-Americans age 25-64 years

old. Education attainment was controlled for in the study. Acculturation was assessed

through country of birth and primary language. kcalories, fat, saturated fat, cholesterol,

fruit/vegetable and vitamin/mineral intake was assessed through a 24-hour recall and a 1-

month qualitative food frequency questionnaire. Statistically significant results were as

follows. Mexican born men had a higher intake of kcalories compared to US-born men

(2615 verses 2,389, respectively; $p< .05$), although both Mexican born men and women

had a more healthy dietary intake when compared to US-born men and women as

determined by the number of men and women who met the dietary guidelines for specific

nutrients (percent total fat, saturated fat, fiber, potassium, vitamin A, vitamin C, folate,

vitamin B6, calcium and magnesium). Cholesterol was the only indicator that was worse

in Men born in Mexico than men born in the US (438.6 mg/day compared to 399.2 mg/day; $p < .05$).

In regards to food consumption Mexican born participants consumed more fruit, vegetables, grains, and beans and less snacks, desserts and added fats than their US-born counterparts although US-born Spanish speakers ate less of the desserts, snacks and added fats than the US-born English speakers. The consumption of these foods across birthplace and language were only observed as descriptive statistics. Country of birth was a greatest predictor of food, nutrient and energy intake ($p < .05$) although significant observations between intake and language and the interaction between language and country of birth were made with Mexican born and US-born/Spanish speaking equating to a healthier diet i.e. met RDA for specific nutrients and high consumption of fruit, vegetables, legumes, grains, milk products, meat and egg dishes, and lower consumption of desserts and added fats, than US-born/English speaking. The measurement of acculturation was linear and only consisted of language and birth place therefore not encompassing multiple factors that are involved in the acculturation process.

Neuhouser et al. (2004) examined the effect of acculturation on fruit/vegetable and fat intake in a sample of 1,795 non-Hispanic Whites and Hispanics. Forty-three percent of the sample population was Hispanic with 90% of the Hispanic population immigrating from Michoacan, Mexico. An adapted fruit and vegetable frequency questionnaire and the Fat-Related Diet Habits questionnaire were administered to assess dietary intake. Acculturation was assessed through a four item validated instrument that was developed by Coronado, Thompson, McLerran, Schwartz, and Koepsell (2005) and measured acculturation through language, ethnic identification and birthplace. After

scoring, each participant was categorized into one of two acculturation levels; low acculturated or high acculturated. Age, sex, income and education were controlled for in the analysis. Results indicated that the Hispanic group had one more serving of fruits/vegetables when compared to non-Hispanic whites ($p < .001$) and a half serving more when compared to the high acculturated group ($p < .05$). In terms of fat intake, there was not a statistically significant difference in total fat intake across ethnic groups and acculturation levels, but fat sources did vary. Hispanics (low and high acculturated) cooked with more lard and drank more whole milk than non-Hispanic whites whereas non-Hispanic whites and the high acculturated group added more fat on foods at the table. Limitations of this study were that the instruments were short food frequencies which may have underestimated fruit/vegetable and fat intake. Some of the participants did not understand the instrument, which may have made it unstable and decreased its validity and reliability. Lastly, the Hispanic population was homogeneous in that over 90% were from the same region in Mexico; therefore, caution should be taken in generalizing the results to the overall Hispanic population in the US.

Akresh (2007) examined dietary intake and Body Mass Index across time spent in the US and language use and proficiency controlling for age, sex, marital status, income and education. Data from the New Immigrant Survey was used. The sample included new legal permanent residents (all foreign born, n = 2,132) with the majority of participants migrating from Mexico and Central America. A questionnaire evaluating diet change and food intake was administered and self-reported height, weight and health status (smoker, physical activity level, and high blood pressure and diabetes diagnosis) was collected. Acculturation was evaluated through language use and proficiency as well as time spent

in the US. In men, speaking English at work indicated a statistically significant diet change (β=1.36, p=<0.01). There was a positive relationship between time spent in the US and BMI (β=.14, p<0.01). An inverse relationship was found between fruit intake and BMI in men (β=-1.90, p<0.05). An inverse relationship was also noted between reported health status and English use at work (β =.04, p<0.10) and time in the US (β=.009, p<0.01). A positive relationship was observed between reported health status and fruit consumption (β=.06, p<0.10). The limitations in this study included self-reported anthropometric data and questionnaires used for data collection that had not been tested for validity and reliability.

A cross-sectional study examined the influence of country of birth and language in Mexican-American women in regards to fat, fiber, fruit and vegetable intake (Montez & Eschbach, 2008). Data was used from the 2000 National Health Interview Survey (NHIS). In the NHIS the National Cancer Institute abbreviated food frequency screener was used to measure energy from fat, fiber, fruit and vegetable intake. The sample population included 1,245 non-pregnant Mexican-American women 25-64 years old. In this study, acculturation was assessed through two proxies; country of birth and language. The participants were divided into foreign verses US birth and "predominately Spanish" verses "predominately English" groups. Also, correlations and relationships across the two variables were examined. Age, marital status and education were covariates in the analysis. The results indicated that women born in the US had a significantly higher intake of fat (2.1%, p<.01), lower intake of fiber (p <0.01) and consumed less beans (β = -.37; p <.01), fruit (β = -.40; p <.01), whole milk (β = -.63; p <.10), whole-grain bread (β = -.69; p <.01), 100% fruit juice (β = -.49; p <.01) and more sausage (β = .41; p <.05)and

fried potatoes ($\beta = .29$; $p < .05$) than their foreign-born counterparts. "Predominately

Spanish" and foreign-born women had significantly higher fiber intake compared to their

counterparts ($p < .01$). "Predominately English" had a lower intake of fruits and

vegetables across both US-born and foreign-born, although the association was greater in

the US-born group ($\beta = -0.27$, $P < 0.10$). This group also had a lower intake of beans (($\beta = -$

.26; $p < .01$), fruit ($\beta = -.14$; $p < .05$), whole milk ($\beta = -.24$; $p < .10$), cereal ($\beta = -.15$; p

$< .10$) and overall fiber ($\beta = -1.07$; $p < .01$). Overall, birth country (fiber $r^2 = -2.44$; $p < .01$;

energy from fat $r^2 = 2.06$, $p < .01$) was more highly associated with food consumption

differences than language ability (fiber $r^2 = -1.07$; energy from fat $r^2 = 0.09$). However,

there was a significant interaction between birthplace and language acculturation for

fruits and vegetables ($\beta = -.27$; $p < .10$) that was not observed for birthplace and language

individually. This study incorporated an abbreviated instrument (16 foods), therefore

possibly underestimating food consumption. In terms of acculturation, the study only

used language and birth country as proxies of acculturation and defined acculturation as a

linear process.

Duffy et al. (2008) also observed a difference in dietary intake across birth place.

NHANES data from 1999-2004 was used for the analysis and the sample population

included 3,997 participants. Variables explored included ethnic subgroups; Mexican

(84% versus other Hispanic 16%), birth place, and language spoken at home. Gender,

age, income and education were controlled for in the analysis. Dietary data was collected

through a 24-hour recall. US-born Mexicans consumed ($M=2,311$ kcalories/day, SD=32)

more kcalories than foreign-born Mexicans ($M=2,248$ kcalories/day, SD=38; $p < .05$) and

had lower kcalorie intake from legumes ($p < .05$), fruit ($p < .05$), high-fat milk ($p < .05$),

and vegetables ($p < .05$). They also had a significantly ($p < .05$), higher intake of high

calorie foods such as high sugar beverages, snacks, and desserts than their foreign-born

Mexican counterparts as well as fast food. When comparing Spanish to non-Spanish

speakers, the Spanish speakers had diets that mostly mimicked that of the foreign-born

group. They had higher energy intakes of legumes, ($p < .01$), pasta, rice, and cereals (p

$< .01$),, soups ($p < .05$),, potatoes ($p < .05$), and fruits ($p < .05$), indicating healthier diets

among those that spoke Spanish rather than English. Acculturation was again only

measured through language and birthplace.

In conclusion, studies have used different measures for dietary intake and

acculturation. Dietary intake has been measured through food frequency questionnaires

and 24-hour recalls. The main acculturation variables used were birthplace and language

with birthplace being a stronger indicator of dietary acculturation (Dixon et al., 2000;

Duffy et al., 2008; Montez & Eschbach, 2008). Foreign-born Hispanics' diets consist of

more fruits, vegetables and fiber and are lower in fat than their US-born counterparts

although one study did not indicate a significant difference in fat intake across

acculturation level (Neuhouser et al., 2004). The higher acculturated group had higher

intakes of snacks, desserts and added fat across studies (Dixon et al., 2000; Duffy et al.,

2008). All these studies controlled for socioeconomic status (SES) and demographic

characteristics. The next section will outline studies that included SES and acculturation

as independent variables in assessing diet in Hispanics.

Dietary Acculturation and Socioeconomic Status

Researchers have explored the interaction between SES and acculturation in terms

of dietary intake in Hispanics (Gregory-Mercado et al., 2006; Guendelman & Abrams,

1995; Mazur et al., 2003). One study examined dietary intake across acculturation level and other socio-demographic indicators in 346 greater than 50 years old Mexican-American and non-Hispanic White women in Arizona (Gregory-Mercado et al., 2006). The Acculturation Rating Scale for Mexican-Americans (ARSMA-II) was used to measure acculturation. This scale incorporates language, cultural identity, traditions, and heritage pride into the measure of acculturation. In this study, ARMSA-II was used to categorize each participant into one of two acculturation levels; low or high acculturated. Three 24-hour dietary recalls were collected. Results indicated that women with a higher education level and lower acculturation level had a significantly higher fruit and vegetable intake than participants of high education and acculturation (P=0.019).

In terms of income, Guendelman and Abrams (1995) analyzed data from the 1982-1984 Hispanic Health and Nutrition Examination Survey (HHANES) and NHANESII. The sample used for this study included 1,373 Mexican-American women and 2,326 non-Hispanic White women aged 16-44 years old. A 24-hour recall was collected and analyzed to examine nutrient adequacy relative to the RDA. Acculturation was measured through generational differences (first-generation compared to second-generation). Therefore, there were three groups in the analysis; first-generation Mexican, second-generation Mexican and non-Hispanic White. The results indicated that first-generation Mexican-American women had significantly higher nutrient adequacy overall (M=0.75, SE=0.01) compared to the other two groups (M=0.68, SE=0.01; M=0.71, SE=0.01). Education was positively associated with dietary adequacy in non-Hispanic Whites but not in the other two groups (β = .96, p <.05). Also, income was positively associated with dietary quality in non-Hispanic Whites although there was no significant

relationship to income and dietary adequacy in second-generation Mexican-American verses first-generation Mexican-American women ($\beta = .85$, $p < .05$). This result indicates that as income increases in first-generation Mexican women dietary adequacy decreases. One limitation in this study is that it did not examine dietary adequacy in men which could differ from women. Another is that the data used is from more than twenty years ago. There has been a rapid increase in the Hispanic population in the past twenty years and more people of Hispanic descent are being born in the US; therefore this study may need to be recreated again to update the results.

Mazur et al. (2003) explored dietary intake in 2,293 Hispanic youth (4-16 years old) across acculturation and socioeconomic factors. Data from NHANESIII was used. Dietary data was collected through a 24-hour dietary recall. Acculturation was assessed by language spoken at home. Parents' country of birth was excluded because it highly correlated with language spoken at home. Other variables included were income, metropolitan residence, education and occupation of the head of the household, age and sex of the child. Results indicated that people with a higher Poverty Index Rating (PIR) and spoke English only in the home had higher intakes of energy from fat ($p=0.006$) and saturated fat ($p=0.022$) than did those that spoke Spanish only or Spanish and English in the home. Interestingly, youth of low income homes had higher intakes of energy ($\beta = 948.9$; $p < .01$), protein ($\beta = 6.8$; $p < .05$) and sodium ($\beta = 492.8$; $p < .05$) although when acculturation was added youth from low income, low acculturated households had lower intakes of fat ($p = .01$), and saturated fat ($p = .02$), compared to low income, high acculturated households indicating acculturation as an independent factor of dietary intake. These studies (Gregory-Mercado et al., 2006; Guendelman & Abrams, 1995;

Mazur et al., 2003) indicate that acculturation is an independent predictor of dietary intake across income and education.

Dietary Acculturation and Psychosocial Factors

Psychosocial factors such as diet and disease related knowledge, attitudes and beliefs, culture and religion and food preference may impact the degree of dietary acculturation. Satia-Abouta, Patterson, Kristal, Teh, and Tu (2002) administered a psychosocial scale to evaluate psychosocial influences including beliefs, attitudes, motivation, knowledge, barriers, infamily and pressure on dietary intake in 244 Chinese-American/Canadian women. Most of the participants believed that diet was connected to health. The younger population indicated a link between diet and chronic diseases and the importance of eating a low fat, high fruit and vegetable diet. The older population did see the importance of eating this kind of diet and believed the traditional Chinese diet to be healthier than the Western diet although they did not note the link between diet and chronic disease. This study also indicated as mentioned before that older Chinese women were more likely to prefer a traditional diet. Studies examining psychosocial factors in relation to diet in the Hispanic population are limited.

Cuy Castellanos, Connell, and Lee (*in press*) evaluated food intake in a small, low-acculturated, Hispanic male population. They found that depression had an significant inverse relationship with fruit and vegetable intake and depression ($\beta = -.302$; $p = .049$). Also, fat intake negatively correlated with depression ($p < .05$). They concluded that Hispanics with depression may be at risk for a lower intake in food and/or lower dietary quality overall.

Acculturation and Diet and Disease-Related Factors and Acculturation

A study examined the health perceptions of low-income immigrant Latinas age 25 to 61 in the Midwestern US. Seven focus groups were administered with the participants (all of Mexican or Central American descent) along with a demographic and acculturation scale questionnaire (Hartwegg & Isabelli-Garcia, 2007). The focus group questions were used to examine health perceptions of the target population. The results indicated that the participants believed that nutrition was related to good health. However, they had different perceptions on how nutrition and good health correlate. Some participants indicated that it was more difficult to eat healthy in the US due to lack of vegetables and high prices, tight work schedules, and unfamiliarity with some foods in the US. It was mentioned by participants that natural foods can help decrease cholesterol and that eating fruits, vegetables and drinking lots of water is what adds to health and energy. This study was exploratory in nature and was carried out with a homogenous mid-western Latina population, and therefore cannot be generalized to the larger Hispanic population.

Horowitz, Tuzzio, Rojas, Monteith, and Sisk (2004) explored the view of diet on hypertension in African-Americans and Hispanics through focus groups. There were four focus groups with African-Americans and five with Hispanics with hypertension. Most focus groups believed that diet played a large role in causing hypertension. Although, some Hispanics believed that overeating was part of their culture and pleasurable and others did not attribute diet to hypertension. Most believed that salt attributed to hypertension and that certain foods could possibly treat hypertension such as jalapeno peppers, garlic, fruits and vegetables, turkey and drinking lots of water. Many

participants indicated that it would not be easy to avoid eating ethnic foods that may have been perceived as bad for people with hypertension. Lastly, there were others that believed that diet would not treat hypertension and that medicine did have to be taken to control hypertension. The results indicate that the majority of Hispanics do believe diet is linked to hypertension in ways of treatment and prevention although their attitude toward change was negative.

Religion and Diet

Arredondo, Elder, Ayala, Campbell and Baquero (2005) examined the relationship between church attendance and health factors including dietary factors in a subset of 211 Latina women. This study used the ARMSA-II to measure acculturation linearly. The Block Fat and Fiber Screener was used to assess fat and fiber intake. The majority of the sample population was Catholic (77%). Participants were categorized into one of three church attendance groups; no attendance, infrequent attendance and frequent attendance. The study indicated that people who attended church had a significantly higher fiber intake ($\beta = -1.32$; $p < .10$) as well as more physical activity ($M = 33\%$ to 58%; $p < .10$) and higher self-rated health ($\beta = .22$; $p < .05$) than those who did not attend church. Also, those who attended church had a higher acculturation level ($p < .10$) than those that did not attend church. One interesting result is that church may be a mediating factor for this study indicated healthier dietary and exercise habits in church attendees which were significantly more likely to be high acculturated. However, literature indicates healthier dietary habits in the low acculturated population. Future research needs to focus on the factors involved in church attendance that promote healthy habits.

Culture is another aspect that influences diet and cultural retention may influence the degree that an individual adopts or does not adopt the diet of the host culture.

Culture and Diet

In the Hispanic culture, food is not only viewed as a basic need but also is seen to have medicinal effects. Some foods are seen as medicinal and are classified into one of two groups; hot foods or cold foods. Physical and mental illnesses are classified in the same way, hot or cold diseases. The belief in the culture is that if one is sick there is a misbalance in the body and therefore a food that is of the opposite temperature can offset that misbalance. Some cold foods include beans, corn, diary, tropical and citrus fruits and chicken. Hot foods include aromatic beverages, chili, beef and fish, and wheat (Reines, 2003; Smith, 2000). Different herbs are also used in teas for healing. Some common herbs used are garlic, chamomile, oregano, sage and spearmint (Kemp, 2005).

The link between culture retention and diet has been examined through different measurements. Cultural retention is part of the acculturation process. As already mentioned, most dietary acculturation studies compare the degree of acculturation on a linear continuum. Cultural retention may be defined as a person who has a "low acculturation" for he or she has not adopted the aspects of his or her host culture. The non-linear measure of acculturation categorizes people into the degree to which he or she has rejected or accepted the new culture. For this section, two studies are discussed that looked at diet across generations. These two studies were used I used for this section assuming that the first generation retains more of the traditional culture and the second generation more of the host culture. The study done by Guendelman and Abrams (1995) discussed priory found that second-generation Hispanic women had diets that were

comparable to White non-Hispanic women. The first-generation Hispanic women had diets that were more nutrient dense and overall healthier than the other two groups ($p <$ .05). The authors presumed that it was due to retention of traditional foods in the first-generation Hispanic women.

Garcia-Maas (1999) examined the difference in diet between 79 Hispanic first-generation women and their Hispanic second-generation adult daughters. The Block Fat and Fruit/Vegetable Screeners were used to assess dietary intake. Acculturation was measured using the General Acculturation Index which assesses acculturation through multi-factors (language, country where most of one's childhood was spent, friends' ethnicity, and pride felt for Hispanic heritage) and is a short version of the ARMSA-II. The Latina mothers had a significantly higher intake of fruits and vegetables (M = 16.3 compared to M = 14, p =0.02) compared to the daughters. The daughters a higher intake of fat (M = 32.36 compared to M = 28.7, p =0.04) compared to the mothers. Daughters were significantly more acculturated than their mothers (t = -4.20, p = .0001) indicating mothers had a higher retention of their traditional heritage. One limitation of this study is that it was only done with the females; therefore, cultural retention across genders needs to be assessed in males. These studies indicate that cultural retention increases the retention of the traditional Hispanic diet.

Taste Preference and Diet

Taste preference is a factor that has been shown to contribute to dietary intake (Drewnowski, 1997). The four basic tastes that make up taste preference are sweet, sour, salty, and bitter. Sweet is innate. Fat is also innate for it provides palatability and a pleasurable sensation (Cooper, 1987). Children usually prefer salty, sweet and/or fat

foods where taste preferences for foods that are bitterer are usually acquired over time (Rozin & Vollmecke, 1986). A longitudinal study with Japanese adults indicated a higher rate of obesity in people that liked sweet tastes and heavy, rich tastes (Matsushita et al., 2009).The study included 37,860 Japanese participants. At baseline, the participants filled out a questionnaire that asked them if they "liked," "neither liked nor disliked," or "disliked" heavy, rich and/or sweet tastes and height and weight (p. 1192). Height and weight were then assessed again 10 years later. The results indicated a significant positive trend between heavy, rich tastes in men and women ($p < .001$) and increase weight as well as between sweet tastes and increase in weight in women ($p < .001$).

Brisbois-Clarkson, McIsaac, Goonewardene and Wismer (2009) adapted a European preference checklist to the Canadian population to assess taste preference. The checklist included 32 items which were divided into high carbohydrates (HC), high fat (HF), high protein (HP) or low energy (LE). Within the HC, HF and LE categories there were two subcategories; sweet and savory. The participants (N=193) checked which foods within each category they felt like eating at that time. They did this over two occasions. Appetite was also assessed using a Satiety labeled Intensity Magnitude Scale. Results indicated that appetite did affect taste preference for less savory foods were chosen by the participants that were less hungry ($p = .04$). Also, men preferred HP ($p=.03$) and less sweet foods when compared to women ($p=.10$).

In terms of taste and the nutrition transition, people's diets are changing from complex carbohydrates to more meats, fats and sugars therefore toward more highly palatable foods that are easy to become accustomed to (Drewnowski, 1997). Taste

preference in the midst of dietary acculturation in Hispanics has not been explored, which could provide more insight into dietary change during the acculturation process.

Nutrition Literacy

Nutrition literacy is defined as "the degree to which individuals can obtain, process, and understand the basic nutrition information and services they need to make appropriate nutrition decisions" (Silk Sherry, Winn, Keesecker, Horodynski, & Sayir, 2008, p. 4; Institute of Medicine, 2004). Nutrition literacy is linked to nutrition knowledge in that knowledge includes the processing and understanding of nutrition information although it does not address "obtaining" nutritional information. Woodruff, Zaslow, Candelaria, and Elder (1997) examined nutrition knowledge across acculturation in a Hispanic population (n = 132). Nutrition knowledge was assessed through a 12-item nutrition knowledge test and acculturation through the short acculturation scale for Hispanics. Other variables measured were self-efficacy and intentions in terms of eating healthy, and beliefs related to nutrition. There was a significant positive relationship between acculturation and nutrition knowledge in men. Although knowledge was low, self-efficacy and intention were high across all acculturation levels.

Nutrition knowledge in relation to food intake has been explored (Fitzgerald, Damio, Segura-Perez, & Perez-Escamilla, 2008; Sharma, Gernand, & Day, 2008). One study compared nutrition knowledge in Latina women with diabetes (n=100) to a control group; Latina women without diabetes (n=101) (Fitzgerald et al., 2008). A nutrition knowledge scale was developed and pretested that contained questions regarding knowledge of the Food Guide Pyramid and certain nutrients and use of the food label. There was a positive correlation between nutrition knowledge and food label use, healthy

food selection and watching portion sizes. Food label use was positively related to selecting healthier foods. Nutrition knowledge was an independent factor to food label use regardless of educational level indicating that increasing a person's nutrition knowledge and ability to read a food label may positively affect food intake.

In the El Paso area, Sharma et al. (2008) administered a telephone questionnaire that evaluated nutrition knowledge and eating behavior in 963 Mexican Americans (74%) and non-Mexican American (26%). Nutrition knowledge questions revolved around the participant's knowledge of recommended food servings from the Food Guide Pyramid and current intake. The results indicated that Mexican American males had the lowest scores related to nutrition knowledge when compared to Mexican American women and non-Mexican American. Knowledge was positively correlated with food group intake except for fruits and vegetables. Overall in Mexican-American males only 7.1% consumed the recommended servings of fruits and vegetables per day and Mexican-Americans were less likely to eat the recommended amounts of grains, dairy and fruits and vegetables when compared to non-Mexican Americans. One limitation of this study is that acculturation level was not accounted for; therefore the interaction between acculturation and food intake could not be assessed.

In conclusion, studies indicate a positive relationship between nutrition knowledge and acculturation as well as nutrition knowledge and dietary intake in the Hispanic population. The studies indicate that nutrition knowledge is low among the Hispanic population particularly the male Hispanic population. Therefore, nutrition knowledge may be an important factor to target to inhibit negative dietary behavior change as a person becomes more acculturated into the US society. The studies

mentioned assess nutrition knowledge but there are no studies to the researcher's knowledge of studies assessing nutrition literacy in the Hispanic population in the US. An important aspect to examine is not only the processing and understanding of the nutrition information but where the population group is obtaining the nutrition information may be important. This is important in terms of whether the nutrition information people are receiving is valid and accurate. If the information is not valid or accurate, it may negatively affect dietary intake among the individual or group processing that information. This study may therefore aid in planning and developing effective nutrition interventions.

Dietary Acculturation and Environmental factors

Different environmental factors may influence the degree of dietary acculturation in an individual. Environmental factors include food availability, access, and cost (Akresh, 2007; McAurther et al., 2001; Satia-Abouta et al., 2002; Satia-Abouta, 2003). Satia-Abouta et al. (2002) identified enabling and reinforcing factors which included traditional food availability, convenience and food cost in the dietary acculturation of Chinese American/Canadian women (n=30). The results indicated that older and less educated participants were more concerned with the cost of healthy foods and the availability of traditional foods than the younger, educated generation who believed traditional foods were too time consuming. Also, a reinforcing factor suggested that older adults were more likely to prefer and consume a traditional diet.

A study completed with low-Income, Spanish-speaking Latinas in the US examined the health-perceptions of first and second-generation Latina women (Hartwegg & Isabelli-Garcia, 2007). Seven focus groups were administered with women from 25-64

years old. Four focus groups were carried out with Mexican-American women and the other three were done with Central American women. The results from the focus groups indicated that food access and cost of fresh fruits and vegetables encouraged dietary change as well as women's work schedules (Hartwegg & Isabelli-Garcia, 2007).

McAurther et al. (2001) administered a one-on-one interview exploring environmental influences on dietary intake with 23 Hispanic males and females and a focus group with 10 Hispanic males and females residing in the southeastern US. The interview and focus group protocol consisted of open-ended questions that examined food consumption, preparation and purchasing. The results indicated that for food consumption strong influencers were food affordability and generational differences in food preference. Food preparation indicators included maternal employment and food availability. For food purchasing, the indicators were convenience and market style such as supermarkets or outdoor farmers markets. One limitation of this study was that there was only one focus group.

A similar study was done in Scott County, Mississippi (Gray et al., 2006). Ten semi-structured interviews were done with community members that were involved with the local Hispanic community or had an elected position within the city and 18 interviews were done with Hispanics residing in the area to explore factors influencing dietary intake in Hispanics and to use data for intervention development. The questions in the interviews inquired about food purchase and preparation, healthy nutrition ideas, food choice, assessment of school nutrition program and dietary change. Results indicated that food choices were strongly influenced by work and time demands. In summary,

environmental factors that influence dietary acculturation according to these studies are food cost, food availability, convenience and time, and market style.

Ayala, Mueller, Lopez-Madurga, Campbell, and Elder (2005) explored the restaurant and food shopping selections of 357, predominantly first-generation Mexican immigrants. Acculturation level was assessed using the ARSMA-II and each participant was categorized into one of two groups; affiliation to Mexican culture or affiliation to Anglo culture. Restaurant and food-shopping behaviors were assessed through a questionnaire of open and closed ended questions. Dietary fat behaviors were examined by using series of questions on a Likert scale rating system. A higher acculturation level was associated with eating out more for lunch ($r = .19$; $p \leq .001$) and dinner ($r = .19$; $p \leq .001$), eating at fast-food restaurants ($r = .23$; $p \leq .001$), easier time reading a food label ($r = -.16$; $p \leq .01$), sharing high-fat meals ($r = .22$; $p \leq .001$) with another person and saving portions ($r = .22$; $p \leq .001$). The majority of the study population indicated a preference for fast-food over other restaurants (43.1%) due to distance ($p \leq .001$), price ($p \leq .05$), and child-friendliness ($p \leq .001$). The women that preferred other restaurants did so due to familiarity of food options and food service and quality. These women also had an overall higher income than the women that preferred fast-food. Women who chose supermarkets over other food stores were more likely to be married (OR = 1.97; 95% CI), have a higher BMI (OR = .96; 95% CI) and have a higher Anglo orientation (OR = 1.98; 95% CI). This study only incorporated women from southern California and therefore may not be generalizeable to the US Hispanic population. Also, the authors did not report the validity or reliability of the instruments used in the data collection except for the ARMSA-II.

Conclusion

The Hispanic population is increasing rapidly in Mississippi. Research indicates

that as Hispanics acculturate to the US their diets begin to decrease in fruits and

vegetables and mimic the western diet and they become unhealthier. Sabia-Abouta (2003)

developed a dietary acculturation model that outlines different factors that may influence

changes in dietary patterns in this ethnic group. Although there have been an abundance

of studies that have examined different aspects of dietary acculturation, there have not

been studies per the researchers knowledge of studies that have examined each of the

factors that influence the acculturation process in the Hispanic population as outlined in

the dietary acculturation model. Also, acculturation in the nutrition literature has been

measured mostly across a linear continuum although many researchers argue that it is not

a linear process. In conclusion, future research that focuses on gaining knowledge about

each factor of the process across different non-linear acculturation subcategories would

provide deeper insight into this complex phenomenon. This insight could then be used to

plan and develop appropriate nutrition interventions for this population.

CHAPTER III

METHODOLOGY

Overview

The following section describes the research methodology that was implemented to explore dietary acculturation in the Latino male population in southern Mississippi. First, grounded theory (GT) is defined and the study's conceptual framework was discussed. From there, the study population and setting are outlined, followed by the data collection, analysis and interpretation procedures.

Study Design

In an effort to explore dietary patterns and contributing factors of dietary acculturation, and subsequently extend theoretical understanding of acculturation, this research used a mixture of qualitative and quantitative data collection methods. Although the theoretical constructs of dietary acculturation documented by previous authors were used in this study in instrument development, the PR remained theoretically sensitive to constructs not previously documented. The theory that emerges were not exclusively deduced from *a priori* assumptions. Rather, it was anticipated that the emergent theory of dietary acculturation among Latino males in Mississippi were "grounded" in their perceptions, life experiences, and behaviors as determined by data collection, analysis, and interpretation methods described in this chapter.

Grounded Theory

Glaser (2007) describes GT as a "set of integrated conceptual hypotheses systematically generated to produce an inductive theory about a substantive area" (p. 48).GT is not a type of qualitative analysis but stands alone as its own research

methodology. It is a method that "enables the emergence of conceptual theory" (p. 49). In GT, data collection and analysis are conducted simultaneously. As data is collected, it is analyzed and further data is collected based upon the emerging categories and properties that are being extracted from the data. This process is termed theoretical sampling (Glaser, 2007). In the analyses, categories and properties are extracted through a rigorous coding process. There are three levels of coding; a) open coding, b) axial coding, and c) selective coding (Strauss & Corbin, 1990). Open coding involves extracting codes from the data and developing substantial codes. Substantial codes are new codes that are extracted specifically from the data and are not specified a priori (Glaser, 2007; Stauss & Corbin, 1990). Axial coding is the process of drawing connections between the codes to form categories (Strauss & Corbin, 1990). Selective coding occurs when core categories have been identified and open coding is terminated, because only codes related to the core categories are further identified (Glaser, 2007). The categories can then be interpreted into theory.

During axial and selective coding, constant comparison of the data occurs (Stauss & Corbin, 1990). As codes are formed, they are compared to one another across data sources, individuals and/or groups and to theory. During this process, memo writing becomes an integral part. Memo writing is a way for the researchers to write down or "memo" any theoretical insight that he or she forms during data analysis (Corbin & Strauss, 1990). The researcher may document theoretical concepts that he or she does not fully understand or areas that need to be further investigated which can then guide theoretical sampling. Memo writing starts during the first coding and does not end until the writing of the final results.

Conceptual Framework

Qualitative and quantitative data were collected to explore dietary acculturation. Each method poses different strengths and weaknesses; if combined correctly, triangulation can occur allowing the two methods to complement one another decreasing their respective weaknesses (Johnson & Onwuegbuzie, 2004). Triangulation is defined as a way of studying the same phenomenon by combining results from different data collection methods and designs (Greene, Caracelli, & Graham, 1989). In this study, the qualitative data collection methods were the dominant research method while the quantitative data collection methods provided additional descriptive information related to qualitative data collected. The dietary acculturation model proposed by Satia-Abouta (Figure 1) was used to guide the development of qualitative and quantitative instruments used in the data collection process.

Qualitative Method

Qualitative research is defined as "an inquiry process of understanding based on distinct methodological traditions of inquiry that explores a social or human problem. The researcher builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting" (Creswell, 1998, p. 15). The interpretive paradigm, which indicates that reality is through the eyes of the beholder, is a common paradigm of qualitative methodology. Qualitative studies seek a deeper, richer understanding of what is behind human behavior (Ulin, Robinson, & Tolley, 2004).

Strengths and weaknesses to qualitative research are outlined by Johnson and Onwuegbuzie (2004). The approach allows for gathering rich, descriptive data about a human phenomenon; comparison and analysis across cases is possible; data is collected

within the context and setting of the participant; the data as it is collected guides the study; the researcher can contextualize and possibly determine the events and causes of the phenomenon. Some weaknesses of this method include data is not generalizeable to a larger population, predictions are difficult to make, data collection and analysis is timely and costly, researcher bias may influence the results due to the subjective nature of the process, and the testing of the hypothesis is difficult (Johnson & Onwuegbuzie, 2004). However, GT was used to insure standardization and rigor in the data analysis and interpretation process.

Quantitative Methods

Quantitative methods typically assume a positivist paradigm which states that all phenomenona can be measured and are objective. This method is used in an attempt to quantify phenomena for observational purposes. Statistical analysis is used in quantitative methods to infer whether there is a significant difference or relationship. If so, then this indicates the occurrence of a "true" phenomenon.

Theoretical Propositions

The theoretical propositions that were used to guide the research included the proposed dietary acculturation model (Figure 1) (Sabia-Abouta, 2003), and the acculturation strategies (Figure 4) from the bidimensional acculturation model (Berry, 1997).

The dietary acculturation model identifies socioeconomic and cultural factors that are instilled in a person before migration. The model also identifies different psychosocial and environmental factors that may influence different dietary patterns once migration occurs and the person is exposed to the host culture. The final section of the

model indicates the dietary pattern of the individual after accounting for the mediating dietary factors. These patterns may take one of three forms: maintenance of traditional eating patterns, adoption of the host culture eating patterns, or a bicultural eating pattern (Sabia-Abouta, 2003). The PR used this model to guide instrument development and adaptation. By utilizing GT as a collection, analysis and interpretation method, the PR was able to identify additional and distinct factors influencing dietary acculturation in Hispanic males.

The bidimensional acculturation model (Berry 1997) indicates that acculturation occurs across two dimensions: a) contact and participant and b) cultural maintenance (Figure 4). The model suggests that immigrants exhibit attitudes and behaviors which can be categorized into one of four acculturation subcategories: integration, assimilation, separation/segregation and marginalization. This model was utilized in the proposed research to guide acculturation categorization. However, in this study integration is referred to as bicultural and separation as traditional.

<div align="center">Population</div>

The Setting

There are fifteen counties in the southeastern region of Mississippi: Covington, Forrest, George, Greene, Hancock, Harrison, Jackson, Jefferson-Davis, Jones, Lamar, Marion, Pearl River, Perry, Stone and Wayne. The total proportion of Latinos in these counties combined is about 2%, the same proportion as the overall Mississippi Latino population (PEW, 2007). Table 3 indicates the total Latino population for each county and the population percent change from 2000 to 2007 (PEW, 2007).

Is it considered to be of value to maintain one's identity and characteristics?

Yes   ←→   No

Is it considered to be of value to maintain relationships with larger society?	Yes ↕ No	**Integration** **Assimilation** **Separation/** **Marginalization** **Segregation**
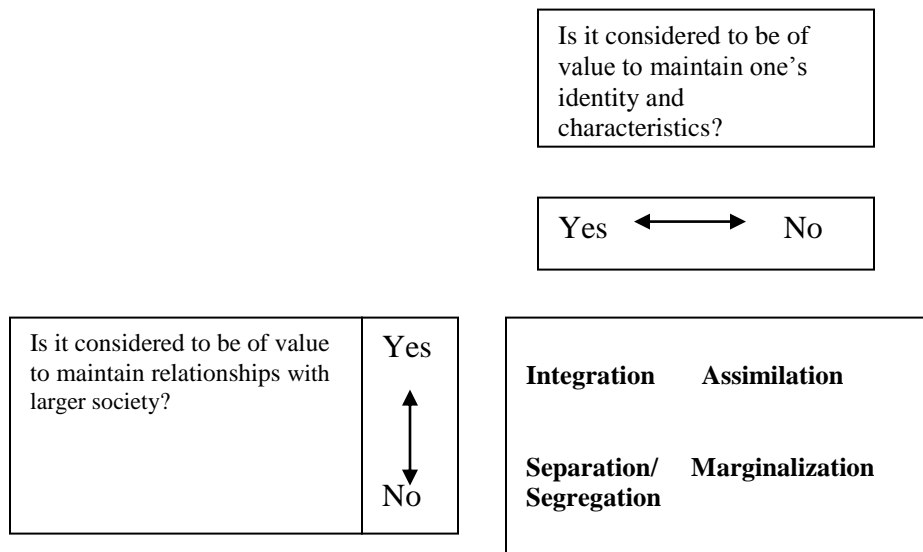
Figure 4. The acculturation strategies model - two dimensions of acculturation and the four acculturation subcategories. *Note:* Berry, J.W. (1997). Immigration, acculturation, and adaptation. *Applied Psychology: An International Review, 46*(1), 5-68.

Most of these counties are rural or coastal areas. The coastal areas were greatly affected by Hurricane Katrina in 2005. The overall population decreased in the three coastal counties (Harrison, Hancock and Jackson) while the overall population greatly increased in counties north of the coast after Hurricane Katrina. The Hispanic population has increased greatly in the southeastern region of Mississippi over the past 18 years with the coastal areas having one of the highest percent of Hispanics along with Jones County (PEW, 2007). In the midst of population decreases in the coastal counties following Hurricane Katrina, there was a population increase in the Hispanic population in these counties possibly due to the increase in construction and labor jobs available. In Jones County, there is a large industry that employed a high number of Latinos until the company was raided by U.S. Immigration and Customs Enforcement (ICE) in 2008.

The majority of the Hispanic population in Mississippi is of Mexican origin (US Census Bureau, 2008). There is limited data on socioeconomic factors specific to Hispanics in the individual southeastern counties, but there is data for Hispanics in

Mississippi as a whole. Two-thirds of the Hispanics in Mississippi do not speak English at home, and about half of Mississippi Hispanics do not speak English well (US Census Bureau, 2007). According to the US Census Bureau (2007), just under half of the Hispanics do not have a high school education compared to about 20% of the entire Mississippi population. The majority of Hispanics residing in Mississippi are men and the average age is 27 years old. About two-thirds of the men are foreign-born compared to only about 40% of Latino women in Mississippi. The average age of foreign born Hispanics in Mississippi is 10 years older than that for Mississippi overall population indicating that the Latino population is relatively "new." The average yearly income is around $16,000 for a Latino vs. $22,000 for a non-Latino Mississippi resident. The main occupations for Hispanics in Mississippi include construction, maintenance, farming, manufacturing, and information and services.

Sampling Technique

Nonprobability sampling, specifically convenience and snowball sampling approaches, were used to identify potential participants. These two approaches were chosen due to the exploratory nature of the study and to gain access to the Hispanic population within the study's setting.

Selection Criteria

Hispanics residing in the following southeastern Mississippi counties will be invited to participate in the study: Covington, Forrest, George, Greene, Hancock, Harrison, Jackson, Jefferson-Davis, Jones, Lamar, Marion, Perry, Pearl River, Stone, and Wayne.

Table 3

Latino Population by County in Southeastern Mississippi

County	Percent Hispanic population (2007)	Percent change in Latino population from 2000 to 2007*	Percent change in total population from 2000 to 2008 (rounded to the nearest tenth)**
Covington	1%	34%	6%
Forrest	2%	63%	9%
George	2%	61%	17%
Greene	1%	4%	4%
Harrison	4%	39%	-6%
Hancock	2%	23%	-7%
Jackson	3%	54%	-1%
Jefferson-Davis	1%	25%	-9%
Jones	4%	133%	3%
Lamar	1%	48%	26%
Marion	1%	50%	1%
Pearl River	2%	60%	18%
Perry	1%	11%	1%
Stone	1%	11%	18%
Wayne	1%	51%	-2%

Note. *Data from PEW Hispanic Center. (2007). Demographic profile of Hispanics in Mississippi – 2007. [Data

File].Retrieved on December 12, 2009 from http://pewhispanic.org/states/?stateid=MSone.

** Data from US Census Bureau. (2008). American Community Survey: 2008 Subject Definitions. Available from

http://www.census.gov/acs/www/UseData/Def.htm.

To be included in the study, participants must have met the following inclusion criteria: male of Mexican, Central or South American, or Caribbean origin, first- or second- generation, 18 years of age or older, provided informed consent, and spoke English or Spanish. If a potential participant is a first generation immigrant, the participant must have migrated to Mississippi at least six months before the date of his recruitment. Table 4 shows the *a priori* intended sample sizes for each component of the research project. During Phases I and II, quantitative measures, semi-structured interviews (SSI) and a focus group were administered. There were four bidimensional acculturation groups which included 1-19 participants in each group. The groups were a) assimilated, b) marginalized/separated, c) bicultural (integrated) and d) traditional.

Recruitment Sites and Strategies

Potential participants in south Mississippi were identified from locales where Hispanic males gather as groups. Recruitment sites included an English language program at a Catholic church in Hattiesburg, Mississippi and Mexican restaurants/stores around Southern Mississippi. Also, Hispanic community stakeholders, who have participated in preliminary research or volunteered to aid in recruitment procedures, helped identify participants and recruit them for participation.

Human Subject's Protection

The Institutional Review Board (IRB) at The University of Southern Mississippi reviewed this study and provided IRB approval (Appendix A). Each participant provided written consent before engaging in the study (Appendix A).

Table 4

Sample Size for Data Collection Procedures

Residence	Sample number for semi-structured interviews	Sample number for photovoice and group interviews
Mississippi		
Assimilated	N = 6-8	N = 3-5
Traditional	N = 6-8	N = 3-5
Bicultural	N = 6-8	N = 3-5
Marginalized/Separated	N = 6-8	N = 3-5

The PR protected the confidentiality of each participant of and trained recruiters to insure that there was no coercion in regards to recruiting participants through referrals (snowball sampling). Finally, participants were able to withdraw from the study at any time or refuse to answer any questions without penalty.

<div align="center">Data Collection Procedures</div>

The data collection and data analysis occurred in three phases. There were three researchers involved in data collection and analysis: the PR and two trained bilingual research assistants (RA). One RA was trained in interview administration and worked in data collection and analysis whereas the second RA was only involved in data analysis. Both RAs were trained by a qualitative researcher in coding procedures.

Phase I

Once a potential participant was identified, the PR contacted him by telephone or in person, and read the informed consent (Appendix A). The purpose of this phase was

five-fold and included the following: a) to have initial contact with the potential participant, b) to ensure the participant adhered to the inclusion criteria, c) to obtain informed consent from the potential participants, d) to categorize participants into one of four bidimensional acculturation groups and e) and to administer the quantitative questionnaires.

If the participant verbally consented to participate in the study, then the PR or RA asked him questions to insure he met the inclusion criteria (Appendix B). If the potential participant met the inclusion criteria, and the initial contact was by telephone, the PR or and participant agreed upon a time and place to meet so the participant could sign the consent form and complete the quantitative measurements. If the initial contact occurred in person, the participant consented to participate and met the inclusion criteria, he signed the consent form and the PR or RA administered the quantitative instruments to the participant at that time in either Spanish or English depending on the preference of the participant.

The quantitative instruments included the ARSMA-II (Appendix B), Marginality Scale (Appendix B), socio-demographic/economic questionnaire (Appendix B), psychosocial and environmental questionnaire (Appendix B), New Vital Signs Food Label for Health Literacy (NVS) (Appendix B), Fruit/Vegetable and Fat Food Screeners (Appendix B). The ARSMA-II, NVS, and Food Screeners were available in Spanish and English. The PR translated the psychosocial and environmental questionnaire and socio-demographic/economic questionnaires from English to Spanish and then the RA back translated the instruments into English to insure instrument accuracy (Brislin, 1970). The validity and reliability of each instrument is explained in the Data Collection Instruments

and Procedures section. The total contact with each participant for Phase 1 was approximately 45 minutes to one hour. The participant received a $10 gift card for his participation in the Phase I data collection. At the end of the contact the PR or RA and participant decided on another time and place to meet for Phase II of the study.

Phase II

The PR or RA conducted the SSI with each participant and there was one focus group. The focus group for five participants employed in the same company and administered by the PR during the participant's work break. The SSIs and focus group were used to explore the dietary pattern, dietary contributing factors, and changes in dietary patterns across and between acculturation groups. The PR or RA administered the Dietary Pattern Interview Guide (DPIG) (Appendix B) during the SSI and focus group. The PR translated the guide from English into Spanish and the RA back translated it into English (Brislin, 1970). The proposed sample size for each stratified SSI sample is outlined in Table 5, although it fluctuated due to access to Hispanics representing different acculturation groups, theoretical sampling (other data that may need to be collected depending on the gaps identified using the constant comparative data analysis method from GT) and informational redundancy (data saturation or no new codes are being extracted from constant comparison) (Sobal, 2001).Furthermore, the research tailored the DPIG for focus group administration and completed one focus group with five participants. These participants were employed with the same employer and had the same work hours; therefore, a focus group was more conducive to their situation. The PR or RA conducted the SSIs in Spanish or English per participant request. The interviews were audio-taped with permission by the participants. Each interview lasted

approximately 45 minutes to one hour. At the end of the SSI and focus group, the PR or

RA explained the procedures for Phase III of the study to each participant and asked if he

was willing to participate in this final phase.

Phase III

Phase three consisted of the photovoice and group interview procedures. The

participants continued to be split into one of the four bidimensional acculturation groups

based on their identified acculturation grouping. There were less participants in phase

three due to the complexity of photovoice. There were the proposed number of

participants from each group (Table 4) that agreed to participate in Phase III and the PR

contacted each potential Phase III participant to confirm whether he was still interested.

In the language preference of the participants, the PR led the training sessions during

which she provided photovoice guidelines to each participant (Appendix C). In the

training session, the PR addressed the ethical and power concepts behind photovoice as

indicated in the protocol (Appendix C). She also provided participants with instructions

on photovoice procedures the use of digital cameras. The PR instructed the participants to

not take pictures of people when taking the photographs. Also during the training session,

each participant decided on a way he would return the memory card from the digital

camera to the PR after completing the photograph protocol: a) by mail, b) meet PR at a

neutral place, or c) bring the cameras to the PR's office. The participants had two weeks

to complete the photovoice protocol. After the two weeks the participants provided the

PR with the camera's memory card and the research made hard copies of the

photographs.

The PR and RA conducted group interviews with each acculturation group after the photographs were developed. The photographs were used as points of reference during the group interviews and this process is described in greater detail under the section "Data Collection Instruments and Procedures." The objective of the group interviews was to gain more insight into the dietary contributing factors as well as the participant's actual dietary patterns and changes in dietary patterns. These items were explored through an organized discussion around the photographs. Each photovoice participant was involved in a group interview comprised of those in his respective acculturation group. For example, if the participant was in the traditional acculturation group and agreed to participate in the group interview, he participated in the group interview with other traditional participants. If participants had the same acculturation group but spoke different languages, then two group interviews would have been completed; however, this did not occur in this study meaning all participants within a group spoke the same language(s).

The PR developed the group interview guide to facilitate conversation around the participants' photographs (Appendix B). The guide was revised to address ill-defined and unclear themes identified in the data, regarding the dietary contributing factors, dietary patterns and changes in dietary patterns, during/after the SSI and quantitative data analysis and in the development of the conditional relationship guide and (Appendix D) (see Data Analysis section below). The group interview administrator (PR or RA) audio-taped each group interview with permission from the participants. The PR and RAs transcribed the group interviews and analysis was completed.

Data Collection Instruments

The purpose of this research was to explore dietary patterns and dietary contributing factors that influence dietary patterns across and between Hispanic males; each of whom represented one of four bidimensional acculturation groups. The dietary acculturation model was used to guide the factors that were explored. The following is a description of each component or construct of the proposed dietary acculturation model, the factors within each construct and the corresponding instruments and specific questions used to explore and describe each construct measured in this research (Table 5).

Dietary Patterns

Quantitative and qualitative methods were utilized to explore dietary patterns across acculturation subcategory groups (Table 5). The quantitative instruments included the Fruit/Vegetable and Fat Screeners. SSIs, focus group, photovoice and group interviews were the qualitative methods used to examine dietary patterns.

Quantitative methods and instruments. The Fruit/Vegetable and Fat Screeners are quantitative instruments (Appendix B). The research utilized the screeners to obtain dietary scores that further categorized the fruit/vegetable and fat intake of the participant into one of four groupings (Table 6). Wakimoto, Block, Mandel and Medina (2006) developed the Fruit/Vegetable and Fat Food Screeners for the Hispanic population. The screeners were validated with the Mexican population but the researchers used national data from the NHANES-III, which included a more diverse more diverse Hispanic population, to identify frequently consumed fruits, vegetables and high fat foods in the overall Hispanic population. The screeners were tested with the Hispanic population using interviews and subacculturation focus interviews, field testing and a reliability

study (Wakimoto et al., 2006). There were formatting changes that came from the interviews and field testing, although no changes in the foods listed in the instrument were made. In the reliability testing, the correlation statistic for the Fruit/Vegetable screener was $r = .64$ and for the Fat screener, it was $r = .85$.

The screener can either be scored on a continuous scale or scores can be categorized into one of four groups: low, medium-low, medium-high or high intake. The screener has to be used with caution because it does not provide a full picture of dietary and nutrient intake. The PR entered the individual item responses for each participant into SPSS and calculated a screener score for each participant. Based on the participant's score, the PR placed him into one of four categories for fat and one of four for fruit and vegetable intake. The cutoff scores for each category are noted in Table 6.

Qualitative methods and instruments. During the SSIs and focus group, the PR or RA utilized the dietary pattern interview guide (DPIG) to provide descriptive data about dietary patterns within each acculturation group as well as retrospective information on dietary change since migration (Appendix B). The qualitative interview questions were adapted from Falk, Sobal, Bisogni, Connors, and Devine (2001).The interview guide explored "current and past food and nutrition roles, food choices, and changes in dietary behaviors" (p. 427). Falk and colleagues used the guide to identify ways people define healthy eating and different factors that influence a person's perspective of healthy eating. The researchers administered the guide to non-Hispanics and Hispanics using individual interviews and categorized each study participant into a cluster based on how he/she managed healthy eating. Each cluster was defined by the following characteristics: themes, experiential/informational sources, food classification, situation classification

and strategies. Table 5 lists the specific questions from the DPIG that explored dietary patterns and dietary pattern changes in the participants.

Photovoice, journals, and subacculturation focus interviews. Photovoice is a qualitative methodology that has been used to give a voice to vulnerable populations in an effort to influence policy, and for purposes of needs assessment and evaluation (Wang & Pies, 2004). Wang (1999) outlines the key concepts and methods of photovoice. The five concepts are a) images teach through individuals being able to visualize themselves and the world around them, b) policy can be affected through photography in that policy makers can be brought into the visual reality of the people for whom they develop policy, c) photovoice provides a way for the community or "target population" to shape and influence policies that affect them, d) policy makers and other stakeholders become the audience for the community, and e) photovoice encourages individuals and communities to active participation.

The use of photovoice has not been documented in the dietary acculturation literature. In the Hispanic population, the method has been implemented to examine health perceptions and influences of immigration (Jurkowski & Paul-Ward, 2007; Schwartz, Sabble, Dannerbeck, & Campbell, 2007; Streng, Rhodes, Ayala, Eng, Arceo, & Phipps, 2004; Vaugh, Rojas-Guyler, & Howell, 2008). One study concluded that photovoice was a useful method in the identification of environmental factors affecting health in Hispanics (Jurkowski & Paul-Ward, 2007).

Table 5

Dietary Acculturation Constructs, Supporting Factors, and Measures

	Dietary Pattern Interview Guide	Photovoice Group interview guide	Fruit/Veg. and Fat Food Screeners	ARSMA-II	Psychosocial And Environment Questionnaire	NVS	Demographic/ Economic Questionnaire
Mediating dietary factors – before migration		Pending on gaps in data from phase 1 and 2					
Socio-demographic/ economic							All
Acculturation				Bi-dimensional score			
Language				1-3			17
Culture	A4, A7, B3, D1, D2, D3, F5			HOS/AOS Score			
• Beliefs	D3(b-e)						
• Attitudes	D3(b-e)						
• Values	A7e						
Religion	D3f						21
Ethnic enclave							7
Mediating dietary factors – after migration		Pending on gaps in data from phase 1 and 2					
Diet – disease related changes	A4, A8, B2, C1, C2, D1, D2, 4-7, 9-10						
• Knowledge	A8a, A8b, A8d,D1a, D2a, D5(a-b), D9a				17-18, 21	X (nutrition literacy score)	

Table 5 – (continued).

	Dietary Pattern Interview Guide	Photovoice group interview guide	Fruit/Veg. and Fat Food Screeners	ARSMA-II	Psychosocial And Environment Questionnaire	NVS	Demographic/ Economic Questionnaire
• attitudes and beliefs	A8e, D2b, D3(a-b,e), D5(a-b), D6, D7(a-b), D9(a,c)				14-15, 17-18		
Values: assimilated vs. traditional	A7(e,g), B2, B3, D9c				19-20		
Taste and Food Preference	A7 (c-d), A8(c-d), A8c				12		
Environmental changes	A1 -6. B1-4,C1, C2, D1, D2, D8-10,E						
• shopping, restaurant, purchasing and preparation	A1, A3a, A4b, A7b,h, B1-4, C2a, D1, D2a, E(a-f)				1-6, 10-11, 13		
• family/friends (not included in the dietary acculturation model)	A1(b-d), B1-B2 B4(a-c), D1, D2a, E(e-f)				7-9a		
Dietary Patterns	A2, A3b, A6, A7(a-b), A8e, C1a, C2a	**Pending on gaps in data from phase 1 and 2**	All		8, 9b, 16		
Dietary Pattern changes	A3, A7d, A7f, C1(a,e), C2a	**Pending on gaps in data from phase 1 and 2**			22		
Mediating dietary factor changes	B3, C1, C2, D8, D10, F5, F6	**Pending on gaps in data from phase 1 and 2**					

Note. The letter(s) and/or number(s) across each measure and construct represents the item number(s) from the measurement tool that addresses that particular construct. DPIG

(Appendix I), Photovoice protocol (Appendix K), group interview guide (Appendix L), ARSMA-II (Appendix C), Marginality Scale (D), Fruit/Vegetable and Fat food screeners

(Appendix H), psychosocial and enviornmental questionnaire (Appendix F), socio-demographic/economic questionnaire (Appendix E)

Table 6

Fat and Fruit and Vegetable Categories from the Dietary Screener Scores

	Fat Score	Fruit and Vegetable Score
Excellent	<18	>18 = 5/day
Good	19-24	16-17 = 4/day
Fair	25-33	13-15 = 3/day
Poor	>33	<13 = <2/day

Note: Source:Wakimoto, P., Block, G., Mandel, S., Medina, N. (2006). Development and reliability of brief

dietary assessment tools for Hispanics. [serial online]. *Prevention and Chronic Disease, 3*(3), Available from

http://www.cdc.gov/ped/issues/2006/jul/05_0117.htm

In the nutrition literature, photovoice has been used with school children to explore

different environmental factors that influence school nutrition and with women to

document their perspectives of health during parenting (Fitzgerald, Bunde-Birouste &

Webster, 2009)

For purposes of this research, the photovoice process included two steps: (a)

participants "photograph[ed] their everyday health and work realities; (b) [they]

participate[d] in group discussion about their photographs, thereby highlighting personal

and community issues of greatest concern; and (Wang & Pie, 2004, p. 96). In this study,

the PR asked the participants to take pictures of (a) all food and beverages consumed

over a three day period, (b) all supermarkets, convenience stores, markets and restaurants

where foods are bought over a two-week period, (c) their food storage at the beginning of

the week and at the end of the week, (d) food preparation techniques used during meal

preparation over a one week period, and (e) anything else they deem important that

reflects their food environment during the one-week period (Appendix C).The

participants were allotted a two-week period to capture their food environment and dietary related factors. However, this period provided sufficient photos to facilitate adequate discussion in the group interviews. More than two weeks may have increased participant burden. The PR provided each participant with a camera and a journal. The purpose of the journal was to complement data collected through the photographs. The PR instructed participants to list each food they ate over the three day period to correspond with the photographs taken of these foods and to document reasons for choosing each food. The PR used the journals and photographs to facilitate discussion about participants' dietary patterns during the group interviews.

During the data analysis of Phases I and II, constant comparison and memo writing allowed the PR and RAs (described under "Data Analysis" section) to identify areas around dietary patterns that need further exploring. The PR and RAs adapted the group interview guide by incorporating questions that addressed these identified areas. Once the group interview data was collected and transcribed, the PR and RAs continued the coding, constant comparison and memo writing processes of all the data for all three phases to describe the dietary patterns for each acculturation group.

Dietary Contributing Factors

Proposed dietary contributing factors are outlined in the dietary acculturation model (Satia-Abouta, 2003; Figure 1) and consist of socio-demographic/economic, acculturation, cultural, religious, psychosocial and environmental factors. The following section describes the instruments and methods utilized to gather data about the dietary contributing factors included in the dietary acculturation model. However, during all

phases, constant comparison occurred during data analysis so that a dietary acculturation

model unique to this population could be developed.

Quantitative methods and instruments. The socio-demographic/economic

questionnaire (Appendix B) was a 16-question instrument that assessed socioeconomic

and demographic characteristics of the research population. The PR adapted the

questionnaire from a socio-demographic/economic questionnaire that had been used with

a low acculturated Hispanic population in Mississippi in 2008 (Cuy Castellanos, Connell

& Lee, 2011). The questionnaire was translated from English to Spanish and then back

translated into Spanish for accuracy (Brislin, 1970). The PR and RA administered the

questionnaire to the participants in the language indicated by the participant. The PR

entered the data into SPSS and used descriptive statistics to describe the sample and the

sub-categories of acculturation.

The PR and RA administered the ARSMA-II and Marginality Questionnaire to

the participants in the first phase of the research (Appendix B). The ARSMA-II is

designed to categorize each participant into one of four non-linear acculturation

subcategories (a) low acculturated (b) high acculturated, (c) high bicultural, or (d) low

bicultural, and to indicate a person's cultural orientation based on the Anglo-orientation

subscore (AOS) and the Mexican-orientation subscore (MOS) (Berry, 1997; Cuellar,

Arnold, & Maldonado, 1995). The two bicultural groups were collapsed into one

bicultural group. There are 17 items for the MOS and 13 for the AOS. The PR changed

the questions that indicated "Mexican or Mexican-American" to "Hispanic or Hispanic-

American" (Cabassa, 2003). Therefore, the MOS was converted to Hispanic-oriented

subscore (HOS). The ARMSA-II includes six dimensions of acculturation: language,

ethnic interaction, cultural heritage, ethnic pride and identity, generational proximity and

ethnic distance, and perceived discrimination. The PR chose this instrument because it

included multiple factors that influence the acculturation process (Cabassa, 2003).

The ARSMA-II includes 30 items with a response set of 1, signifying *never* to 5,

signifying *almost all or all the time*. The PR entered each participant response (1-5) of

each ARMSA-II item into SPSS. For each participant, the PR calculated two scores from

the 30 items: the HOS and the AOS. The PR used these scores in conjunction with the

Marginality Questionnaire scores to examine cultural orientation and acculturation.

The Marginality Questionnaire allowed for the ARSMA-II to be used in a non-

linear mode for it includes a measurement for marginalization. The Marginality

Questionnaire has 18-items with a five item response set: 1 to 5 with 1 indicating *strongly*

disagree and 5 indicating *strongly agree*. The questionnaire observed participants beliefs,

values and attitudes towards Hispanics, Hispanic-Americans, and Anglo-Americans by

creating three different scores: Hispanic marginalization score (MEXMAR), Anglo

marginalization score (ANGMAR) and a Hispanic-American marginalization score

(MAMAR). The PR combined of the scores from the ARSMA-II and the Marginality

Questionnaire to obtain an overall non-linear bidimensional acculturation score, by

comparing the HOS, AOS and Marginality scores to predetermined cut off points shown

in Table 7. If participant scores adhered to the bicultural or assimilated cutoff points as

well as one of the four Marginality scale categories then participants were placed into the

marginalized or separated group. Just to note, Berry's definition of separated mirrors

Cuellar's definition of low acculturated or tradition (see p. 17). In this study, "traditional"

will be used to refer to "low acculturated" and "bicultural" will refer to "integrated"

(Table 7). Due to low participant representation of the marginalized group, the marginalized and separated groups were collapsed into one group "marginalize/separated." Cuellar differentiates marginalized from separated by explaining marginalization as experiencing rejection from the host culture and rejecting the indigenous culture whereas separation refers to not acculturating to a particular culture even though the opportunity is present. Once the scores were determined, the PR grouped each participant into one of the four acculturation strategies based on his scores; termed "bidimensional acculturation group" in the present study. Table 7 indicates the terminology used by Berry (1997) in the acculturation strategy compared to the terminology used for each group by Cuellar et al. (1995). The terminology used by Cuellar et al. was used to differentiate acculturation groups in the present study.

The PR adapted the psychosocial and environmental questionnaire from Sabia-Abouta, Patterson, Kristal, Teh, and Tu (2002) (Appendix B). It was originally created for a Chinese-American population residing in the US northwest. The questionnaire explores diet-related psychosocial and environmental factors that influence dietary intake. The questionnaire was divided into three different constructs: predisposing, reinforcing and enabling. The predisposing constructs included questions around the beliefs, attitudes, knowledge and motivation of dietary intake in regards to chronic disease. The enabling construct identifies barriers (environmental influences) to continuing to eat a traditional diet. The reinforcing construct included questions that explored in-family, normative pressures for retaining or rejecting the traditional diet. The PR substantially revised the instrument to include more constructs from the proposed dietary acculturation

model (Table 5) and changed each question response from a categorical (yes/no/do not know) to an ordinal 9-point Likert scale.

Table 7

Acculturation Subcategory Scores

	Acculturation Strategy terminology	MOS	AOS	MEXMAR	ANGMAR	MAMAR
ARSMA-II						
Assimilated (high Acculturated)	Assimilated	<2.44	≥4.11			
Bicultural (low or high bicultural)	Integrated	>2.95	≥2.86			
Traditional (low acculturated	Separated	>3.7	<3.24			
Marginality Questionnaire						
Marginalized	Marginalized			≤17.34	≥16.82	≥14.98
Separated Mexican				≤11.14	≥13.98	≥13.98
Separated Mexican-				≥14.7	≥14.7	≤12.06
American				≥14.98	≤ 12.61	≤14.98
Separated Anglo						

Note. Source: Cuéllar, I., Arnold, B., &Maldonado, R. (1995). Acculturation Rating Scale for Mexican Americans-II: A revision of the original ARSMA scale. *Hispanic Journal of Behavioral Sciences*, 17(3), 275-304. [a]Meets Assimilated or bicultural ARSMA-II scores and fits one of the criteria listed for MEXMAR, ANGMAR and MAMAR

The PR translated the instrument into Spanish and a RA back translated it into English to insure accuracy of the instrument (Brislin, 1970). The PR pilot tested the questionnaire with five people that represented the target population to examine item

comprehension. The PR asked each question to the participant and asked the participant to paraphrase the question in his own words to examine cognitive comprehension of the question. The PR then asked the participant if he thought it would be hard for others to understand and why or why not. After cognitive testing the PR modified the questions to improve item comprehension and then re-tested. Once the questionnaire was finalized for this population, the PR and RA administered it during Phase I as described above. The PR and RA extracted individual participant answers from the psychosocial and environmental questionnaire and added them to the DPIG, enabling the PR or RA to elicit more insight from the participant regarding diet and disease-related knowledge, attitudes, values and beliefs.

The NVS (Appendix B) is a short health literacy screener and contains a food label that is accompanied by six questions. The PR used the NVS in this study to evaluate diet-related knowledge; one of the dietary contributing factors in the dietary acculturation model. The instrument is in English and Spanish and is a test of health reading and comprehension. The NVS compared well with The Test of Functional Health Literacy in Adults (TOFHLA) for reliability, validity and accuracy. The English version took 2.9 minutes and the Spanish version 3.4 minutes to administer. The internal consistency was $\alpha = .76$ for the English version and $\alpha = .69$ for the Spanish version. Both correlated well with the TOFHLA; r = .59, $p < .001$ and r = .49, $p < .001$ (Weiss et al, 2005). The PR and RA administered the NVS to each person in either English and in Spanish as indicated by the participant. A score of 0-1 indicates low literacy, 2-3 possible limited literacy and 4-6 adequate nutrition literacy. This tool was used in triangulation with the SSI and the group interviews to explore nutrition knowledge.

Qualitative measures. The DPIG (Appendix B) was utilized during the SSIs and focus group and broadly explored factors identified in the dietary acculturation model (Table 5) that influenced the dietary pattern and diet change in the study population. The specific factors that were explored included culture, religion, diet related knowledge, behaviors and attitudes, values associated with diet, food and taste preferences and environmental factors. Table 5 outlines the factors in the model and the questions in the DPIG that were used to obtain information about each factor. As discussed in the previous section, a section of questions on interview guide were tailored to participants based on their response to certain items on the psychosocial and environmental questionnaire.

The group interview questions explored various dietary contributing factors (Appendix B). As previously stated, group interviews with each acculturation group occurred once photovoice pictures were developed. The PR developed a preliminary group interview guide. These questions were meant to encourage group discussion about the images, behaviors captured in images, and influences that affect food choices. Additional questions were developed depending on the ill-defined or unclear themes identified regarding the dietary contributing factors after analysis of the quantitative instruments and the SSIs (theoretical sampling).

Dietary Pattern and Dietary Contributing Factor Change

Qualitative data was used to assess changes in dietary patterns and mediating dietary factors experienced by the participants due to migration. During the SSI, focus group and group interviews, the PR and a RA asked questions of the participants the inquired about changes that the participant had experienced in his dietary patterns and

dietary contributing factors that have been influential in his dietary pattern changes. These changes were examined across acculturation groups through the data analysis and interpretation process discussed below.

<div align="center">Data Analysis</div>

The PR and the two RAs transcribed all audio-taped sessions, including the SSI, focus group and the group interviews. They then coded the qualitative interviews using open, axial, and selective coding (Hoepfl, 1997). By using open and axial coding, as compared to coding the data based only on constructs of the acculturation model, the PR could gain theoretical insight into constructs not presented in Satia-Abouta's model. Also, the PR and two RAs involved in the data collection and analysis engaged in memo writing during the data analysis process. Memo writing began with the first coding session and did not cease until the final results are written up. Each researcher involved in the data analysis was provided with a notebook. He or she carried the notebook while data analysis was occurring and documented any insights that he or she had regarding the research.

The quantitative data was coded according to the specific coding scheme for each particular instrument. The PR entered the data into SPSS and generated descriptive statistics (means, standard deviations, and frequencies). This descriptive data was combined with the qualitative data through constant comparison incorporated into the conditional research guide and reflective coding matrix described below.

A framework to assist in transitioning from open code to theory construct, known as a conditional research guide, was developed for each of the three bidimensional acculturation groups represented in this study (Wilson Scott & Howell, 2008). This study

lacked the assimilated group due to only having one participant that fit the assimilated criteria. The conditional relationship guide "identifies the relationships and interactions of the categories one with the others and also describes how the consequences of each category are understood." (p. 8). The conditional research guide originated during the open coding process and clearly identified the what, when, where, why, how, and with what consequence for each code that emerged from the qualitative data. The "consequence" for each code answered (a) whether the code was understood or (b)"with what consequence" the code occur (p. 6). The final category in the guide, consequences for each code, guided the PR and RAs into the process of axial coding where relationships between codes and acculturation subcategory groups were connected to identify the core categories in the data.

Ultimately, the guide resulted in the development of a reflective coding matrix (Appendix D) (Wilson Scott & Howell, 2008). This was a tool used to provide theoretical context to the patterns identified in the conditional relationship guide. The reflective coding matrix was developed during axial and selective coding processes and incorporated data from all data sources. The matrix guided the PR and RAs in describing the process, dimensions, contexts, properties and outcomes of each core category. The PR and RAs identified categories that were insufficiently explored and documented in the data during the processes of developing the matrix and memo writing therefore leading to theoretical sampling to clarify and ill-defined data.

Once the PR and RAs identified all the core categories, open coding ceased, therefore moving into the selective coding phase. During selective coding, the PR and RAs incorporated new information that expands the context of the core categories. The

reflective coding matrix guided this process. Once the PR and RA completed the reflective coding matrix and addressed all the ill-defined themes identified during the coding, memo writing and constant comparison processes, the PR developed a conceptual framework from the core categories.

Dietary Acculturation Model – Operationalizing the Variables

Triangulation occurred during the analysis process through constant comparison of quantitative and qualitative data to explore dietary patterns and dietary contributing factors. Data from each instrument was included in the conditional relationship guide and reflective coding matrix for each bidimensional acculturation group to help organize and compare the data and identify and contextualize phenomenon. The PR and RA examined dietary patterns through analysis of the SSIs, focus group, group interviews, and the food screeners. The analysis of the data collected from the SSI, focus group and group interviews were combined with the data from the psychosocial and environmental questionnaire, socio-demographic/economic questionnaire, and NVS to explore possible dietary contributing factors. For example, the analysis of the data from the SSI was compared to the answers from the psychosocial and environmental questionnaire. The SSI, focus group and group interview analysis was compared to the enabling and reinforcing sections of the psychosocial and environmental questionnaire to explore the environmental factors around the dietary patterns within and between each acculturation subcategory group. Lastly, individual participant answers from the Psychosocial and environmental questionnaire were incorporated into the DPIG with the intention for the participants to expand on the reasoning behind his answer.

Data Interpretation

Once the reflective coding matrix was completed, descriptions of the dietary patterns and the dietary contributing factors of the patterns were interpreted across and between each bidimensional acculturation group and compared to the aforementioned dietary acculturation model. After data analysis was complete, the PR compared the core categories and themes with the theoretical constructs presented in the existing model (Satia-Abouta, 2003).The findings from this research with the Hispanic population resulted in theoretical constructs, emerging from codes, which diverged from the previous dietary acculturation model, and a new model was developed. Data interpretation (model adaptation/development) occurred only once data saturation was reached and there were no gaps in the reflective coding matrix.

Conclusions

From the analyzed data, the PR drew conclusions on whether the dietary acculturation model was appropriate for the Hispanic population which led to the development of a dietary acculturation conceptual framework specific to the Hispanic population. Lastly, the PR drew conclusions on the appropriateness of using a bidimensional acculturation model in assessing dietary acculturation in the Hispanic population based on observations from the data.

CHAPTER IV

MANUSCRIPT I: USING A BIDIMENSIONALACCULTRUATION MODEL TO

EXAMINE DIETARY INTAKE AND POST-MIGRATION CHANGE IN HISPANIC

MALES

Abstract

Acculturation has been shown to be a factor in dietary behaviors in the Hispanic

population in the US and affects chronic disease risk. Studies assessing dietary intake in

the Hispanic population have used a unidimensional measure of acculturation; however,

it is reported that a bidimensional measure captures the complexities of the acculturation

process more accurately. The purpose of this study was to incorporate the bidimensional

acculturation model to explore and compare dietary intake in a sample of Hispanic males

residing in the southern US. Qualitative and quantitative measurements were used to

assess acculturation group and dietary behavior. Dietary intake in terms of fruit and

vegetable, meat, and processed and fast foods for each group are presented and

comparisons between groups are reported. The results indicated that the bidimensional

model may be a better measure in determining acculturation in future diet-related

research with this population, as it captures the bidimensional aspects of the acculturation

processes.

Introduction

Health disparities are apparent in the Hispanic US population (Elder, Ayala,

Parra-Medina,& Talavera, 2009). Hispanics have a higher rate of cardiovascular

mortality and a higher prevalence of diabetes and obesity when compared to Non-

Hispanic whites(Centers for Disease Control and Prevention [CDC], 2009).Furthermore,

acculturation has been implicated as a factor contributing to chronic disease rates among

Hispanic immigrants (Flores, Bauchner, Feinstein, & Nguyen, 1999; Grundy, Blackburn,

Higgins, Lauer, Perri, &Ryan, 1999; Kaplan, Huguet, Newsom, & McFarland, 2004;

Lara, Gamboa, Iya Kahramanian, Morales, & Hayes Bautista, 2005). During the

acculturation process, one of the first behaviors to change is diet (Marin, 1992),which

also contributes to health outcomes (Cordian et al., 2005)

Acculturation

Acculturation encompasses "psychological and social changes that groups and

individuals experience when they enter a new and different cultural context" (Cabassa,

2003, p.128). There are different acculturation theories; however, the bidimensional

acculturation model is shown to be more accurate and inclusive in terms of capturing the

complexity of the acculturation process (Ryder, Alden, & Paulhus, 2000) when compared

to a unidimensional model. The unidimensional model insinuates that the acculturation

process takes place along a single continuum, over a period of time, during which

behaviors and norms from the indigenous culture are shed, while behaviors and norms of

the new culture are adopted. The bidimensional model, however, suggests that an

individual can continue to identify and retain behaviors and norms of the indigenous

culture, while also adapting to the host culture (Ryder et al., 2000). The bidimensional

model includes measures acculturation across two continuums contact and participation

and cultural maintenance, in which the following four acculturation groupings are

created: (a) separated or traditional, (b) integrated or bicultural, (c) marginalized, and (d)

assimilated (Berry, 1997). Berry terms these groupings "acculturation strategies" (p.9). A

description of the acculturation strategy or group is provided in Table 8 (Berry, 1997). In

terms of exploring acculturation and dietary behaviors in this population, the bidimensional acculturation model has been exempt; whereas, the unidimensional acculturation model has been used.

Dietary Behavior in Hispanics

Acculturation has been shown to play an independent role in nutrition behavior (Mazur, Marquis, & Jensen, 2004) in the Hispanic population. In particular, dietary changes during the acculturation process have been observed, whereby a healthy traditional diet is replaced with a western diet. This change in diet is characterized by high intakes of processed foods, refined sugars, fats, and low intakes of fruits and vegetables (Dixon, Sundquist, & Winkleby, 2000; Duffey, Gordon-Larsen, Ayala, & Popkin, 2008; Gregory-Mercado et al., 2006; Hartwegg & Isabelli-Garcia, 2007; Mazur et al., 2003; Montez & Eschbach, 2008; Neuhouser, Thompson, Coronado, & Solomon, 2004; Norman, Castro, Albright,& King, 2004).Furthermore, a western diet has been associated with increased chronic disease risk (Cordain et al., 2005).

Researchers have observed dietary behaviors in low and high acculturated Hispanics to illustrate the role of acculturation on diet. However, in these studies, acculturation was measured using unidimensional measures, including time spent in the host culture, birthplace, language, or a combination of these proxies (Dixon et al., 2000; Duffy et al., 2008; Neuhouser et al., 2004; Norman et al., 2005).To our knowledge, studies conducted thus far have measured acculturation using a linear unidimensional measure, which is limited in terms of capturing the complexities of this process. Exploring dietary behavior across bidimensional acculturation groupings allows for a more accurate description of the dietary acculturation process as well as the ability to

make comparisons of dietary behaviors between distinct acculturation groups. Because Hispanic Americans suffer disproportionately from higher rates of diet-related chronic diseases, an exploration of diet in terms of acculturation is important in identifying risky dietary behaviors.

The purpose of this study is to explore dietary behavior in Hispanic males across the four bidimensional acculturation groups. This study focuses exclusively on the dietary intake of Hispanic males, a group traditionally omitted from such research (Dixon et al., 2000; Gregory-Mercado et al., 2006; Montez & Eschbach, 2008; Norman et al., 2004).The Hispanic male population is larger than their gender counterpart (US Census Bureau, 2009) and within the Hispanic culture the males have a large decisional role within the household, therefore influencing foods that are prepared and consumed (Cuellar, Bastida, & Braccio, 2004).

Methods

Participants

Recruitment targeted individuals, 18 years or older, who were first and second generation Hispanic males residing in southern Mississippi, whose origin or heritage was Mexican, Central or South American, or Puerto Rican. These participants were recruited from an English as a Second Language class at a local church or were identified by local Hispanic leaders and participants in a prior research study (snowball sampling).

Data Collection Procedures and Instruments

The study used quantitative and qualitative data collection methods, including individual research assistant-administered questionnaires, semi-structured interviews, a focus group, and photovoice and group interviews. The questionnaires and interviews

were administered by the primary researcher, or a single trained RA, both bilingual, in the preferred language of the participant (English or Spanish). Quotations presented in this paper that were originally expressed in Spanish have been translated into English.

All data collection procedures were conducted in locations chosen by the participants and included local cafes, churches, participants' homes, and the PA's home. This research was approved by the Institutional Review Board at The University of Southern Mississippi. The following outlines each data collection procedure.

Research Assistant-Administered Quantitative Questionnaires Acculturation Measurement

Acculturation measures. The first step in this research was to characterize each participant by acculturation group. The Acculturation Rating Scale for Mexican American-II (ARSMA-II) and the Marginality questionnaire were research assistant-administered to each participant (Cuellar, Arnold, & Gonzalez, 1995).These scales were developed for the Mexican-American population, but for our purposes, questions reflecting the participant's ethnic classification were changed to represent that of his ethnicity. Other researchers have used this approach with the ARSMA-II with acceptable results (Cabassa, 2003; Garcia, Hurwitz, & Kraus, 2005; Wilson, 2009; Zebraki, Holzman, Bitter, Feehan & Miller, 2007). Combining the scores of each measure allowed for participants to be categorized across two dimensions: contact and participation and cultural maintenance. The ARSMA-II was used to categorize participants by cultural orientation along a continuum from high to low on two subscales: the Hispanic orientation (HOS) and the Anglo orientation (AOS), yielding a bidirectional linear acculturation score, and categorizing each individual into one of three typologies:

(a) Traditional Hispanic, (b) Bicultural (Integrated) or (c) Assimilated (Cuellar et al., 1995). The ARSMA-II had Cronbach's α of .79 and .90. The Marginality Questionnaire assessed the participant's acceptance of the ideas, customs, values, and beliefs related to three cultural groups: Hispanic, American, and Hispanic-American, by averaging responses on corresponding subscales that are part of an 18 item set. The Cronbach's α of the Marginality Questionnaire was .84, .91, and .94 respectively.

The combination of scores from the ARMSA-II and the Marginality Questionnaire were then used to categorize each participant into one of four groups: traditional, marginalized/separated, bicultural, or assimilated, adopting Berry's (1997) acculturation strategies. Table 8 provides definitions of each group (Berry, 1997; Cuellar et al., 1995).

Fruit/vegetable and fat intake. The fruit/vegetable and fat food frequency screeners were research assistant-administered to each participant (Wakimoto, Block, Mandel, & Medina, 2006). The instruments, developed for the Latino population using data from the Third National Health and Nutrition Examination Survey, provide an estimate of usual intake of fruits and vegetables and fat. In this study, the reliability of the fruit and vegetable screener was .41 and .70 for the fat screener. However, reliability values were previously reported as .64 and .85 respectively (Wakimoto et al., 2006).

Qualitative Dietary Measures

Semi-structured interviews and focus group. The dietary pattern interview guide (DPIG) was adapted from Falk**,** Sobal, Bisogni, Connors, and Devine (2001).

Table 8

Definitions of the Bidimensional Acculturation Strategies

Acculturation Group	Definition
Traditional	Little contact with the host culture and maintenance of the indigenous culture
Bicultural	Having contact with host culture while being able to retain cultural norms of the indigenous culture
Marginalized/Separated	Having little contact with the host culture while having little interest in retaining the indigenous culture or rejecting acculturation into a culture even through the opportunity is present.
Assimilated	Having contact with host culture and possessing cultural norms of host culture

Note: Source: Berry, J.W. (1997). Immigration, acculturation, and adaptation. *Applied Psychology: An International Review, 46*(1), 5-68.

The interview guide explored beliefs and influencing factors for managing healthy diets in a diverse population, as well as changes, and reason for changes, in diet since migration or leaving the childhood home. Questions exploring reason for emigration and perceived advantages and disadvantages for residing in the US were included. The six main question categories were food choices, food role, diet changes, food and nutrition knowledge, environmental influences, and life stage. Table 9 includes a sample of a question from each category. The questions were translated from English to Spanish, and then reviewed by two Hispanic men from the target population to insure that the meaning of each question was captured correctly from the English version. The bilingual research

assistant then back-translated to English and that version was compared to the original

English version to insure that the original meaning of the questions was retained. The

interview guide was pre-tested with four Hispanic men from the target population for

semantic, conceptual, and normative dimensions of equivalence to insure that the Spanish

language used was appropriate for the target population. The guide was also transferred

into a focus group interview format. One focus group was completed with five

participants that worked in the same place due to employer time constraints. Individual

interviews conducted with participants and the focus group were audio tape-recorded, and

subsequently transcribed in the language that they were administered.

Table 9

Question Categories and Sample Questions from the Semi-Structured Interview Guide

and the Photovoice Group Interview Guide.

Question category for semi-structured interview guide	Sample Question
Food Choices	If I followed you through a typical food shopping trip, what things would I see you choose? How different are these foods than the foods you would buy in your country of origin?
Food Role	Traditionally, the women in families have been responsible for making sure that everybody eats right. How true is that in your family now? How true was that in the family you grew up in?
Dietary Changes	How has the way you eat changed in the last couple of years (if person is second generation) or since moving to the US (if person is first generation)?

Table 9 – (continued).

Question category for semi-structured interview guide	Sample Question
Food and Nutrition Knowledge	We hear a lot these days about choosing more fruits and vegetables in our diets.
	• What do you think about that?
	• What do other people you know think about that? ...the people you usually eat with [or...your family]?
Environmental Influences	How do you think the way you personally eat is affected by:
	• Where you live?
Life Stage	How does life in the US compare to life in your country of origin?
Photovoice group interview guide	Sample questions
Dietary change	Describe how your photos would look if you participated in a similar photo project in your birth country?
Key Questions	When looking at ALL the photos, which foods do you perceive as the US foods? What influences you to choose the "US" foods?
	Show me meals from your pictures that you also ate in your home country. What was the same about it? What was different?
	Find different fruits and vegetables that you ate in your photos. What were the reasons for choosing these fruits and vegetables? Where did you get them from here in the US? How do they differ from the fruits and vegetables you ate in your country of origin, or those you grew up eating?
	If your food role has changed since coming to the US, or moving to Hattiesburg, how has this affected the way you eat?

Note: Source: Falk, L., Sobal, J., Bisogni, C., Connors, M., Devine, C. M. (2001). Managing Healthy Eating: Definitions, Classifications, and Strategies. *Health Education and Behavior, 28*(4), 425-439

Photovoice and group interviews. Photovoice is a qualitative methodology that has been used to assess needs, behaviors, and attitudes of populations not typically engaged in research (Wang & Pies, 2004). Individuals who completed the aforementioned surveys and participated in the interview were recruited to participate in photovoice. Photovoice was a method of assessing food choices, changes in food intake, and influences of food decisions in the US and their country of origin. Each participant was provided with a digital camera for two weeks, and asked to take pictures of food he consumed and his food environment. The pictures were developed and returned to each photovoice participant, who was invited to attend a group interview for a discussion of the photos and their meaning. Three 90-120 minute group interviews were conducted with participants, who were segmented by their identified acculturation category. Group interviews followed a 14-question guide, developed during the semi-structured interview data analysis process, which focused on clarifying ill-defined themes. Sample questions are listed in Table 2.

Data Analysis

SPSS was used for data entry and analysis of the quantitative instruments. The HOS and AOS scores from the ARSMA-II and the Marginality scores were calculated and compared to predetermined cut-off points. Participants were placed into one of five acculturation groups based on these scores. The individual item responses from the fruit/vegetable and fat screeners were entered into SPSS and an overall score for each was calculated for each participant. An average score on each screener for each acculturation group was calculated. The scores were compared to predetermined cut-off scores (Wakimoto et al., 2006) to categorize the fruit/vegetable and fat intake of each

groups "poor," "fair," "good," or "excellent" as a basis for describing intake of fruit, vegetables, and fat.

The semi-structured, focus groups and group interviews were categorized by acculturation group, then transcribed by the primary researcher and research assistant. Transcription was completed in the language of the interviews, either English or Spanish. Grounded theory guided the analysis of the qualitative data (Strauss & Corbin, 1990). Open, axial and selective coding was completed across all qualitative data using the constant comparative method (Hoepfl 1997; Strauss & Corbin, 1990). The researcher, research assistant, and a bilingual coder extracted common themes from the interviews (open coding). All coding occurred in the English language; therefore, codes extracted from the Spanish transcripts were translated into English by the coders. The themes were discussed among the coders and when agreement of a theme was reached it was adopted. The three coders identified connections between the themes and began to identify core categories (axial coding) (Hoepfl, 1997). Also during the coding process, the three coders used memo writing to document their thoughts and interpretations of the data. Identified core categories, themes, and findings from the food screeners were transferred into a reflective coding matrix (Scott & Howell, 2007). The food screeners helped quantify food intake in terms of fruit, vegetables, and fat and examine differences between groups. In accordance with the constant comparative method, unclear and ill-defined categories developed during the reflexive coding matrix were further investigated during the group interviews. The individual interviews and focus group were analyzed first, and then the group interview data was analyzed and incorporated into the reflective coding matrix. The coders finalized the core categories and a final reflexive coding matrix was adopted

for each acculturation group. Lastly, descriptions of each group were formed based from the socio-demographic quantitative questionnaire responses and information extracted from the life stage section of the semi-structured interview guide.

Results

Participants were first (n=31) and second generation (n=4) Hispanic males residing in southern Mississippi. The first-generation Hispanic participants included 19 from Mexico, 11 from Central or South America, and one from Puerto Rico. For the various components of this research, the number of participants included: acculturation and food frequency instruments (n=35), individual semi-structured interviews (n = 30), focus

group participants (n = 5), photovoice (14 volunteered, 12 completed), and group interviews (three, for a total n of 12). Eighteen of the semi-structured interviews and one of the group interviews were completed in English, and the remainder in Spanish. Based on the ARMSA-II and Marginality Questionnaire scores, 19 participants were categorized as traditional, eight as bicultural, seven marginalized/separated, and one assimilated. Due to small numbers in each category, two acculturation groups, separated and marginalized, were collapsed into one for all analyses. The one participant categorized as assimilated was excluded from analyses. Quantitative data on participants, by the three analyses categories are included in Table 10.These data are discussed along with qualitative data, by acculturation group, below. The food screener scores indicated that for the traditional group, the fruit/vegetable score fell below the cut-off of 15 for a "good" intake, placing this group in the "fair" intake category; whereas, all groups' scores were in the "good" category for fat intake. For this small sample, qualitative data

provided a much richer understanding of food intake commonalities and differences among acculturation groups, for fruits and vegetables and fat, as well as for other food categories. In the qualitative analyses, traditional foods, convenience and processed foods, fruits and vegetables, meats, and alcohol were categories that emerged. Findings are described for each acculturation group.

Traditional Group

Overview. Participants categorized as traditional were all first generation immigrants who had migrated voluntarily to seek employment opportunities. This group had a lower education and income level and was from poorer families, when compared to the other two groups. This group was primarily employed in service jobs. Advantages to living in the US mentioned by this group were high wages, more employment opportunities, and safety. Disadvantages to living in the US, versus their home countries, included living in fear of the police and not being able to see their families (kids, parents, and/or wife).

Traditional foods. This group continued to consume primarily traditional Hispanic dishes. Common traditional meals mentioned were "caldos" (soups and stews) and "guisados"(sauces) that incorporated meat. The participants indicated that tortillas and beans were consumed with every dish. Eggs were a common food consumed when money was lacking. Common ingredients mentioned by participants included tomatoes, chilis, onions, and cilantro. A traditional participant responded, when asked if the food he ate had changed, "For me no because what I ate there (in home country) is what I eat here."

Table 10

Socio-Demographic/Economic Variables and Fruit, Vegetable and Fat Intake in

Participants across Bidimensional Acculturation Groups

	Traditional (n=19)		Bicultural (n=8)		Marginalized/Separated (n=7)	
Descriptive	M	SD	M	SD	M	SD
Age	31.89	6.83	41.38	13.49	33.57	9.38
Years in the US	7.57	4.90	15.00	13.08	23.71	6.90
# living in Household	5.11	4.95	2.13	1.11	1.86	1.57
Fruit/Vegetable Score	14.17	3.50	15.50	5.13	17.57	4.31
Fat Score	22.89	7.44	21.00	4.31	23.86	12.28
Frequencies	n=19		n=8		n=7	
Married	12		6		5	
Spouse/girlfriend in US	5		5		5	
Income						
<$1500/month	12		4		3	
>$1500/month	7		4		4	
Education						
<9th grade	5		0		0	
9-12th grade	10		0		1	
Some college	0		1		1	
Technical	1		1		3	
Bachelor's degree or higher	3		6		2	

The reason for continuing to consume traditional foods was preference and custom. However, participants often mentioned that traditional Hispanic foods prepared in the US were not as good as those prepared in their country of origin by their mother or wife. Furthermore, this group expressed a strong emotional attachment to traditional Hispanic foods. One participant, when asked if the foods he cooked were as good as those in his country of origin responded, "No, because you can't get it to taste the same. Because they (moms) make it with love and here you just do it because you are hungry and want to fill your stomach."

Processed and convenience foods. Participants reported that they consumed more processed and convenience foods in the US compared to their country of origin due to less availability of fresh traditional foods, lack of cooking skills, and time constraints. Participants mentioned canned or packaged Hispanic ingredients and foods, as well as meats, and foods bought from convenience stores or fast food restaurants, as common processed and convenience foods consumed. One participant explained the difference between his country of origin and the US in terms of food availability when he said the following:

> For example in this case [in my country of origin] we go to the fresh market and buy fresh tomato and vegetables, very fresh just cut within these days. You go to the supermarket and it isn't the same as the fresh market because the supermarkets have the fruits and vegetables in some instances but they sell it to you processed for example a can of tomato puree.

Fruits and vegetables. Across the traditional group, participants believed their intake of fruits and vegetables had decreased since migrating to the US due to a change in

availability and access. They perceived fruits and vegetables in the US as tasting different, not being as fresh, having more chemicals/fertilizers, being expensive, and not as readily available due to a lack of fresh markets and infrequent shopping trips. A participant in the traditional group said, "Yes like the huachinango (pepper) and jalapeño that we know are much smaller [in country of origin].Here they aren't hot at all but in Mexico they are very hot. I don't know if here they cut them before they are ripe or what."

Meats. Participants mentioned that they only ate meat once or twice per week in their country of origin, but they eat meat daily in the US. One participant explained, "I have had a drastic change because in our country we only ate meat once or twice per week but here we always eat meat." Increased income was indicated as the reason for the increase in meat consumption. Typical meats consumed were chicken, red meat, and pork. However, participants mentioned that they believed the meat was not as fresh here, for it was processed and had more "chemicals." Another participant described his thoughts regarding meat in the US when he said, "the meat there I think is more fresh and here it is more processed. It has a longer time in the refrigerator. There (country of origin) it goes from the butcher to the frying pan."

Alcohol. Participants reported increased alcohol consumption since coming to the US as a result of social influences, availability, and increased income.. One participant from the traditional group said, "No, no, no, it is because for example there is beer in Mexico but when you go to drink a beer it is only at a party and you only drink one beer but here you can say 'right now' and you can find beer in the store and so let's go and keep drinking."

Bicultural Group

  Overview. The bicultural group was all first generation, and included professionals, as well as graduate students. All participants migrated to the US voluntarily to seek a better education. Participants from this group were from middle to upper class families. The advantages of living in the US reported by the participants were employment and educational opportunities as well as safety; while the disadvantages included being far from family and lacking a sense of social interaction.

  Traditional foods. Participants in this group enjoyed traditional Hispanic foods and associated them with their mother's cooking and custom, but did not seem to place a high value or importance on retaining these foods solely. They prepared traditional Hispanic foods on the weekends or when they had extra time. Reasons for not consuming these foods as much in the US included having a wife from the US, children's preferences, lack of cooking skills, time constraints, availability, access due to distance of markets, cost of foods, exposure to foods, and preference for other foods. Furthermore, various participants from this group indicated that traditional Hispanic foods did not taste the same in the US and these foods were something they looked forward to eating when they traveled back to their country of origin for visits.

  Processed and convenience foods. First generation participants mentioned eating more processed and convenience foods, such as frozen foods, and consuming more "snacks," which were defined as packaged foods, such as chips and cookies, since migrating to the US. When asked how his diet had changed since migration, one participant responded by saying he was, "drinking more soda, eating more snacks, junk in other words, basically." Pertaining to foods in the US, one participant said, "I think here

things are more like processed. Everything is canned and there is a lot of packaging so you don't get to see really what you buy. [Food in the US]…seems more like unnatural." Participants indicated that they ate more processed foods in the US compared to their country of origin because of availability (fewer fresh markets, bakeries, and butcher shops), children's preference, cost, and convenience due to time constraints. One participant explained, "for me it is (frozen) French fries. They are very practical. You put them in the oven and they are ready in 20 minutes."

Fresh fruits and vegetables. Overall, participants mentioned that their intake of fruits and vegetables had decreased since migrating to the US. Reasons for the decrease in fruits and vegetables included lack of availability and quality of certain types of fruits and vegetables and cost. Cost appeared to be a major factor. Several participants mentioned making fresh juices daily in their country of origin, but not being able to do this in the US due to the expense and lack of availability of fruits. Participants' perception of the quality of fruits and vegetables available in the US was negative, as they associated fruits and vegetables in the US with being imported from far away, and treated with pesticides and chemicals. These processing techniques were viewed as unhealthy and contributed to decreasing the actual flavor. However, the participants indicated that they believed it was important to incorporate fruits and vegetables into their daily diet; however, it was more difficult to do so in the US.

Meats. The bicultural group indicated they ate red meat, but it did not appear to be a significant part of their diet. Leaner meats, fish, and chicken were of priority, due to health. Participants mentioned that they usually baked or used olive oil to sauté their

meats. Two participants in this group indicated that they were raised on a vegetarian diet; and one of these two participants continued to follow this diet.

Alcohol. The majority of participants had an alcoholic beverage occasionally, for example when out at a restaurant or in a social environment; however, participants did not place a high value or importance on drinking alcohol. Participants mentioned that since moving to the US, their access to liquor had decreased, while access to beer had increased due to availability and cost. The cost of beer was inexpensive in the US, but liquor was expensive compared to their country of origin. Furthermore, it was more common to consume liquor after a meal in people's homes and restaurants in their country of origin compared to in the US. Lastly, participants mentioned that wine was they commonly consumed wine as an alcoholic beverage.

Marginalized/Separated Group

Overview. Finally, among the marginalized/separated group, three of seven participants were second generation, but migrated to Mississippi from areas in the US that had a large Hispanic population (Los Angeles, CA and Queens, NY), with one native Mississippian. Two of the four participants that were born outside the US moved here involuntarily with their parents while still children. The dietary behavior changes they noted occurred after leaving the home of their parent(s). The participants in this group were in the military, students in a local university, and professionals. They had been in the US longer than the other two groups (M = 23.7 years). Several participants explained that they believed they did not identify completely with their Hispanic culture; but, they also felt as if they were misunderstood or unaccepted into the US society. Advantages of

living in the US included opportunity; while disadvantages included being far from family, although two participants indicated that they did not see any disadvantages.

Traditional Hispanic foods. Participants indicated that whether they grew up in the US, or outside of the US, they did so consuming mostly traditional Hispanic foods prepared by their mother or another relative. Furthermore, those raised in the US came from areas that had a high Hispanic population and access to traditional Hispanic foods. Since migrating to Mississippi, this group indicated that they only consumed traditional Hispanic food when they visited family, made it themselves, or ate at a restaurant. The wives or girlfriends of the participants from this group were all non-Hispanic and did not frequently prepare traditional Hispanic foods. Participants described these foods as being fresh, homemade, and preferable; and they also associated the best traditional Hispanic foods with their mothers. However, the variety of foods and food preferences mentioned by this group included traditional Hispanic foods and food from other cultures, as well as Western foods.

Convenience and processed foods. The marginalized group indicated that they commonly consumed processed (frozen and canned) foods and ready to eat frozen meals in the home and at work. One of the health conscious participants from the marginalized group said, "I'm taking vitamins because I don't know if it's a conscious thing but I kind of try to supplement everything because everything is so processed." The main reason for eating convenience foods was due to time constraints, for this group placed a high priority on having foods that were quick and easy to prepare. However, other reasons mentioned for eating convenience foods included cost and availability. Furthermore, this group indicated that their intake of convenience and processed foods increased after

leaving their parents' home, regardless of whether they had grown up in the US or outside of the US.

Fresh fruits and vegetables. The marginalized group was the only set of participants that indicated their consumption had increased, or stayed the same, since coming to the US and/or leaving their parents' home. This group indicated that their intake had increased because of the influence of their spouse or children. Two participants in this group mentioned that they did not eat a lot of fruit and vegetables while growing up because they were picky eaters and their mother catered to their preferences. One of the participants from the marginalized group said, "half of the food that I eat here I don't eat at home. I never ate broccoli or cauliflower. I never ate vegetables…For me it was mostly beans, meat, and homemade tortillas." The participant goes on to say that he eats more now because of the influence of his girlfriend and child. Fruit and vegetable intake needs to be explored further in this group, for participants did not place a high importance on eating them; however, the food screener indicated that they had a "good" intake.

Meats. Different meats often selected by the marginalized group included ground beef, chicken, pork, and steak. These meats were often grilled, fried, or baked and participants mentioned consuming meats daily due to preference and custom. One participant said, "My favorite aisle is meats. I like the steer meat that is cut up beef…I mean give me a burger and if you give me a fat free burger I am going to have a problem with that. It better have some fat."

Table 11

Summary of Findings: Similarities and Differences among Acculturation Groups

Food groupings	Similarities between groups	Differences between groups
Traditional Foods	Preference for these foods Consider mother's cooking is the best Foods taste different in the US due to decreased use of fresh and increased use of processed ingredients Decreased consumption of traditional Hispanic foods	Primary foods consumed by traditional group Emotional attachment to these foods in traditional group
Convenience/Processed Foods	Increased consumption since migrating to US/leaving parent's home due to availability, cost, and time constraints; Viewed as unhealthy	Inferred that marginalized group intake of these foods is higher than other groups Traditional group intake includes canned and packaged Hispanic ingredients and ready to eat cereals; bicultural group intake includes frozen foods and packaged foods; marginalized includes microwaveable/pre-cooked frozen meals and packaged foods
Fruits and Vegetables	Believed fruits and vegetables lacked variety and freshness in the US; Traditional and bicultural groups indicated their intake had decreased	Marginalized group indicated an increase or no change in consumption of fruits and vegetables.
Meats	Meats are fresher in country of origin	Increased consumption reported in the traditional group due to increased income and different meats consumed in US; bicultural group reported consuming more lean meats in the US.
Alcohol	Traditional and bicultural group reported increased intake in beer due to increased exposure and cheaper in US; Social drinking reported in traditional and marginalized group	Marginalized group indicated no change in consumption; bicultural group reported less liquor in US

Alcohol. Participants from this group indicated that they frequently consumed alcohol. All participants indicated that they drank alcohol either occasionally at a social event or nightly after coming home from work. This was explained by one participant when he said, "I drink a lot of water during the day because I don't during the night. Once I get home it is Miller time. You know I have to pop open my beer and chill out, relax."

<center>Summary of Findings</center>

Table 11 outlines similarities and differences in dietary intake among groups. Some similarities that were noted include: (a) there was a preference for traditional Hispanic foods that were made by a person's mother and/or in the person's home country; (b) foods and ingredients in the US were perceived as unfresh and processed; (c) processed, convenience and fast food intake had increased across groups since migrating to the US or leaving home; and (d) beer was the most common alcoholic beverage consumed in the US. Some notable differences between groups were: (a) the traditional group continued to consume mostly traditional Hispanic foods; whereas, the other two groups consumed a combination of different western, traditional Hispanic, and other ethnic foods, (b) fruit and vegetable intake decreased in the traditional and bicultural groups, but remained the same or increased in the marginalized group, and (c) meat intake increased in the traditional group, but had not changed in the other two groups.

<center>Discussion</center>

Distinct differences in dietary behavior were observed among acculturation groups. The traditional group could be compared to the "low" acculturated group in the unidimensional studies. Consistent with our findings, these studies have reported that this

group is more likely to retain a traditional Hispanic diet and have a higher dietary quality when compared to their high acculturated counterparts (Dixon et al., 2000; Duffey et al., 2000; McArthur, Viramontez-Anguiano, & Nocetti, 2001; Montez & Eschbach, 2008; Neuhouser et al., 2004; Norman et al., 2004). However, they indicated that their fruits and vegetables had decreased and processed and convenience foods increased since migration, which may indicate a decrease in dietary quality. Although the perceived decrease in fruits and vegetables and increase in processed and convenience foods appears to indicate a decrease in dietary quality, their dietary quality may continue to be above that of assimilated or "high" acculturated Hispanics as observed in prior studies (Akresh, 2007; Dixon et al., 2000; Duffey et al., 2008; Neuhouser et al., 2004).

The present study included two groups, bicultural and Marginalized/Separated, which are often missing when using a unidimensional acculturation measure.. In terms of the bicultural group, researchers argue that they are not necessarily in the middle of the unidimensional continuum, for they often retain indigenous norms and adopt certain host behaviors at the same time (Cabassa, 2003). This finding was also apparent in the present study. Participants were incorporating newly learned dietary behaviors with their traditional Hispanic dietary behaviors. Bicultural participants placed value on eating healthy and trying to eat healthy in the midst of their new food environment of their host culture. Although their intake of fruits and vegetables had decreased and processed foods increased, they reported trying to make sure they were consuming fruits and vegetables, eating lean meats, and choosing healthier processed foods and preparation methods. Examples included using olive oil in cooking or baking frozen French fries instead of frying. Various studies examining health behaviors in different acculturation groups

indicate that this group has healthier behaviors when compared to the other acculturation groups (Lara et al., 2004; Yeh, Viladrich, Bruning, & Roye, 2009) confirming our findings regarding dietary behavior.

The present findings indicated that the Marginalized/Separated group had a dietary intake that represented more of a western diet, and struggled to retain some aspects of a traditional Hispanic diet. The majority of participants from the marginalized group spent all or most of their childhood in the US and; migration for those that were first generation was not voluntary. Even though these participants indicated that they grew up eating traditional Hispanic foods in their home, and had traditional Hispanic foods readily accessible to them in the US, their exposure to western foods was higher than that of the other two groups. Several participants indicated their fruit and vegetable intake had increased; however, they also indicated a low consumption during their youth. Participants seemed to place less importance on health compared to the bicultural group and more on taste with a preference for meats. However, future studies need to be completed that quantitatively examine the dietary behavior of this group in order to flesh out the difference between marginalized and segregated individuals to determine if there are differences in diet between these two groups.

Dietary differences among acculturation groups were apparent in this study. Therefore, it is important that acculturation is assessed as nutrition professionals work with people or groups of different ethnicities. Such an assessment can help professionals understand how diets may have changed or been influenced during the acculturation process. This study is one of the first, of which we are aware currently aware, that examines the dietary behaviors of Hispanic males across acculturation groups determined

through a bidimensional measurement of acculturation. The use of a bidimensional model enabled us to (a) compare dietary behaviors across acculturation groups and (b) explore the dietary intake of bicultural and Marginalized/Separated groups, which is lacking in dietary acculturation research. For example, in terms of comparing findings across groups, it seemed that the traditional group tried to continue to retain a traditional Hispanic diet; whereas, the bicultural group had retained some traditional Hispanic foods, but also had, and were open to, adopting aspects of their new culture and environment. This paralleled their level of cultural maintenance, contact, and participation within their new host culture.

This study provides valuable information that addresses differences in food intake across acculturation groups; however, there were limitations that need to be considered. Dietary behavior and intake were measured qualitatively and through a food screener on a small Hispanic male population in one state. The qualitative data only provides a description of dietary behavior and does not allow for inferences to be made within and between groups. The food screener only assessed fruit/vegetable and fat intake, but did not provide an overview of the entire diet. The sample of participants did not include an assimilated group; therefore, we lacked the comparison of dietary intake across all proposed acculturation groups. The validity and reliability of the Marginality Questionnaire continues to be explored, so a measurement of this complex phenomenon of acculturation continues to be in the experimental stages.

In conclusion, this study provides a foundation for further examining dietary behavior through a bidimensional acculturation model. Future dietary studies that incorporated this model are warranted to provide a more defined and clearer picture of

acculturation in terms of dietary behavior. Further, these studies can inform nutrition

practice and intervention development related to tailoring for certain acculturation

groups.

CHAPTER V

MANUSCRIPT II: EXAMINING THE DIET OF HISPANIC MALES USING THE

PRECEDE-PROCEED MODEL - THE EFFECT OF ACCULTURATION ON

PREDISPOSING, ENABLING AND REINFORCING DIETARY FACTORS

Abstract

Objective: To examine environmental, behavioral, predisposing, reinforcing, and enabling factors contributing to post-migration dietary behavior change among a sample of traditional Hispanic males.

Design: Qualitative methods including semi-structured interviews, a focus group, and photovoice, followed by group interviews, were used to examine dietary change and factors. The behavioral, environmental, organizational and educational assessment phases of the PRECEDE-PROCEED model were used to guide the organization of dietary contributing factors for development of a nutrition intervention.

Setting: The southern region of Mississippi.

Participants: Traditional Hispanic males (n=19) were identified from among 35 Hispanic males using the Acculturation Rating Scale for Mexican Americans-II and the Marginality Questionnaire. They participated in semi-structured interviews (n=15) or a focus group (n=4). Five of the 19 participants further completed the photovoice and group interview portion of the study.

Analysis: Grounded Theory guided qualitative data analysis. Themes and core categories relating to dietary behavior were identified and defined during the analysis process. Constant comparison was used to compare extracted themes across coders and acculturation groups.

Results: These underlying environmental factors were identified: (a) cultural gender role related to food and (b) living structure post-migration impacted several of the predisposing, reinforcing, and enabling (PRE).

Conclusion: Multiple factors influence dietary intake in the target population. The identified environmental factors underlie the PRE factors and, therefore, must first be addressed in nutrition interventions.

Introduction

Social, environmental, and economic factors affect dietary and other health behaviors (Harnack, Block, & Lane, 2008; Kegler & Miner, 2004). Determinants of dietary behaviors are complex in nature and often difficult to pinpoint. Yet, the myriad factors that influence dietary behaviors must be appropriately identified so they can be adequately addressed through nutrition interventions. The PRECEDE-PROCEED Model (Figure 5) is one of the most widely used community health planning models for identifying factors that influence health behaviors, including dietary behaviors. Programs are more likely to address the most critical factors, and be more relevant to the target population, by correctly and comprehensively identifying how each level of factors influences behaviors (Keith & Doyle, 1998; Horacek, Koszewski, Young, Miller, Betts, & Schnepf, 2010). Within the PRECEDE portion of the model, there are five consecutive assessment phases: social, epidemiological, environmental and behavioral, organizational and educational, and administrative and policy. The PROCEED component of the model provides a systematic approach to development and implementation of health behavior interventions (Green & Kreuter, 1999).

The model has been used to develop programs ranging from pedestrian safety to vaccination programs (Howat, Jones, Hall, Cross, & Stevenson, 1997; Santibanez, Zimmerman, Nowalk, Katz, Jewell, & Bardella, 2004). Specifically related to nutrition, utilization of the model ranges from addressing dietary behaviors in regards to chronic disease prevention, to examining dietary acculturation in diverse populations (Keith & Doyle, 1998; Chavez-Martinez, Cason, Mayo, Nieto-Montenegro, Williams, & Haley-Zitin, 2010). Other dietary behavior studies have only used one, or a few, PRECEDE phases in guiding assessment or data analysis. Chavez-Martinez and colleagues (2010) used the organizational and educational assessment phase of the Model to categorize factors contributing to dietary intake in a study of a Hispanic population for the purpose of developing a nutrition education intervention.

Although disentangling behavioral influences is challenging among any population, understanding the dietary behaviors of immigrants, including Hispanics, presents a unique set of complexities. When compared to a western diet, the traditional Hispanic diet has been correlated with a lower prevalence of chronic diseases and obesity in the Hispanic population (Huh, Prause, & Dooley, 2008; Murtaugh, Sweeney, Giuliano, Herrick, Hines, Byers, & Slattery, 2008). However, as Hispanics emigrate they find it difficult to sustain their traditional diet due to various contributing factors (Chavez-Martinez et al., 2010). Chavez-Marinez et al. (2010) reported that Hispanics who had immigrated to the US consumed fewer traditional foods such as beans, fruits, vegetables, and rice and more "American" foods defined as hamburgers, pizza, hot dogs, fried chicken, fast food, and salads. Furthermore, through use of the PRECEDE-PROCEED model, these researchers were able to identify barriers to, and influencers of, healthy

eating in the immigrant Hispanic population. Factors identified by Chavez-Martinez et al. and other researchers included time constraints, lack of cooking skills, living structure, food availability and price, lack of English language skills, lack of family support, unfamiliarity with new foods, lack of transportation, and lack of nutrition literacy and knowledge (Hartwegg & Isabelli-Garcia, 2007; McArthur, Viramontez-Anguiano, & Nocetti, 2001)

Findings such as these may be difficult to generalize and apply to nutrition interventions for this population because immigrants differ, based on their level of acculturation. Therefore, when identifying dietary factors, it is important to take acculturation level of an individual or group into account. In terms of acculturation, as people migrate from one culture into another, each person adopts or rejects different behavioral aspects of the new culture, and engages in the new culture differently. Bidimensional acculturation measures "group" immigrants into different acculturation categories based on their cultural maintenance and participation in the new culture have been developed and are considered more complete when compared to unidimensional acculturation measures (Cuellar, Arnold, & Gonzalez, 1995; Cuellar, Harris, & Jasso, 1980; Ryder, Alden, & Paulhus, 2000). The bidimensional acculturation approach has been used to categorize immigrants into one of four acculturation categories: traditional, bicultural, marginalized, or assimilated which Berry (1997) describes as acculturation strategies. Cuellar et al. (1995) adds another category called separated. Briefly, those categorized as traditional maintain their cultural norms and have little participation in the host culture; whereas, those categorized as assimilated adopt the cultural norms and have high participation in the host culture. The bicultural group maintains cultural norms of

their indigenous culture, but also participates within the host culture. The marginalized group rejects their indigenous culture's norms, but at the same time has limited participation in the indigenous culture (Berry, 1997). Cuellar and colleagues (1995) define the separated group as people who are presented with the opportunity to acculturate into a culture but reject it. Consideration of acculturation categories that discriminate among dietary behaviors offers promise for developing targeted culturally sensitive nutrition interventions (Stein, 2009).

The purpose of this study is to identify and describe behavioral, environmental and dietary predisposing, enabling, and reinforcing (PRE) factors contributing to fruit, vegetable, meat, processed, and fast food consumption in a sample of Hispanic males in Mississippi who are considered traditional, based on the bidimensional acculturation model (Berry, 1997; Cuellar et al., 1995). These factors will be used to explain the complexity of influences on dietary decisions and behaviors among the traditional Hispanic male population. Lastly, the implications of these findings for intervention efforts will be explored.

Methods

Participants

Participants were first generation Hispanic men living in south Mississippi who participated in a larger study on dietary habits and acculturation in Hispanic immigrant men. Briefly, participants were recruited from local venues where Hispanics regularly met or were identified by other participants using the snowball sampling approach. The primary researcher and a research assistant administered the questionnaires and interviews, described below, in the language (Spanish or English) preferred by each

participant. This study was approved by the Institutional Review Board at The University

of Southern Mississippi.
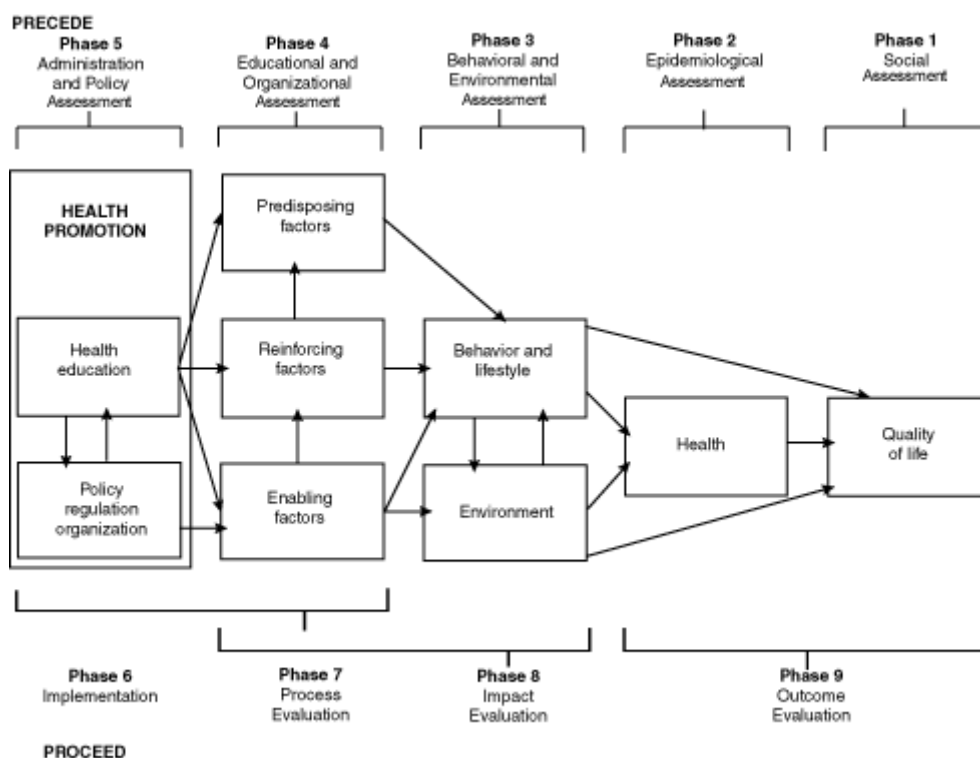
Figure 5. PRECEDE-PROCEED Model *Note:* Source: Green, L., & Kreuter, M. (1999). Health Promotion Planning: An Educational and Environmental Approach.3rd edition. Mountain View, CA: Mayfield Publishing Co.

Instruments and Procedures

     The Acculturated Rating Scale for Mexican-Americans-II (ARSMA-II) and the

Marginality Questionnaire were used to determine acculturation group membership of

each participant (Cuellar et al., 1995). The two scales create a non-linear, bidimensional

measure of acculturation whereby respondents are classified by acculturation group,

through predetermined scores. Two scores are calculated from responses to the ARSMA-

II items: a Mexican-orientation score (MOS) and an Anglo-orientation score (AOS).

Participants were placed into one of three categories based on predetermined cut-off

scores for the MOS and AOS: traditional, bicultural, or assimilated. The Marginality

Questionnaire was used to create two other categories: separated and marginalized.

Predetermined cutoff scores were used to indicate if participants met the criteria to be

further categorized into one of these two groups. If their scores were below the

marginality cutoff scores they were retained in one of the three groups into which they

were placed from the ARSMA-II scores; if not, they were reclassified.

The DPIG broadly explored factors that influenced dietary patterns and dietary

change in the study population. Specific factors explored included culture, religion, diet-

related knowledge, behaviors and attitudes, values associated with diet, food and taste

preferences, environmental factors, and changes in diet since migration. The guide was

adapted from one used by Falk, Sobal, Bisogni, Connors, and Devine (2001) that

examined healthy eating in a diverse population. It was translated into Spanish and back

translated into English for validity. The Spanish version was pre-tested with five

representatives of the target population for semantic, conceptual, and normative

equivalence. Changes were made to the Spanish items for improved equivalence based on

the results of the pre-test. The DPIG was administered to study participants primarily

using individual semi-structured interviews (SSI). The guide was also modified slightly

for focus group administration and used, for the convenience of the researchers and

participants, with one group of participants who worked and resided in the same place.

Photovoice, a qualitative methodology used to give a voice to vulnerable

populations for needs assessment and policy formulation (Wang & Pies, 2004), was used

to identify influencers of dietary intake among a subsample of the participants. After a

one hour training session in the photovoice process and camera use, participants were

provided digital cameras with a memory card and asked to take pictures of foods

consumed and factors related to their food environment over a two week period. After

returning the camera memory card, copies of the photos were developed. The primary

researcher chose a number of photos (10-20) from each participant to use during group

interviews. The researcher and two assistants developed group interview questions and

coded the qualitative data, as described in the section below.

Data Analysis

The ARSMA-II and Marginality responses were entered into SPSS and scored as

described above to identify the acculturation grouping of the participants. For the

qualitative data, the primary researcher and a bilingual research assistant transcribed all

audio-taped sessions, including the SSI, focus group, and photovoice group interviews, in

the language in which each was administered. The qualitative interviews were analyzed

by the primary researcher and two bilingual research assistants using open, axial, and

selective coding methods in accordance with a Grounded Theory approach (Hoepfl,

1997; Stauss & Corbin, 1990). Codes extracted from the English and Spanish transcripts

were documented in the English language; therefore, English was used throughout the

three coding method. The constant comparison method was utilized to compare data

across multiple data sources, groups, and past research, so that codes and themes could be

identified. Each coder participated in memo writing, which included noting thoughts and

inferences that emerged during the analysis processes. The memos were shared and

discussed among coders, which helped to define and connect themes that emerged during

the coding process. In the context of the larger study across acculturation groups, core

categories were identified and agreed upon across coders for all groups. During the

selective coding process, themes were identified specific to each acculturation group

(tradition, bicultural, marginalized, and assimilated). To help conceptualize and organize

the findings to inform the development of a nutrition intervention specific to the

traditional group, the core categories and themes were organized into behavioral,

environmental, educational, and organizational factors as defined by Phases 3 and 4 of

the PRECEDE-PROCEED model (Figure 5; Table 12). Findings are presented as

environmental and dietary PRE factors for dietary behaviors of three food groupings:

fruits/vegetables, meat, and processed/fast food.

Table 12

Definitions of PRECEDE Phases 3 and 4 in Relation to Diet

Phase	Definition
Phase 3	
Behavioral	Dietary behaviors that may cause a health risk
Environmental	Physical and social factors associated with the identified dietary behaviors
Phase 4	
Predisposing	Knowledge, values, attitudes, and beliefs that inform a certain dietary behavior
Reinforcing	Consequences to a dietary behavior that provide either negative or positive reinforcement of the behavior
Enabling	Factors that facilitate a dietary behavior

Results

Participants

Of 35 participants completing quantitative questionnaires and semi-structured

interviews, 19 were categorized as "traditional" according to their HOS, AOS and

Marginality scores. The 19 traditional participants are the subjects of this analysis. Their average age was 31.9$\pm$6.8 years. Sixteen immigrated voluntarily to the US from Mexico and three from Central American countries to seek better employment opportunities. The majority (n=13) indicated that they emigrated from suburban areas. Twelve of the 19 participants earned less than $1,500 per month, and only three had a college education, with five having less than a ninth grade education. The average length of time residing in the US was 7.6 years. Twelve participants were married; however, only five resided with their spouses in the US. Twelve participants indicated they had children, but only two had children residing in the US. The average number of people residing in the household with each participant in the US was 5.11. The majority of participants lived with other Hispanic males that had immigrated to the US.

Dietary Intake

During the interviews, participants indicated that they preferred traditional Hispanic foods, but they felt their diet had changed since immigrating to the US. Perceived changes included a decrease in fruits and vegetables, and an increase in meat, and processed and fast food, suggesting that with exposure to the host culture, dietary acculturation begins. Furthermore, participants said they tried to continue eating traditional Hispanic foods; however, they believed that these foods had an altered flavor in the US for various reasons. These reasons included not having a woman in the household to prepare the foods, increased use of processed ingredients, and a difference in the flavor of produce and other purchased foods in the US. The remaining findings on dietary changes are presented in the context of components of the PRECEDE model below.

Environmental Factors

Two main underlying environmental factors to the dietary PRE factors were identified from the data. These factors were the participants' cultural concept of gender role related to food, and following from that, their post-migration living situation. According to the participants, their indigenous cultural expectation was that the feeding and care of the family was the woman's role, while the male's role was one of financial or material provision. This is expressed by one participant when he explained, "I agree with my culture, and what I have lived and think is that it is the role of the woman to cook; just like it is the obligation of the man to work, the woman has the obligation of the food." Secondly, the majority of the participants had immigrated to the US without their wife or mother, in order to find employment, with the intention of returning to their native country one day. This circumstance necessitated a change in living situation from a family unit with a wife or mother in the native country to a "roommate" system in the US. This resulted in participants trying to adapt to new food responsibilities and food environments with little previous knowledge or skill, but a strong desire to maintain their cultural gender role expectations. Therefore, after migration, their new food role became a stressor. Most of the PRE factors identified as contributing to post-migration dietary change seem to stem from these two environmental factors.

Dietary PRE Factors

Table 13 outlines dietary predisposing, reinforcing, and enabling factors that were identified during data analysis for fruit and vegetable intake, meat intake, and processed/fast food intake across acculturation groups.

Table 13

Dietary Predisposing, Reinforcing, and Enabling Factors Contributing to the Intake of

Fruits/Vegetables, Meats, and Processed/Fast Foods

	Predisposing	Reinforcing	Enabling
Fruits/Vegetables (F/V)	Perception that F/V in US contained pesticides/chemicals Perception that F/V in US lacked quality and flavor Perception that F/V in US were nutritious but outweighed by negative perceptions	Roommates did not buy produce often Roommates consumed produce bought by participant Lack of personal relationship with produce vendors in US Negative taste experience (Produce lacked flavor found in home country)	Lack of availability – existing markets did not sell the variety of fresh F/V participants were accustomed to, nor were there fresh produce markets similar to home country Lack of transportation to market Expensive compared to home country Perishable and with infrequent shopping trips produce over ripens before next trip Time constraints (lack of nearby markets so only shop on weekends) Lack of land to grow produce
Meats	Belief that pork has negative health effects, but not other meats Meats safer in US due to labeling and packaging regulations and availability in frozen form	Taste preference for meat of participant and roommates	Increased disposable income Ability to freeze meats Easy preparation
Processed/Fast foods or other restaurants		Roommates struggling with new food role, prefer to not cook and to eat out in restaurant Employers invite participant to eat at fast food restaurants	Lack of cooking skills Time constraints due to employment and having to prepare own foods Greater availability of processed Hispanic ingredients and foods More access to fast food
Notable Quotations	"They sell (in the US) some apples that are very red, red, they look like pizza and have red even on the inside but they are just painted. So what is up with this? It makes me think they put them in a bucket of paint and the paint soaks into the apple."	"For example, the avocado that is in Mexico in our village is the avocado Hass. This is a good avocado. Now when I came to the US, I found an avocado that looked like Hass in Wal-Mart but it was sweet and I was like 'what, please come on!'"	"Well, here a person can financially afford to eat meat every day but not there [country of origin]. There the major factor is the pocket[book]."

Predisposing

Although participants viewed fruits and vegetables as healthy, they believed that pesticides and chemicals were used during cultivation in the US, which were unhealthy. Participants also had a negative perception of fruit and vegetable quality and flavor compared to those in their country of origin, believing that US produce is not as fresh or is picked before its peak ripeness to allow for longer shipping and storage. Pork was perceived as unhealthy, but other meats were believed to be healthy and safer in the US compared to their country of origin due to packaging and labeling laws. Finally, participants had negative views on processed and fast foods, but their intake had reportedly increased, suggesting that reinforcing and enabling factors influenced their intake more than predisposing factors.

Reinforcing

As aforementioned, the majority of the participants resided with other Hispanic males, and their food intake was reinforced by their roommates through the following ways: (a) roommates consuming fruits that the participant had purchased leaving the participant without fruits until the next grocery trip, (b) having a taste preference for meats, (c) roommates not wanting to cook because it was not their gender role, therefore inviting participants to eat at fast food or other restaurants when it was the roommates' turn to cook. Employers also influenced participants' intake by inviting the participant to lunch at nearby fast food restaurants during work hours. Finally, when participants consumed certain fruits and vegetables they experienced an undesirable taste when compared to those consumed in their country of origin.

Enabling

Several factors enabled the decrease in fruits and vegetables reported by the participants, including decreased availability of and access to fresh markets, decreased variety in the local supermarkets, and increased costs, compared to conditions in their native country. Also, participants did not always have regular transportation, so there were less frequent food purchasing trips and since produce was perishable, participants reported they did not always have enough to last between shopping trips, especially if other roommates ate their fruits and vegetables. The increase in meat was influenced by an increase in disposable income, post-migration, and by the ability to freeze meats. Also mentioned was that the participants lacked overall cooking skills, but were able to prepare meats simply and easily. Processed foods were consumed because they were more available in the markets where they purchased foods, and they were non-perishable and inexpensive. Traditional Hispanic ingredients were also reported to be more available in processed forms. Time constraints, due to employment and lack of cooking skills, influenced participant's consumption of both processed and fast foods.

Discussion

Researchers identified contributing factors related to dietary behaviors in a sample of traditional Hispanic males residing in south Mississippi in the context of the behavioral, environmental, organizational, and educational assessment outlined in the PRECEDE/PROCEED mode. With the influx of Hispanics throughout Mississippi and other states in the US, and health disparities that have been reported in this population, it is important that nutrition practitioners promote healthy dietary behaviors in this population through culturally relevant interventions (Elder, Ayala, Parra Medina,

&Talavera, 2009). Furthermore, research has shown that Hispanics that are low acculturated, similar to those in the traditional category in this research, face health disparities to a greater extent when compared to higher acculturated Hispanics, due to a number of factors, including: limited access to healthcare, lack of insurance, legal status, discrimination, and language barriers (Elder et al., 2009), therefore placing them at risk for negative health outcomes.

After examining the dietary PRE factors, different connections between the factors were made and inconsistencies were noted. For example, participants' nutrition-related health beliefs were not consistent with their dietary behavior. Throughout the interviews, participants indicated that they believed fruits and vegetables were healthy, and processed and fast foods were not healthy. However, their intake of fruits and vegetables had decreased since migration due to availability, cost, and access (enabling), in addition to their beliefs regarding the lack of quality and flavor, the use of pesticides and chemicals during produce cultivation (predisposing), and their experience of an undesirable altered taste, when compared to the taste they experienced in their country of origin (reinforcing). Meat consumption increased due to increased income, availability and ability to conserve it in the freezer (enabling), belief of food safety (predisposing), and taste preference for self and roommates (reinforcing). Another proposed explanation for the increase in meats is a connection between affluence and meat intake. In their country of origin, meat was consumed rarely (one-to-two times per week) due to large families, low income, and the expense of meat. Therefore, in the US, the participants could afford meat and ate it daily. However, this assumption needs to be explored further.

Another example of a dietary contributing factor that was found across the dietary PRE factors was the influence of time constraints on dietary behavior. Due to work, and not having someone in the house that had primary food responsibilities (environmental), participants had time constraints and lacked cooking skills (enabling) that inhibited them from preparing homemade meals in the evening, breakfast in the morning, or from packing a lunch for work. Also, having to travel some distance to the market and/or find transportation to the market required time. These factors contributed to the participants increased intake of processed and fast foods due to the convenience, ease, and shelf life of these foods. Nutrition interventions that address contributing factors within each PRE factor would be able to address multiple influencers of diet; therefore, leading to healthy dietary behaviors. The challenge of intervention development for this group will be to do so in a way that is sensitive to their cultural norms around gender and food roles and current household composition. Table 14 provides suggestions of how the identified PRE contributing factors and environmental factors can be addressed in nutrition interventions specific to a traditional Hispanic immigrant population.

This research has various strengths, such as the use of a bidimensional acculturation measure to identify traditional participants, the identification of dietary behavior factors, and the use of a model to conceptualize these factors. However, limitations of this research are also noted. First, the research was carried out in a single geographic area of one southeastern state. This geographic confinement limits the generalizability of the results, since the environment that the participants from this study resided in may be very different from the food environment in other areas of the US. Dietary intake was examined using qualitative methods, which were intended to examine

contributors to post-migration dietary change, not to quantify food or nutrient intake. Lastly, this study only examined dietary influencing factors of traditional Hispanic males in the US, and cannot be generalized to Hispanic males that are in a different acculturation grouping.

Table 14

PRE Dietary Contributing Factors and Nutrition Intervention Recommendations for a Traditional Hispanic Population

PRE factor	Predisposing	Enabling	Reinforcing
Targeted dietary contributing factors	• Lack of nutrition knowledge related to disease and nutrient composition in foods. • Pesticide use in farming • Educating on seasonal fruits and vegetables to enhance flavor	• Availability and access to fresh produce • Lack of cooking skills • Lack of ability to choose healthy foods based from provided nutrition information • Income budgeting	• Experience of altered tastes of food • Social influence
Intervention Ideas and Examples	Education on the importance of: • Washing fruits and vegetables • Choosing season fruits and vegetables (flavor enhance) • Using healthy traditional ingredients and preparation methods	• Transportation to local farmer's markets • Convenient farmer's market hours • Choosing seasonal fruits and vegetables (decrease cost) • Potted or box gardens • Community garden • Purchase healthy, desirable foods with present income	• Taste healthy good traditional foods prepared by them • Have roommates accompany participant to classes • Facilitate relationship between farmer's market vendors and participants

Table 14 – (continued).

Pre factor	Predisposing	Enabling
Intervention Ideas and Examples	Education to increase knowledge: • Role of diet on disease prevention and maintenance • Organic foods and safe levels of pesticides • Recipe modification • Developing a food budget	• Ability to read food labels to make healthy food choices for meats and processed and fast foods • Access to governmental food program • Supermarket tour • Ability to read and modify recipes • Ability to wash fruits and vegetables • Ability to prepare healthy traditional meals that are quick and easy

Research and Practice Implications

The results from this study can be used to inform nutrition intervention development for traditional Hispanic males. Current nutrition interventions for the Hispanic population only address the predisposing contributing factors, and therefore limit their effectiveness (Mier, Ory, & Medina, 2010). The dietary PRE factors allowed researchers to examine various contributing dietary factors, conceptualize the findings, and translate them into practice. The use of a conceptual framework, or model, helps guide the assessment process and inform intervention development (Mier et al. 2010; Contento, Randell, & Basch, 2002).

There are a variety of contributing factors that need to be addressed to encourage healthy dietary behavior that is culturally relevant to this population. Although all the

dietary PRE factors are important to address through interventions, the underlying environmental factors of cultural gender food roles, and the absence of a woman in the house, must be addressed initially in order to lay a foundation to address the PRE factors.

Additional research is needed to further develop the framework of the intervention presented here. Such development demands significant participation from the Hispanic male population. A community-based participatory research approach could result in a more culturally relevant intervention. Researchers, along with the Hispanic male population, must develop an intervention that directly addresses the perceptions of gender, male and female roles, in their home and host society. Input from the Hispanic community is essential to appropriately and adequately address these factors through an intervention. Table 3 outlines examples of different methods that could be used to address the environmental and PRE factors identified in this research. Again, it is essential that Hispanic community members inform these ideas, in order to insure relevance to the particular target population. Another appropriate method that could be utilized to target the cultural beliefs related to gender roles would be through training a community health worker from the target population to disseminate the nutrition information in the intervention (Mier et al., 2010; Perez-Escamilla, Hromi-Fiedler, Vega-Lopez, Bermudez-Millan, & Segura-Perez, 2008). Lastly, social marketing may be an effective way to address the gender role struggle through encouraging gender identity in food preparation (Hinkle, Mistry, McCarthy, &Yancey, 2008;Lancaster, Walker, Vance, Kaskel, Arniella, & Horowitz, 2009).

In conclusion, the PRECEDE-PROCEED Model enabled researchers to outline dietary contributing factors in a way that can easily be conceptualized and applied to

nutrition practice. Furthermore, focusing on one Hispanic acculturation group allowed for a more individualized assessment of dietary factors, when compared to assessing the Hispanic population as a whole. As noted previously, acculturation has been shown to be an independent factor affecting dietary behavior (Mazur, Marquis, &Jensen, 2008). Therefore, contributing dietary factors in one acculturation group may be different than those of another. To facilitate effective nutrition interventions specific to Hispanic males, interventions need to be culturally and gender relevant, addressing multiple contributing factors, and also informed by the target population. The incorporation of the PRECEDE-PROCEED Model to guide the needs assessment, which takes into account the acculturation process, may help develop more effective nutrition interventions.

CHAPTER VI

MANUSCRIPT III: DEVELOPMENT OF A BIDIMENSIONAL DIETARY

ACCULTURATION CONCEPTUAL FRAMEWORK FOR THE HISPANIC MALE

POPULATION

Abstract

Dietary intake has been independently associated with acculturation in the

Hispanic population; however, the identification of dietary contributing factors specific to

acculturation groups is lacking. Furthermore, the lack of these identified factors inhibits

the prediction of dietary behavior, and therefore, development of appropriate

interventions that are specific to different Hispanic acculturation groups.

The purpose of this article was to propose a bidimensional acculturation dietary

conceptual framework specific to Hispanic males. The framework was developed through

the analysis of semi-structured interviews, a focus group, and group interviews (that

followed a photovoice project) with Hispanic males. The framework incorporated the

operant theory of acculturation, the bidimensional acculturation theory, and identified

intrapersonal and environmental factors related to dietary patterns. This study offers a

conceptual framework that can be used to inform both nutrition intervention development

and practice with the Hispanic male population. However, further confirmatory testing of

this framework needs to be completed.

Introduction

Acculturation, defined as the adoption of behaviors, norms, and values of a host

culture, has been associated with health outcomes in the Hispanic population (Lara, Iya

Kahramanian, Morales, & Hayes Bautista, 2005). Higher rates of obesity, diabetes,

cancer and cardiovascular disease have been observed in Hispanic males residing in the US compared to those residing in Mexico (Angel, Angel, & Hill, 2008). Health behaviors are influenced during the acculturation process, with dietary behavior being one of the first to change during this process (Marin, 1992). As an individual acculturates into the US, a traditional Hispanic diet begins to be replaced with a Western dietary pattern (Dixon, Sundquist, & Winkleby, 2000; Duffey, Gordon-Larsen, Ayala, & Popkin, 2008; Mazur, Marquis, &Jensen, 2003; Montez & Eschbach, 2008; Neuhouser, Thompson, Coronado, &Solomon, 2004; Norman, Castro, Albright, & King, 2004). The traditional Latino diet, specifically in Mexico and Central America, includes chili, lard, cactus, coffee, rice, poultry, fish, meat, beans, cocoa, citrus fruits, tomatoes, corn, peas, and squash, and is typically high in fiber, fruits, and vegetables (Goody & Drago, 2009; Kittler & Sucher, 1998; Loftas et al., 1995; McArther, Anguiano, & Nocetti, 2001). On the contrary, a Western diet consists mainly of refined or processed, high sugar and salt foods, fatty meats, and dairy products that have been shown to correlate with nutrition-related diseases such as heart disease, diabetes, obesity, and cancer (Cordain et al., 2005). In essence, as an individual's acculturation increases, the diet transitions from a traditional Hispanic diet to a Western one, thus increasing risks for nutrition related chronic disease.

Bidimensional Acculturation Theory

Previous literature has reported two different models used to measure the acculturation process: unidimensional and bidimensional models. The unidimensional model is a linear one in which an individual is positioned on a continuum between the traditional culture and host culture (Ryder, Alden, & Paulhus, 2000). The

unidimensionality of this model assumes a sum-zero score, which indicates that for each cultural factor, a person either does or does not possess it (Cabassa, 2003). For example, regarding values and diet, based on the unidimensional model, a person either would or would not value a traditional Hispanic diet, equaling to sum-zero.

Some researchers conclude that a "bidimensional model constitutes a broader and more valid framework for understanding acculturation…[and that the unidimensional model] offers an incomplete and often misleading rendering of the acculturation process" (Ryder et al., 2000, p. 62). Additionally, the bidimensional model suggests that acculturation is the degree to which an individual values and possesses the norms of the indigenous culture (Lara et al., 2005). Value and possession of the norms are assessed across two dimensions: (a) cultural maintenance and (b) contact and participation (Berry, 1997). Cultural maintenance is the extent to which an individual strives to maintain the indigenous cultural due to the individual's perception of importance of those cultural characteristics. Contact and participation is the "extent to which an individual becomes involved in the host culture" (Berry, 1997, p. 9).

The bidimensional acculturation model represents the interaction of the two dimensions, creating four acculturation subcategories: assimilation, integration, separation, and marginalization (Berry, 1997). Assimilation is the adoption of the values and norms of the host culture, and association with people of the host society. Integration, characterizing an individual as bicultural, involves retaining some values and norms from the indigenous culture, while adopting some values and norms of the host society, as well as interacting within each culture. Separation, which is also referred to as traditional, assumes people have rejected the values and norms of the host society, and

maintain most or all interaction with people of their indigenous society. Lastly, the categorization of marginalization refers to people who have been forced to accept the norms and values of the host culture, and to participate in that society.

In nutrition literature, researchers have suggested that acculturation in nutrition and health research should be measured using a bidimensional, non-linear model to increase the sensitivity and accuracy in identifying correlations between acculturation and diet (Lara et al., 2005; Yeh, Viladrich, Bruning, &Roye, 2008). However, existing nutrition acculturation research has primarily utilized a unidimensional acculturation measure, or simple descriptors such as nativity, length of residence, or language. Unfortunately, these measures are limited in looking at immigrants' adoption of American values (Lara et al., 2005; Norman et al., 2004; Yeh et al., 2008).

Operant Theory of Acculturation

Operant is defined as voluntary behavior (Glenn, Ellis, & Greenspoon, 1992); while, behavior is defined as what a person "does;" and learning encompasses the "experiences" a person has to inform behavior (Chance, 1999; Landrine & Klonoff, 2004; Skinner, 1953). Combining these two constructs, behavior and learning, with bidimensional acculturation theory, forms the model referred to as the Operant Theory of Acculturation. This theory includes behavioral learning in the decision process to adopt or reject new health behaviors within the host culture. Landrine and Klonoff (2004) emphasized that the use of this theory in health promotion allows the examination of certain health behaviors to go beyond description and into explanation and prediction. This move occurs by identifying contributing factors that may be influenced by the acculturation processes, and then leads to a certain health behavior. Therefore, in terms of

diet, being able to identify factors that are retained, or adopted (voluntary), during the

acculturation process can lead to the prediction of dietary intake.

Numerous theories have associated acculturation to dietary intake—the primary

indicator for assessing nutritional patterns and behavior. Yet, there remains a dearth of

theoretical frameworks that address the complex contributing factors related to dietary

changes across acculturation groups with individuals acculturating at different rates and

to different behaviors (Abaido-Lanza, Armbrister, Flores, & Aguirre, 2006; Landrine &

Klonoff, 2004; Satia-Abouta, 2002). With the prevalence of diet-related illnesses among

the Hispanic population, a comprehensive theoretical model that identifies structural,

contextual, and mediating variables that occur and are associated with diet is greatly

needed. Examining dietary intake. only in terms of acculturation without context, inhibits

the ability to identify and intervene on diet-related contributing factors (Abaido-Lanza et

al., 2006; Landrine & Klonoff, 2004). Moving away from solely observing dietary intake

to integrating structural and contextual meanings of acculturation, as they relate to dietary

behaviors, allows for nutrition interventions and practice to promote the retention of

healthy, traditional dietary behaviors, and the adoption of healthy dietary behaviors

associated with the host culture (Abaido-Lanza et al., 2006; Yeh et al., 2000).

Dietary Acculturation

Dietary acculturation is a term used to describe the adoption of the host culture's

dietary norms (Satia-Abouta, 2002). In terms of dietary acculturation in the Hispanic

population, various studies have examined contributing factors of diet, but either failed to

measure acculturation or only used a single proxy, a unidimensional measure of

acculturation (Chavez-Martinez, 2010; McArthur, Viramontez-Anguiano, & Nocetti,

2001; Satia-Abouta, 2003). Satia-Abouta (2002, 2003) proposed a comprehensive dietary acculturation model based on research with a Korean-American population. This model proposes four main constructs that ultimately influence and determine dietary intake in a population experiencing acculturation to a host culture. Pre- and post-migratory factors that influence dietary pattern are outlined under main categories, which include: socioeconomic, demographic, and cultural factors, and changes in psychosocial and environmental factors. Dietary pattern is represented by three different categories: maintenance of traditional eating pattern, bicultural eating pattern and adoption of host countries' eating patterns. This model identifies dietary contributing factors that influence dietary patterns; however, an important limiting factor is that this has not been tested with the Hispanic population. Although it specifies certain pre-migration socio-demographics that have been used to evaluate acculturation unidimensionally, it does not incorporate a bidimensional measure of acculturation.

Currently, the conceptualization of the dietary acculturation process is limited. There are not comprehensive dietary models that unite the bidimensionality of acculturation with the operant aspects of behavior that are apparent during the acculturation processes. Being able to understand the operant aspect of the dietary acculturation processes, in terms of bidimensionality of acculturation, can help nutrition practitioners and researchers to: (a) move beyond a simple description of dietary intake, into explanation and prediction, by identifying contributing dietary factors in terms of their specific acculturation processes and context; and (b) appropriately intervene on unhealthy dietary behaviors.

The purpose of this study was to explore dietary patterns and identify and compare contributing dietary factors in Hispanic males from various bidimensional acculturation groups. Findings presented here are an initial step towards developing a conceptual framework that outlines contributing factors on dietary intake in Hispanic males according to their bidimensional acculturation grouping. This framework is meant to guide description, explanation, and prediction of dietary patterns in this population.

Methodology

Participants

This study included first- (N = 31) and second-generation Hispanic males (N = 4), ages 18-64 years old, residing in southern Mississippi. Participants were recruited through convenience sampling, including snowball sampling, from English as a Second Language (ESL) classes, a local Catholic church, and also by word of mouth, via participants from a preliminary study (Cuy Castellanos, Connell, & Lee, *in press*). When recruited individuals verbally agreed to participate, the primary researcher contacted them again to schedule a time and place for data collection. The informed consent document was presented and signed by the participant during the data collection session. This study has been approved by The University of Southern Mississippi's Institutional Review Board (IRB).

Data Collection Procedures

The primary researcher, and a bilingual-trained interviewer, administered quantitative questionnaires, and performed semi-structured interviews with each participant. Each participant completed a demographics questionnaire, the Acculturation Rating Scale for Mexican-Americans-II, and the Marginality Scale (ARSMA-II). The

ARSMA-II was both valid and reliable in measuring acculturation level in the Mexican

population. Further, this tool has been used extensively with the general Hispanic

population (Arredondo, Elder, Ayala, & Campbell, 2005; Cuellar et al., 1995; Garcia,

Hurwitz, & Kraus, 2005; Lopez & Brummett, 2003). A score is calculated from items

listed on a five-item response set. The Marginality Scale is listed on a five-item response

set, and includes items such as: examine beliefs, values, attitudes, and norms associated

with the host and indigenous cultures (Cuellar et al., 1995). The ARSMA-II can be

divided into the following two scales: (a) Mexican (Hispanic) orientation score and (b)

Anglo orientation score. The Marginality scale creates three different scores that

measure: (a) MEXMAR, marginalization with Latino cultures; (b) MAMAR,

marginalization with Latino-American cultures; and (c) ANGMAR, marginalization with

Anglo cultures. The combination and comparison of scores, to predetermined score

cutoffs, create distinct acculturation categories that parallel those identified in the

bidimensional acculturation model (Berry, 1997; Cuellar et al., 1995; Gutierrez, Franco,

Powell, Peterson, & Reid, 2009).

Qualitative Measures

Qualitative methods were utilized to gather in-depth information about dietary

intake and factors influencing intake in the target population.

Semi-structured interview/focus group. Participants took part in a semi-structured

interview (n = 30) or a focus group (n = 5). One focus group was held, in place of

interviews, to accommodate five participants who worked in the same place and had

similar schedules. Semi-structured interviews were not possible for these individuals.

During the semi-structured interview and focus group, participants were asked questions

specifically relating to constructs outlined in the dietary acculturation model (Satia-Abouta, 2003). The interview and focus group guide was an adaptation of one previously used by Winter, Falk**,** Sobal, Bisogni, Connors, and Devine (2001), to examine dietary behaviors and influences on behaviors, in a diverse population that included Hispanic participants. These interviews were administered in English or Spanish, depending on the participant's preference. The focus group was conducted in the Spanish language.

Photovoice and group interviews. After the semi-structured interviews were completed, photovoice and group interviews were employed to define unclear areas, or to confirm prior findings. Fourteen participants agreed to take part in the photovoice portion of the study. Two of these participants did not complete this portion due to time constraints. During this session of the research, participants took photographs of their food environment and intake over a two-week period of time. After these photographs were developed, these individuals participated in a group interview with others that were also \in their acculturation group. The group interview guide, described in detail below, was developed by the primary researcher and two of the data coders.

Data Analysis

Quantitative data analysis. The item responses from the demographic questionnaires were entered into SPSS and frequencies and averages were generated. The ARSMA-II and Marginality Scale scores were calculated in SPSS. Participants were placed into one of four acculturation groups (traditional, bicultural, marginalized/segregated, or assimilated) based on their scores compared to predetermined cut-off scores.

Qualitative data analysis. Each qualitative data source was analyzed using a grounded theory approach. Grounded theory (GT) is described as a "set of integrated conceptual hypotheses systematically generated to produce an inductive theory about a substantive area" (Glaser, 2007, p. 48). In GT, data collection and analysis are conducted simultaneously. As data is collected, it is analyzed, and further data is collected based on the emerging categories and properties that are extracted from the data through a process called theoretical sampling. GT has been used in numerous studies that have ultimately led to theory development (Charmez, 2006). GT was utilized in this research and was incorporated into the data analysis and theory development. The semi-structured interview, one focus group, and group interviews were transcribed in the language in which they were administered. The primary researcher and two bilingual trained coders analyzed the transcripts and extracted themes (open coding). Each coder analyzed the focus group and three semi-structured interviews (10%). The themes were compared across coders to ensure accuracy. Next, each coder analyzed nine interviews. As themes were extracted, a conditional relationship guide was created (see Table 16). Data from the quantitative instruments were included in the guide where appropriate. Constant comparison was utilized to compare data across acculturation groups and to prior proposed dietary acculturation theory. Constant comparison was beneficial during the process of theme identification, across past and current research, and when comparing unclear or ill-defined themes that surfaced during the analysis process. To remain consistent in utilizing the constant comparative method in a grounded theory approach, subsequent data collection allowed the researchers to clarify and better define emerging themes. Also during this phase, possible consequences of the identified themes were

noted and connections between different consequences began to form, leading to proposed core categories (axial coding). Each coder analyzed group interviews and the data from these interviews were included in the conditional relationship guide. Next, the three coders discussed the proposed core categories to determine consensus. If all coders were in agreement, the category was adopted. The core categories were entered into a reflective pattern matrix (selective coding) as shown in Table 3. Finally, the identified core categories and themes were arranged into a systematic framework that outlined the dietary acculturation process in the sample population.

<div align="center">Findings</div>

Participants

Thirty-five participants completed the quantitative questionnaires and semi-structured interviews. The average age was 34.4 years old. After analysis of the ARSMA-II and Marginality Scales, participants were categorized as follows: traditional (N = 19), bicultural (N = 8), separated (N = 6), marginalized (N = 1), and assimilated (N = 1). Due to low group membership, the marginalized and separated groups were collapsed into one group and the assimilated group was removed from further analysis. The following describes the socioeconomic and demographic characteristics of each group.

Traditional Group

The average age of the traditional group was 31.9 years old, the youngest of the groups. Sixteen of the participants migrated to the US from Mexico and three from Central American countries. The participants in the traditional group indicated that they immigrated to the US voluntarily to seek better employment opportunities. The majority (N = 13) indicated that they migrated from suburban areas. Sixty-three percent of this

group earned less than $1,500 per month and only 16% had a college education, with 26% not having a high school diploma. These participants, on average, had lived 7.6 years in the US, only 45% of which lived with a spouse in the US. Twelve participants indicated they had children, but only two of the participants' children resided in the US. Of the participants in the traditional group, the average number of people residing in a single household in the US was 5.1.

Bicultural Group

The bicultural group consisted of one participant from Mexico, with the other participants emigrating from Central (N = 2) or South America (N = 4), and Puerto Rico (N = 1). The majority of these participants were professionals (N = 5), three of which were studying for an undergraduate or graduate degree at a local university. The primary reason for migration was to seek a better education than what they believed they could receive in their country of origin. Four of the participants earned less than $1,500/month; however, three of these were university students. The average time that participants in this group had spent in the US was 15 years; with 2.1 being the average number of people residing in a single household.

Marginalized/Segregated Group

The marginalized group's average age was 33.6 years old. Two of the participants were university students, and earned less than $1,500/month; with the other participants averaging earnings greater than $1,500/month. All of the participants in this group had a minimum of a high school degree, and were either undergraduate students, professionals, or in the US military. Three of the seven participants were second-generation Hispanic and were currently not living with their parents. They were raised in New York (the

Bronx), California (Los Angeles), or Mississippi. The other participants migrated from either Mexico (N = 2) or South America (N = 2), and emigrated with their parents (involuntarily). The average time spent in the US was 17. 75 years, and the average number of people residing in a single household was 1.9.

Framework Identification

Analysis of the qualitative data reveals the complex network of factors that result in an individual's dietary pattern. An assortment of intrapersonal and environmental factors relate to whether an individual adheres closely to a traditional diet, has adopted the host diet, or possesses aspects of both. Thematic analysis suggested intrapersonal factors such as attitudes, beliefs, and knowledge, precede environmental factors that ultimately result in behaviors. These contributing factors were organized in the proposed framework based on their relationship to, or influence on, other factors, and ultimately dietary intake. According to an individual's dietary intake (as influenced by antecedent factors), each participant can be categorized into one of five dietary pattern groups.

Figure 1 outlines a proposed bidimensional dietary acculturation framework. The following narrative provides a brief description of each overarching theme and links identified in the proposed framework.

Bidimensional Acculturation

The first box of the proposed framework (Figure 1) represents the bidimensional acculturation grouping determined by the participants' contact and participation with the host culture and cultural maintenance, as assessed by the ARSMAII and marginality. Participants in this study, within respective acculturation categories, were found to be homogenous in factors such as socio-demographics and economics, language, and reason

for migration. This framework suggests that by determining the acculturation group membership of an individual or group, the participation within the host culture, and individual's or group's overall values, norms, beliefs, and attitudes can be predicted.

Diet-Related Intrapersonal Factors

Intrapersonal factors include dietary values, norms, knowledge, attitudes, beliefs, and preferences that a person possesses. Table 15 outlines the various intrapersonal factors identified among participants in this study and how they relate to dietary influence for each acculturation group. The nature of the factors suggests that they were either formed while still in their country of origin, after the migration process, or both. As insinuated by the operant theory of acculturation, the identification of a person's, or a group's intrapersonal factors associated with diet can facilitate prediction and explanation of dietary patterns; therefore, nutrition interventions that target changeable intrapersonal factors may have the greatest potential for impact on behavior.

Diet-Related Environmental Factors of the Host Culture

Dietary environmental factors include food availability and access, living structure, food preparation skill, and time. Migration into the US, or within different regions in the US, may expose individuals to a new food environment and social norms, which in turn may influence dietary patterns. The influence of the food environment of the host country may determine what resources and foods are available for a person to be able to retain traditional dietary behavior and/or adopt dietary behaviors from their host culture.

Dietary Patterns

The acculturation grouping, and intrapersonal and food environment factors, inform the dietary behaviors of an individual. From this research, these researchers propose that the dietary behaviors of immigrant Hispanic men can be divided into one of five groups: Traditional, modified Traditional, Bicultural, modified Western, and Western. A descriptive representation of each dietary behavior is provided in Table 16. The descriptions were developed from the analysis of semi-structured, focus group, and group interview transcripts.

Links

This framework illustrates how bidimensional acculturation grouping can be used to predict the intrapersonal factors for each individual. These factors then influence the way an individual reacts to the food environment of the host culture (Table 15). However, the data indicated that there were instances when individuals were forced into a particular dietary behavior due to their host environment, which contradicted intrapersonal factors (beliefs, attitudes, preferences, values, and knowledge); therefore, a direct link from acculturation grouping to environmental factors can be made, and these researchers termed this direct link "culturally imposed." For example, in this study, traditional participants indicated that they did not want to consume certain canned products, but had no other choice, because fresh products were not available. Additionally, the link between environment and dietary behavior is bidirectional, which indicates that the two influence one another in either direction. For example, if a portion of the population demands a type of produce, and purchases this produce consistently,

supermarkets will be inclined to have this produce available, since it will potentially increase revenue.

Discussion

There has been an abundance of literature exploring acculturation, dietary patterns, and factors affecting diet in the Hispanic population (Chavez-Martinez et al., 2010; Cuellar et al., 1995; Dixon et al., 2000; Duffey et al., 2008; Montez & Eschbach, 2004; Neuhouser et al., 2004; Norman et al. 2004); however, lacking is a conceptual framework connecting these three concepts. Such a framework can help predict how an individual from an identified acculturation group will react to the new host environment and what behaviors will be adopted and/or rejected (operant behavior). The proposed framework in this article is meant to provide practitioners with a more comprehensive understanding of the relationships among acculturation groups, intrapersonal factors, environmental factors, and dietary patterns. By first assessing the bidimensional acculturation group to which an individual belongs, the nutrition practitioner, or researcher, can then target intrapersonal and environmental contributing dietary factors that are specific and meaningful to that acculturation group. Conversely, if a nutrition practitioner understands the contributing dietary factors of the overall Hispanic population, but cannot identify the patient's acculturation grouping, then the practitioner may be limited in providing nutrition care that is individualized and specific (Stein, 2009). Further, with an integrative framework that incorporates the operant theory of acculturation (Landrine & Klonoff, 2004), such as the one proposed, interventions can be developed around contributing dietary factors that are likely to have the greatest impact on dietary intake particular to each bidimensional acculturation group.

The proposed framework is a starting point for conceptualizing the relationship between acculturation and diet and further research and testing of the framework is needed. Testing with a diverse Hispanic male population would be both ideal and recommended. First, a similar study design could be used with Hispanic populations outside the research region to: (a) confirm the findings from this study; (b) explore the applicability of the framework with an assimilated group; and (c) test the generalizability of the findings with a broader Hispanic population. Second, instruments that validly and reliably measure the factors within the framework need to be developed and/or tested. For example, it is essential that the ARSMA-II and Marginality Scales be validated with a diverse Hispanic population. Valid and reliable measures of acculturation could then be used in nutrition practice to identify acculturation group membership of the Hispanic individual.

The development of valid intrapersonal and food environment measures is necessary to assess contributing dietary factors. In this study, a psychosocial food questionnaire was adapted for the study population; however, the validation analysis has not been performed on the questionnaire. The dietary patterns should be operationalized through more rigorous dietary data collection and cluster analysis. Finally, once the aforementioned instruments are developed and tested, the framework can also be tested to examine the ability to predict dietary patterns in terms of the identified contributing factors and acculturation grouping.

This study is valuable in providing a conceptual framework that guides the examination of the behavioral and acculturation aspects of dietary intake in the Hispanic population. However, the study is not without limitations. The collected dietary data was

qualitative in nature; therefore, the dietary intake groupings are based on descriptions that the participants provided in relation to their diets. Further, the study sample was small and participants were from one region in Mississippi, limiting generalizability, as previously noted.

In conclusion, while previous studies have assessed dietary intake in terms of acculturation (Dixon et al., 2000; Duffey et al., 2008; Neuhouser et al., 2004; Norman et al., 2004) and contributing factors in the Hispanic population (Chavez-Martinez, 2010), this study lays the groundwork for a proposed conceptual framework that incorporates multifaceted concepts in relation to dietary patterns in Hispanic males across acculturation groups. Further research is merited to confirm the framework and instrument development to quantify contributing factors and dietary intake among acculturation groups. As previously mentioned, when nutrition practitioners and/or researchers can increasingly understand and identify contributing dietary factors (intrapersonal and environmental factors) of greatest impact on an individual or group, nutrition interventions that address increasingly desirable dietary practices may be more effectively and efficiently developed and implemented.
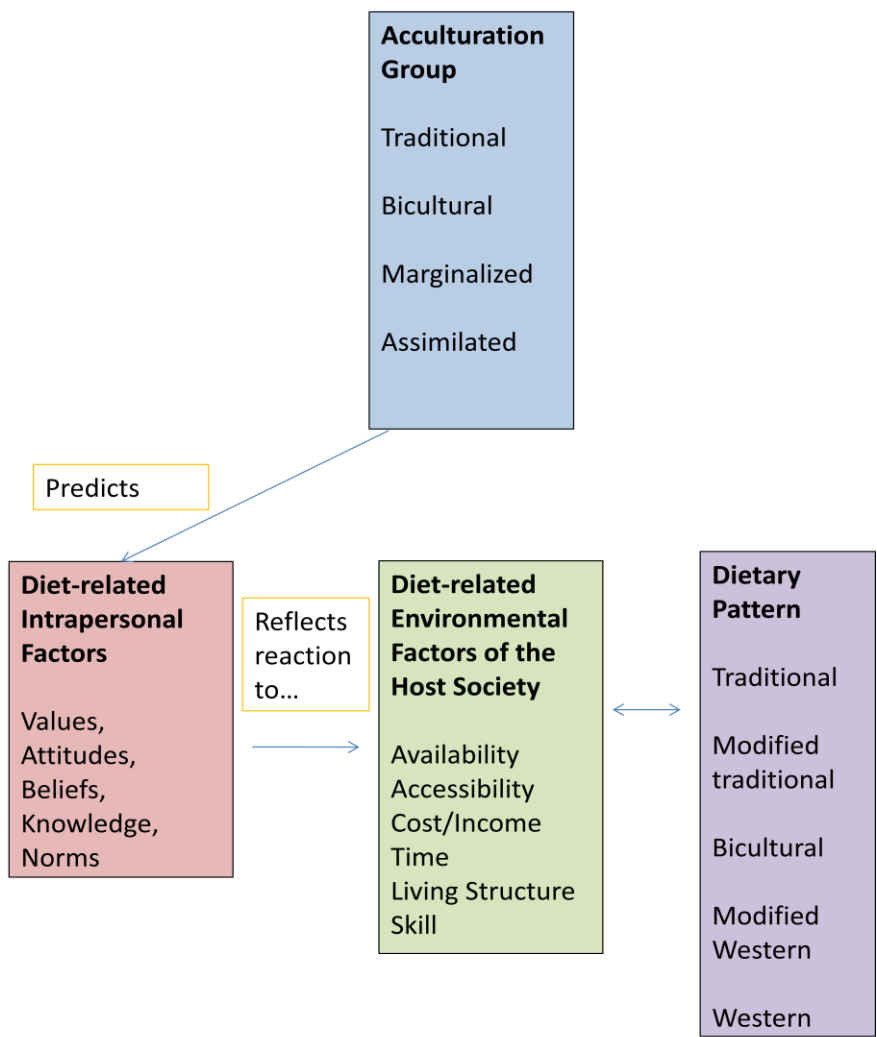
Figure 6. Proposed Bidimensional Acculturation Conceptual Framework for Hispanic males

Table 15

Example of Contributing Dietary Factors across Groups

	Traditional	Bicultural	Marginalized
Dietary Intrapersonal Factors			
Values	Important to eat traditional diet	Important to eat healthy diet	Important to eat what tastes good
Attitudes	Negative perception of western foods	Health is a priority; negative perception of, lack of social interaction around meal times; accept new foods	Negative perception of foods available; health and nutrition are not of priority
Beliefs	Belief that woman is responsible for food purchasing and preparation	Belief that woman and man are responsible for food purchasing and preparation	Belief that woman and man are responsible for food purchasing and preparation
Preference	Prefers food prepared by mother; prefers traditional Hispanic foods	Prefers healthy foods; enjoys foods from indigenous and new culture as well foods from other cultures	Foods that taste good, meat; meals that are convenient
Knowledge	Low nutrition literacy; disconnect of nutrition to disease; misconception of nutrients and foods	High nutrition literacy; connects nutrition to disease states	Moderate nutrition literacy; understands nutrition and disease connection
Culturally Imposed	Lack of traditional Hispanic ingredients and meats; processed ingredients; lack of certain produce	Processed ingredients; lack of certain produce	Lack of traditional Hispanic ingredients and meats
Host Culture Food Environment			
Availability	Deceased availability of fresh fruits and vegetables and traditional Hispanic ingredients; increased availability of processed and convenience foods, fast foods, and beer	Deceased availability of fresh fruits and vegetables and traditional Hispanic ingredients; increased availability of processed and convenience foods and fast foods	Decreased availability of traditional Hispanic ingredients
Living structure	Lack of woman in the household; reside with other Hispanic males or alone	Reside with wife, children, or alone	Reside with wife, children, or alone
Accessibility	High cost of fruits and vegetables; inexpensive processed and convenience foods; increased income for meats and beer; lack of transportation to food Markets	High cost of fruits and vegetables; inexpensive processed and convenience foods	High cost of fruits and vegetables; inexpensive processed and convenience foods

Table 15 – (continued).

	Traditional	Bicultural	Marginalized
Time	Lack of time for meal preparation	Lack of time to prepare traditional meals	Lack of time to prepare homemade meals

Table 16

Description of Dietary Intake Categories

Traditional Hispanic diet	Diet high in fiber, fruits, and vegetables; low intake of processed and convenient foods and meat; use high fat dairy products and lard
Modified Traditional Hispanic diet	Diet high in fiber and traditional Hispanic dishes, as well as meats; traditional dishes made with some processed ingredients; consumes convenience foods occasionally
Bicultural diet	Combination of traditional Hispanic dishes, western foods, and foods from other cultures; diet is high in fruits and vegetables, lean meats, and legumes
Modified Western diet	Mostly Western foods, with some traditional dishes; includes moderate amounts of fruits and vegetables
Western diet	Diet high in refined and processed foods, high in fat, and salty foods

CHAPTER VII

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND FUTURE RESEARCH

Summary and Conclusions

The grounded theory (GT) approach was used to explore dietary intake, change in intake since immigrating into the US or leaving the childhood home, and dietary contributing factors in a sample of Hispanic males of one of four bidimensional acculturation groups. Participants were grouped into one of four possible bidimensional acculturation groups according to their contact and participation in the host culture and cultural maintenance of their indigenous culture. Acculturation groups were determined for each participant through the administration and scoring of the ARSMA-II and Marginality scales; two instruments that where combined to provide a bidimensional acculturation score. There were a total of 35 participants with each participant representing one of the four acculturation groups (traditional N = 19; bicultural N = 8; marginalized/segregated N = 7 and assimilated N = 1). Due to the low representation of the assimilated group, this group was removed from the data analysis. Qualitative and quantitative methods were incorporated to explore dietary behavior in the sample population. Instruments exploring food intake, nutrition knowledge and factors contributing to intake were utilized. Semi-structured interviews (N = 30), a focus group (n = 5), and photovoice followed by three group interviews (N = 12) were the qualitative methods used to collect data. The photographs from the photovoice portion of the data collection provided points of reference for discussion during the group interviews. The data from the assimilated participant was not analyzed due to low participant representation within this group.

The qualitative data was transcribed and analyzed using a three step coding process: open, axial and selective coding. During open coding, the primary researcher and two research assistants coded the transcripts and participated in memo writing. The three coders discussed the extracted codes and memos and identified themes. Through constant comparison, themes were compared and contrasted between coders, acculturation groups, quantitative data and prior research. The coders began to identify main themes and identify connections between themes (axial coding). During the last stage (selective coding) of the data analysis process, core categories were identified which informed the development of a dietary acculturation conceptual framework for the target population.

The conceptual framework that was developed outlines intrapersonal and environmental dietary factors and dietary patterns of a Hispanic male based on his present bidimensional acculturation group (Figure 6, p. 141). In the conceptual framework, intrapersonal and environmental dietary factors represent the dietary contributing factors that inform the dietary pattern of a specific acculturation group. The results from this study indicated that intrapersonal dietary factors were influenced either by the indigenous or host culture or a combination of both. The environmental dietary factors in this study reflected the food environment of the host culture. The identification of one's bidimensional acculturation group therefore should enable prediction of a Hispanic male individual or groups' intrapersonal dietary factors and reaction to the environmental dietary factors of the host culture, ultimately leading to prediction of the person or group's dietary pattern and identification of dietary factors of most impact on

dietary intake. Similarities and differences in these dietary factors were observed between acculturation groups.

Bidimensional Acculturation Grouping

As aforementioned, each participant was grouped into one of four bidimensional acculturation groupings. Apparent differences in terms of dietary intake and contributing dietary factors were observed between groups and are described in more detail below. This study is one of the first studies, to the author's knowledge, that incorporates a bidimensional measure of acculturation into exploration of dietary behavior. This measure was beneficial for the bidimensional acculturation model includes a bicultural and marginalized group; two groups that had previously been exempt from dietary acculturation research. Therefore, the use of this model in dietary acculturation research allows for a more accurate and valid measure of dietary acculturation for the measurement is more complete and inclusive of factors occurring during the acculturation process (Ryder et al., 2000).

Dietary Intake and Diet Change

Dietary intake and diet change since immigration into the US or since leaving their childhood home was explored across all three acculturation groups and compared and contrasted between the three groups. Dietary changes were more apparent in the traditional and bicultural acculturation groups. The major food groupings extracted from the data included traditional foods, fruits/vegetables, meats, processed and fast foods, and alcohol. Across groups, traditional Hispanic foods continued to be consumed although the amount consumed varied between acculturation groups. The traditional group's diet consisted mainly of these foods and the marginalized group only consumed them

occasionally (at family functions, when visiting relatives in other states or in the home country, or when prepared by the participant himself). Fruits and vegetables were a main part of the diet in both the traditional and bicultural group before immigrating into the US. Since immigration, the intake of fruits and vegetables had decreased due to various environmental and psychosocial factors. The marginalized group differed for participants in this group indicated that their consumption of fruits and vegetables had increased since their childhood, for they did not consume fruits and vegetables regularly as children.

The traditional and marginalized group consumed meats on a daily basis with the traditional group indicating an increase since immigrating into the US from once to twice a week to daily. Lean meats, fish and poultry were meats often consumed by the bicultural group; however, this group did not eat meat on a daily basis. All groups indicated increasing their consumption of processed and fast foods since migration into the US, but the use of these foods and amounts differed between groups. The marginalized group had a higher consumption of processed and fast foods when compared to the other two groups. The bicultural group did not consume fast food often, but did use some processed foods and indicated this had started since immigrating to the US. Finally, the traditional group also had increased their use of processed foods since immigrating to the US, in particular, they used more processed traditional Hispanic food ingredients consumed more fast foods then when they resided in their home culture. All groups indicated drinking more beer; with the traditional and marginalized groups indicating they commonly drank beer (daily to a few times per week). Beer was not commonly consumed in the bicultural group; however, they did indicate consuming it

more in the US when compared to living in their home country where they more commonly consumed liquor.

Five dietary patterns were identified and each group represented a different pattern: (a) traditional Hispanic, (b) modified-traditional Hispanic, (c) bicultural, (d) modified-western and (e) western (Table 16, p. 143). The dietary patterns were developed during the analysis and constant comparison processes, through the identification of foods participants commonly consumed in the US and past research examining dietary acculturation. The tradition Hispanic diet was high in fruits, vegetables, fiber, high fat dairy products and traditional Hispanic food dishes and low in processed foods. The modified traditional Hispanic diet was high traditional Hispanic food dishes; however, there was an inclusion of processed foods in meal preparation and a lower intake of fruits and vegetables and higher meat intake compared to the traditional dietary pattern. The bicultural dietary pattern included a combination of traditional Hispanic foods and foods from other cultures and the US. This pattern had a moderate intake of fruits and vegetables and included lean meats. The modified-western was moderate in fruits and vegetables, but high in meat, convenience and processed foods. The western diet was low in fiber, fruits and vegetables and high in processed, refined and high fat foods. The traditional group consumed a modified traditional Hispanic diet; currently in the US but indicated that before immigration to the US they followed a diet that mirrored the traditional Hispanic dietary pattern. A bicultural dietary pattern was apparent in the bicultural group and the marginalized/segregated group's dietary pattern was representative of a modified western diet. Past literature has indicated that groups that are acculturated into the US consume a dietary pattern that mimics that of a Western diet.

During data analysis, different intrapersonal and environmental dietary factors were identified that contributed to each acculturation group's dietary pattern.

Dietary Contributing Factors

Dietary contributing factors were categorized into two main categories: (a) Intrapersonal dietary factors and (b) Environmental dietary factors in the host culture. Main themes observed in the intrapersonal dietary factors included beliefs, attitudes, values, knowledge and norms. Availability, access, cost/income, time, living structure and skill were identified as environmental dietary factors. Similarities and differences in terms of these factors were observed between groups.

Traditional group. The traditional group continued to retain many of their indigenous cultural beliefs, values and norms around food. A cultural norm that was foundational to their dietary behavior and was reflected in their intrapersonal dietary factors and their reaction to their new food environment was their gender role in terms of food for: (a) they believed that the food role belonged to females, and (b) when in their country of origin, they did not have to participant in food purchasing or preparation because there was always a female in the household to prepare three homemade meals a day and purchase the foods. The majority of participants resided in the US without their spouse or other female family member and lived with male roommates, therefore being forced into a food role they did not believe was theirs. This was reflected in their attitude towards foods consumed in the US for they preferred traditional Hispanic homemade meals made with fresh ingredients by their mother or wife and they felt that Hispanic dishes were not as good in the US. However, they did continue to consume mostly traditional Hispanic foods and dishes. The absence of a woman in the home was also

reflected in their struggle with time management in terms of food purchasing and preparation as well as lack of cooking skills. Other intrapersonal and environmental dietary factors identified in this group regarding their dietary intake and change in intake since immigrating to the US included a low dietary knowledge, food preference for traditional foods, custom, increased income, high cost of fruits and vegetables and low cost of processed foods, lack of transportation and fresh markets near home, lack of variety in fruits and vegetables, negative perception of growing techniques in the US and negative taste experience of US produce.

Bicultural group. The bicultural group differed from the traditional group in that although they continued to value their Hispanic foods and societal norms around food (i.e., having social time during meals), they also valued and preferred foods of other ethnic groups and foods associated with the US. They did not feel that the food role was only that of the women and participated in food purchasing and preparing alongside their wife or alone within the home. They had a high nutrition knowledge and placed high importance on eating healthy. Other factors influencing their diet and change in diet included cost, availability, and time constraints. They also had a negative perception about growth methods used for produce in the US.

Marginalized group. The marginalized group placed high value on convenience due to time constraints. They had a negative attitude in terms of Hispanic foods available to them and were struggling to retain Hispanic foods in their diet. They also placed a high value on food preference. Participants in this group were influenced by their spouse and children specifically in terms of an increased intake in fruits and vegetables when compared to their intake during childhood. All the participants that were married or

residing with a girlfriend had a non-Hispanic wife or girlfriend (N = 6). The majority of

participants had grown up in the US due to migrating at a young age or being born in the

US; therefore, spending the majority of their lives in the US. They indicated having a low

intake of fruits and vegetables as a child. Other influencing factors included availability

and to a smaller extent then the other two groups, cost. Furthermore, this group had

moderate nutrition literacy, possessed some cooking skill and participated with the wife

or alone in food purchasing and preparation.

In summary, the intrapersonal factors between groups differed in terms of gender

role perception, nutrition knowledge, transportation access, cooking skills, time

constraints, and food preference. However, there were some similarities between groups.

Across all three groups there was a belief that growing methods used in the US included

pesticides and chemicals and that fruits and vegetables were picked before they were at

peek ripeness. Participants believed that these growing methods altered the flavor when

compared to produce grown and picked in their indigenous countries. Also, each

participant was residing in the same region and therefore experienced similar food

availability and cost.

<div align="center">Limitations</div>

This study was an exploratory study with a small Hispanic male population

residing in southern Mississippi; therefore, limiting the ability to generalize the findings

to a larger Hispanic population. The assimilated group, one of the four bidimensional

acculturation groups, was missing in this study and further exploratory studies need to be

conducted that examine the assimilated group's dietary behaviors. The dietary evaluation

instruments utilized were simple food screeners that only assessed fruit/vegetable intake

and fat intake and did not provide a complete representation of dietary intake. Furthermore, dietary intake and changes in intake were examined through open ended qualitative questions and no formal dietary analysis was performed, limiting the results to be used for descriptive purposes only. The psychosocial dietary questionnaire has not been validated and was only used for descriptive purposes. Lastly, although indicating good reliability scores in this study, the Marginality scale has not been validated with the Hispanic population. Amid the limitations, this study provides fundamental insight into the dietary behaviors of Hispanic males that can be translated into nutrition practice and interventions and inform future research.

<div align="center">Implications</div>

Various findings can be implemented into nutrition practice and research. First the bidimensional acculturation model provides the ability to identify distinct acculturation groups. Second, the dietary acculturation conceptual framework developed from this research provides descriptions of dietary behaviors in this population.

The incorporation of the bidimensional acculturation model in the dietary acculturation research has not been used to the author's knowledge prior to this study. However, there is a call for the use of this model in health behavior and dietary research (Yeh et al., 2009) for it is a more complete model of the acculturation process (Ryder et al., 2000). It also goes beyond measuring acculturation horizontally on a low to high continuum and measures it across two dimensions, cultural maintenance and contact/participation. Furthermore, the proxies used to measure acculturation unidimensionally in the dietary acculturation literature have been inconsistent not allowing for findings to be compared across studies. The use the bidimensional

acculturation model can help researchers to better explain the impact that the acculturation process has on health behavior, specifically dietary behavior. It also allows for a standardized measure so that findings across studies can be compared and contrasted. The present study was the first of its kind to use the bidimensional model and showed promising results. Differences between groups in terms of dietary intake and dietary contributing factors were clearly apparent when using this model.

The dietary acculturation conceptual framework developed through this research, can guide the prediction of dietary patterns and dietary contributing factors of most impact depending on a person or group's acculturation group. By assessing the acculturation grouping of a person or group, one can "predict" the person's or group's contributing dietary behaviors and patterns. This allows for interventions to move away from a one-size-fits-all approach (Stein, 2009) and target factors associated with a particular acculturation group. For example, Traditional participants struggled the most with this new role and it was foundational to the intrapersonal and environmental dietary factors among this group. Therefore, when planning nutrition interventions with this acculturation group, gender role must first be addressed to affectively impact other contributing factors and dietary behavior. Therefore, developing an intervention that is culturally relevant and that lays a foundation to be able to address other dietary related factors is extremely important.

<div align="center">Future Research</div>

The Hispanic population has the highest rate of diabetes and obesity among ethnic groups within the US. Health promotion interventions for the Hispanic that go beyond education and target other factors (i.e., environmental, acculturation process) that affect

health behavior are important to disease prevention (Alvarez, 2006; Contento et al., 2002). However, there are limited nutrition interventions for the Hispanic male population that go beyond nutrition education and that target specific acculturation groups (Perez-Escamilla, 2008). Therefore, a next step is to use prior research to develop culturally-relevant interventions that promote retention of healthy traditional dietary behaviors and adaptation of healthy dietary behaviors of the host culture. Health promotion studies indicate that interventions informed by prior informative research are more successful in reaching their objectives (Contento et al. 2002; Mier et al., 2010).

The present study was an exploratory study of dietary acculturation using a bidimensional acculturation measure and has developed a foundation for further research into the phenomenon of dietary acculturation. In terms of this study, the proposed dietary acculturation conceptual framework needs to be confirmed. First, the development and validation of a quantitative instrument(s) measuring the intrapersonal and environmental dietary factors is essential. Second, the Marginality scale is an experimental scale and needs to be further validated. Third, quantitative dietary intake that could be analyzed by cluster analysis is necessary to operationalize the qualitative dietary patterns which emerged from this research. Once the instruments are developed and validated, a model fit analysis can be implemented to confirm the conceptual framework.

Future studies are needed to clarify particular factors involved in dietary behaviors in this population. One area for further exploration includes the struggle around gender role in terms of food that was observed in the traditional acculturation group. Methods on how to intervene and develop interventions in midst of this cultural factor are necessary for interventions to be successful.

APPENDIX A

INFORMED CONSENT AND INSTITUTIONAL REVIEW BOARD APPROVAL

LETTERS

Consent to Participate in the Hispanic Nutrition Project

We are seeking your participation in a nutrition research study with the Hispanic population in Hattiesburg and the surrounding areas. The purpose of the study is to gain understanding in how food choices change after someone migrates from his country of origin to the US. There are three phases to the study. If you decide to participate, you will be asked to participate in either the first two or all three phases. The first and second phases of the study involve questionnaires and an interview regarding your food intake and factors affecting your intake. The questionnaires and interview will be administered to you by a bilingual trained interviewer in the language you prefer: Spanish or English. The first phase will take approximately 45 minutes and the second phase approximately 1 ½ hours. If you are asked and decide to participate in the third phase, you will be provided with a camera and asked to photograph some of your meals and the places where you eat them during a two-week period. You will also be asked to keep a journal about your meals during this phase. There will be a training session during which you learn what to take pictures of and what to write about the pictures you take. You should not take any pictures of yourself or others. After you have completed the two weeks of taking pictures, the pictures will be developed and you will participate in a 1 – 1 ½ hour focus interview to discuss the photos you took. The interviews and group discussions of photos will be audio-recorded so that we do not miss any important information that you give us. For your time in participating in the research, you will receive gift cards to a local retail store for each phase in which you participate

The risks of participation in the research study are small and consist of the inconvenience of time to participate in the interviews, taking photographs and recording information about the photographs. No individual will be identified as a result of participating in this research. The information you provide throughout the three phases will be kept private and your identity will be kept confidential. Any personal information about you will be kept separate from your answers to interview questions. All the data will be stored in a locked cabinet in the office of Diana Cuy Castellanos, graduate assistant, on the University of Southern Mississippi campus. Only researchers involved in this project will have access to your data. At the end of the research study all surveys and audio tapes will be destroyed. You may choose to terminate your participation in the study at anytime during the study and you may decline to answer any of the questions asked by the survey administrator. If you need to talk to someone after the interview regarding any psychological issue you may contact Pine Belt Mental Health at 601-544-4641.

If you have any questions about the interview you may call Diana Cuy Castellanos at 601-266-5275. This project has been reviewed by the University of Southern Mississippi Institutional Review Board and guarantees that the research that involves human subjects follows the federal regulations. If you have any questions about your rights as a participant in this interview you may contact the University of Southern Mississippi Institutional Review Board representative at The University of Southern Mississippi, 118 College Dr. #5147, Hattiesburg, MS 39406 or by telephone at 601-266-6280.

Authorization: I have read the statement above and understand the purpose of the research. I have had the opportunity to ask all my questions and have received answers

from the investigator that were acceptable to me. Therefore, I hereby give my consent to

participate in this survey.

_____

Your name (Print)

_____

Your signature   Date

_____

Signature of researcher   Date

Consentimiento voluntario de los Participantes en el Proyecto de Investigación:

"Factores que influye en la dieta de un latino que vive en el sur de Mississippi"

Estamos buscando su participación en una investigación de nutrición para la población hispano, en Hattiesburg y las áreas sidantes. El propósito de esta investigación es obtener una entendimiento en cómo cambian los opciones de comida de alguien que se traslada de su país de origen a los EEUU. Hay tres fases en la investigación. Si usted decide participar, le habrá preguntado de participar en dos de los tres fases o los tres fases. Fases uno y dos envuelven cuestionarios y una entrevista acerca de su consumo alimentario y factores que afectan su consumo. La primer fase incluye una entrevista que toma aproximadamente 45 minutos y el segundo dura acerca de 1 ½ horas. Las entrevistas será administradas a usted por un entrevistador bilingüe en el idioma que prefiere usted: Español o Ingles. Si la preguntamos a usted a participar en la tercer fase y usted decide a participar, se le estará dando una camera y se le preguntarara a tomar fotos de lo que come y de lugares donde compra y come su comida. También se le pedirá en recordar en un diario acerca de lo que come. Tendra una sesión de entrenamiento para informarle acerca de cómo tomar los fotos y lo que debe escribir en su diario acerca de los fotos. No debería tomar fotos de usted o de otras personas. Después de que cumple los dos semanas de tomar los fotos, los fotos serán desarrollados y participara usted en una entrevista focal que dura uno a 1 ½ horas para conversar acerca de los fotos. Las entrevistas en fase dos y tres van a estar garbadas par que no perder información importante que nos provea. Para su tiempo de participar en esta investigación, usted recibirá tarjetas de regalo a tiendas locales después de cada fase.

Los riesgos de participar en esta investigación son mínimo y consiste en la inconveniencia de su tiempo para participar en las entrevistas, como toma de fotos y escribir la información acerca de los fotos. Ningún individuo será identificado como resultado de su participación en la investigación. La información que provee durante las tres fases será mantenida en privado y su identidad será confidencial. Información personal acerca de usted será mantenido separada de las respuestas a las respuestas de las entrevistas. Todos los datos serán guardadas en un gabinete con seguro en la oficina de Diana Cuy Castellanos, asistente graduada, en el campus de la Universidad de Misisipi del Sur. Solo los investigadores que están involucrados en el proyecto tendrán acceso a sus datos. Cuando termina la investigación, todos los cuestionarios y grabaciones serán destruidos. Usted puede terminar su participación en la investigación durante cualquier tiempo de la investigación, y puede negar de responder a cualquier pregunta que le haga por el entrevistador. Si necesita hablar con alguien después de la entrevista acerca de una tema psicológico, puede contactar Pine Belt Mental Health (Salud Mental de Pine Belt) a 601-544-4641.

Si tiene alguna pregunta relacionada con este proyecto de investigación, puede dirigirse al investigador principal (Diana Cuy Castellanos, MS, RD. 601-266-5275). Este proyecto ha sido revisado por "la Directiva de Revisión Institucional" para investigaciones en la Universidad del Sur de Misisipi y garantiza que las investigaciones que involucra seres humanos sigan las reglas federales. Cualquiera pregunta o preocupación sobre los derechos como participante de la investigación debe ser dirigida al jefe de la Directiva de revisión Institucional, Universidad del Sur de Misisipi, 118 College Drive #5147, Hattiesburg, MS 39406-001, o llamar a (601) 266-6820.

   Autorización: Yo he leído el ornamento anterior y entiendo el puposito de esta

investigación. He tenido oportunidad para hacer mis preguntas y recibí las respuestas a

mi satisfacción atrás de la investigadora. Aun, yo doy mi permiso a participar en esta

investigación.

De antemano gracias, si usted elige participar en este estudio.

Nombre de Participante   Fecha

Firma de Participante   Fecha

Firma de Investigador   Fecha

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board

118 College Drive #5147
Hattiesburg, MS 39406-0001
Tel: 601.266.6820
Fax: 601.266.5509
www.usm.edu/irb

HUMAN SUBJECTS PROTECTION REVIEW COMMITTEE
NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Human Subjects Protection Review Committee in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
  Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **10021701**
PROJECT TITLE: **Dietary Acculturation in Latino Males Residing in Southern Mississippi**
PROPOSED PROJECT DATES: **03/01/2010 to 12/31/2010**
PROJECT TYPE: **Dissertation or Thesis**
PRINCIPAL INVESTIGATORS: **Diana Cuy Castellanos**
COLLEGE/DIVISION: **College of Health**
DEPARTMENT: **Nutrition and Food Systems**
FUNDING AGENCY: **N/A**
HSPRC COMMITTEE ACTION: **Expedited Review Approval**
PERIOD OF APPROVAL: **02/23/2010 to 02/22/2011**
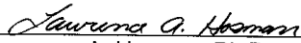
Lawrence A. Hosman

Lawrence A. Hosman, Ph.D.
HSPRC Chair

2-24-10
Date

APPENDIX B

INSTRUMENTS

Inclusion Criteria Questionnaire

1) Gender _____ Male _____Female

2) Are you 18 years older or older _____Yes _____No

(If "NO" stop questionnaire here)

3) What country are you from

_____ US

_____México

_____Central or South America

_____ Other _____

(If "other" stop questionnaire here)

4) Are you

_____ First Generation, if first how long have you resided in the US?

_____(*each participant has to have been in the US for at least 6*

months)

_____ Second Generation

_____ Third generation or greater

(If "third" or greater stop questionnaire here)

4) Do you reside in Mississippi _____ Yes _____No

(If "NO" stop questionnaire here)

5) What county do you reside in? ___ Covington ___ Forrest ___ George ___ Greene

___Hancock ___ Harrison ___ Jackson ___ Jones ___ Lamar ___ Pearl River ___ Perry

___ Stone ___ Wayne ___ other

(If "other" person cannot participate due to being outside of study region)

Cuestionario del Criterio de Inclusión

1) Sexo _____ Masculino _____Feminino

(Si es una mujer, para el cuestionario.)

2) Tiene 18 años de edad o mas _____Si _____No *(Si "NO" para el cuestionario aquí)*

3) ¿De qué país es usted?

_____ US

_____México

_____América Central o El Sur

_____ Otro _____

(Si es "otro" para el cuestionario aquí)

4) Usted es…

_____ Primer generación, ¿Si usted es primer generación, cuánto tiempo ha estado aquí en

Estados Unidos? _____ *(tiene que había estado por lo menos 6*

mesas en EEUU)

_____ Segunda generación

_____ Tercer generación o mas

(Si él es "tercer o mas" para el cuestionario aquí)

4) Vive usted en Misisipi _____ Si _____No

(Si "NO" para el cuestionario aquí)

5) En que condado ("county") en Misisipi vive usted? ___ Covington ___ Forrest ___

George ___ Greene ___Hancock ___ Harrison ___ Jackson ___ Jones ___ Lamar ___

Pearl River ___ Perry ___ Stone ___ Wayne ___ Otra

(Si "otro" el no puede participar en la investigación porque es afuera de la área)

Socio –Demographic/Environmental Questionnaire Code # _____

1. In what city do you currently live? _____

2. How old are you? _____

3. In what year were you born? _____

4. What country are you originally from?
    ____ Mexico
    ____ Other _____

5. What state and city are you originally from?
    State _____
    City _____

6. What describes best the area you lived in your country of origin?
    ____ Rural
    ____ Suburban
    ____ Urban

7. What is your ethnicity?
    ____ Hispanic
    ____ Indigenous
    ____ Multiracial _____
    ____ Other _____

8. When did you come to the US? _____

9. When did you come to Mississippi? _____

10. What is your civil status?
    ____ married
    ____ single
    ____ live with girlfriend
    ____ divorced
    ____ separated
    ____ widow

11. If married or have a girlfriend, does she live with you in the US? ____ Yes ____ No

12. Do you have children that live with you in the US? ____ Yes ____ No

12a. If so, how many? _____

13. If you do have children, how many live with you in the US? ____

14. How many family members and/or friends live with you in the US? _____

15. Did you come to the US with because your parents or other family members brought you here?

____ Yes

____ No

16. What is the highest level of schooling you have completed?

____ Through 3rd grade

____ Grammar school

____ High school or equivalent (GED)

____ Vocational/technical school

____ Some college

____ Bachelor's degree

____ Master's degree

____ Doctorate degree

____ Professional degree (MD, JD etc…)

____ Other _____

17. What is your language ability on a scale from 1 being that you do not speak English to 5 indicating that you speak fluently?

No English   Fluent

1   2   3   4   5

18. What work do you do? _____

19. What is your (individual) monthly income?

____ 0-$499

____ $500-$999

____ $1000 - $1499

____ $1500 - $1999

____ $2000 - $2499

____ $2500 - $2999

____ $3000 - $3999

____ $4000 - $4999

____ > $5000

20. Do you have another income. For example from a spouse, children, significant other etc…
____ Yes
____ No

21. Do you attend church regularly?
___ Yes
___ No

b. If yes, what religion do you identify?
___ Catholic
___ Protestant
___ Mormon
___ Jewish
___ Other _____

Cuestionario de la Socio-Demografía/Economica   # del Código _____

1. ¿En qué ciudad vive? _____

2. ¿Cuántos años tiene? _____

3. ¿En qué ano nació?_____

4. ¿De dónde es usted?   (Estado)   (Ciudad)
        ____ México   _____   _____
        ____ Otro _____   _____   _____

5. ¿Cual le describe mejor el área donde vivía en su país de origen?
        ____ Rural
        ____ Suburbana
        ____ Urbana

6. ¿De qué etnicidad es usted?
        ____ Hispano
        ____ Indígena
        ____ Raíces múltiple _____
        ____ Otro _____

7. ¿En qué año vino usted a Estados Unidos?_____

8. ¿En qué año vino usted a Misisipi?_____

9. ¿Cuál es su estado civil?
        ____ Casado
        ____ Soltero
        ____ Unido
        ____ Divorciado
        ____ Separado
        ____ Viudo

10. ¿Su esposa o compañera/novia vive con usted en Estados Unidos?   ____ Si ____ No

11. ¿Tiene hijos? ____ Si ____ No

12. ¿Si tiene, cuantos tienen? _____

13. ¿Si tiene hijos, cuantos viven con usted en Estados Unidos? _____

14. ¿Cuántos familiares o amigos viven con usted ahora? _____

15. ¿Vino a EEUU porque sus papas o otros familiares lo trajieron aquí? _____ Si _____ No

16. ¿Cuál es el nivel escolar más alta que usted ya ha cumplido?
    _____ Tercer grado o menos
    _____ Escuela primerio
    _____ Escuela secundaria
    _____ Escuela tecnológico
    _____ Algo de la Universidad
    _____ Licenciatura
    _____ Maestrías
    _____ Doctorado
    _____ Profesional como doctor
    _____ Otro _____

17. ¿Cuánto ingles habla usted. En una escala del uno al cinco – uno significa que no habla nada y cinco significa que habla fluentemente?

No habla Ingles   Habla Fluentemente

1   2   3   4   5

18. ¿De qué trabajo hace? _____

19. ¿Cuál es su sueldo mensual?
    _____ 0-$499
    _____ $500-$999
    _____ $1000 - $1499
    _____ $1500 - $1999
    _____ $2000 - $2499
    _____ $2500 - $2999
    _____ $3000 - $3999
    _____ $4000 - $4999
    _____ > $5000

20. ¿Tiene otra ingreso? Por ejemplo los ingresos de su esposa, compañera, hijos….
    ___ Si
    ___ No

21. ¿Usted asiste la iglesia regularmente?

     ___ Si

     ___ No

21. b. ¿Si asiste, con que religión idéntica usted?

     ___ Católico

     ___ Evangélico o Protestante

     ___ Mormón

     ___ Judío

     ___ Otro _____

Acculturation Rating Scale for Mexican Americans

Use this scale (give hand card in English) to indicate how much you do or like to do each of the following statements.

1. I speak Spanish……………………………	1	2	3	4	5
2. I speak English……………………………1		2	3	4	5
3. I like to speak Spanish……………………1		2	3	4	5
4. I associate with Anglos………………………	1	2	3	4	5

5. I associate with Mexicans (Hispanics)

and/or Hispanic Americans…………………………1		2	3	4	5
6. I enjoy listening to Spanish language music	1	2	3	4	5
7. I enjoy listening to English language music……1		2	3	4	5
8. I enjoy Spanish language TV……………………1		2	3	4	5
9. I enjoy English language TV…………………… 1		2	3	4	5
10. I enjoy Spanish language movies……………… 1		2	3	4	5
11. I enjoy English language movies……………… 1		2	3	4	5
12. I enjoy reading (e.g. books in Spanish)……	1	2	3	4	5
13. I enjoy reading (e.g. books in English)……….. 1		2	3	4	5
14. I write (like cards) in Spanish…………………..1		2	3	4	5
15. I write (like cards) in English……………………1		2	3	4	5
16. My thinking is done in the English language…...1		2	3	4	5
17. My thinking is done in the Spanish language…..1		2	3	4	5
18. My contact with Mexico/_____ has been…… 1		2	3	4	5
19. My contact with the USA has been………………1		2	3	4	5

20. My father identifies (indentified) himself as

Mexican/_____...1		2	3	4	5

21. My mother identifies (identified) herself as

Mexican/_____...1		2	3	4	5

22. My friend(s) while I was growing up were of

Mexican/_____ origin……………………………   1   2   3   4   5

23. My friend(s) while I was growing up were of

of Anglo American origin…………………………   1   2   3   4   5

24. My family cooks Mexican/_____ foods………….. 1   2   3   4   5

25. My friends now are Anglo origin……………………… 1   2   3   4   5

26. My friends now are Mexican/Hispanic………………… 1   2   3   4   5

27. I like to identify myself as Anglo American………….. 1   2   3   4   5

28. I like to identify myself as Mexican -   American(_____ – American)

……………………………………………………………..   1   2   3   4   5

29. I like to identify myself as Mexican/_____   1   2   3   4   5

30. I like to identify myself as an American………………… 1   2   3   4   5

Marginality Scale: **The following questions refer to attitudes, values and behaviors of your**

culture and other cultures.

1. I have difficulty accepting some ideas held by Anglos………1   2   3   4   5

2. I have difficulty accepting certain attitudes held by Anglos.. 1   2   3   4   5

3. I have difficulty accepting some behaviors exhibited

by Anglos………………………………………………….. 1   2   3   4   5

4. I have difficulty accepting some values held by some Anglos.. 1   2   3   4   5

5. I have difficulty accepting certain practices and customs

commonly found in some Anglos……………………………… 1   2   3   4   5

6. I have, or think I would have, difficulty accepting Anglos

as close personal friends……………………………………..1   2   3   4   5

7. I have difficulty accepting ideas held by some MEXICAN/

_____………………………………………………… 1   2   3   4   5

8. I have difficulty accepting certain attitudes held by MEXICAN/

_____...….1   2   3   4   5

9. I have difficulty accepting some behaviors exhibited by MEXICAN

_____ ……………………………………………………1   2   3   4   5

10. I have difficulty accepting some values held

by some MEXICANS/_____……………………………………1   2   3   4   5

11. I have difficulty accepting certain practices and customs

commonly found in some Mexicans/_____…………………….1   2   3   4   5

12. I have, or think I would have, difficulty accepting MEXICAN/_____

As close personal friends……………………………………1   2   3   4   5

13. I have difficulty accepting ideas held by Mexican/_____ -

Americans…………………………………………………1   2   3   4   5

14. I have difficulty accepting certain attitudes held by

Mexican/_____ - Americans…………………………1   2   3   4   5

15. I have difficulty accepting certain behaviors exhibited by

Mexican/_____- Americans …………………………1   2   3   4   5

16. I have difficulty accepting some values held by Mexican/_____

Americans…………………………………………………………1   2   3   4   5

17. I have difficulty accepting certain practices and customs commonly

found in some Mexican/_____ - Americans. ……1   2   3   4   5

18. I have or think I would have, difficulty accepting

Mexican/_____- Americans as close

personal friends……………………………………………… 1   2   3   4   5

Adapted from   Cuéllar, I., Arnold, B., & Maldonado, R. (1995).Acculturation Rating Scale for

Mexican Americans-II: A revision of the original ARSMA scale. *Hispanic Journal of*

***Behavioral Sciences, 17*(3), 275-304.**

ARSMA-II en Espanol

Use esta escala para indicar cuanto le hace o le gusta cada de las declaraciones siguientes.

1. Yo hablo Español………..………………………   **(1) (2) (3) (4) (5)**

2. Yo hablo Inglés………………………………….   **(1) (2) (3) (4) (5)**

3. Me gusta hablar en Español………..…………   **(1) (2) (3) (4) (5)**

4. Me asocio con Anglos…………………………   **(1) (2) (3) (4) (5)**

5. Me asocio con Mexicanos (Hispanos) o con Mexicano (Hispanos/) -Americanos…………………………....   **(1) (2) (3) (4) (5)**

6. Me gusta la musica Mexicana (Hispano) (musica en idioma Español) ………………………………… ….   **(1) (2) (3) (4) (5)**

7. Me gusta la musica de idioma Ingles…………..   **(1) (2) (3) (4) (5)**

8. Me gusta ver programas en la televisión que sean en Español........................…………………   **(1) (2) (3) (4) (5)**

9. Me gusta ver programas en la televisión que sean en Inglés ....…………………………….   **(1) (2) (3) (4) (5)**

10 Me gusta ver películas en Inglés. ………………   **(1) (2) (3) (4) (5)**

11. Me gusta ver películas en Español ……………   **(1) (2) (3) (4) (5)**

12. Me gusta leer (e.g. libros en Español).............   **(1) (2) (3) (4) (5)**

13. Me gusta leer (e.g. libros en Inglés).………….   **(1) (2) (3) (4) (5)**

14. Escribo (como cartas) en Español……..………   **(1) (2) (3) (4) (5)**

15. Escribo (como cartas) en Inglés…………………   **(1) (2) (3) (4) (5)**

16. Mis pensamientos ocurren en el idioma Inglés.………….……………………………………   **(1) (2) (3) (4) (5)**

17. Mis pensamientos ocurren en el idioma Español …………………………………………….   **(1) (2) (3) (4) (5)**

18. Mi contacto con Mexico/_____ ha sido……   **(1) (2) (3) (4) (5)**

19. Mi contacto con Estados Unidos ha sido…..……   **(1) (2) (3) (4) (5)**

20. MI padre se identifica (o se identificaba) como Mexicano/_____ ……………..……………….…..   **(1) (2) (3) (4) (5)**

21. Mi madre se identifica (o se identificaba) como Mexicana/_____.………………..………………..   **(1) (2) (3) (4) (5)**

22. Mis amigos(as) de mi niñez eran de origen Mexicano/_____ ..………………..…………...   **(1) (2) (3) (4) (5)**

23. Mis amigos(as) de mi niñez eran de origen Anglo Americano.…………………….…………… (1) (2) (3) (4) (5)

24. Mi familia cocina comidas Mexicanas/_____ (1) (2) (3) (4) (5)

24. Mis amigos(as) recientes son Anglo Americanos.....................................……………….. (1) (2) (3) (4) (5)

26. Mis amigos(as) recientes son Mexicanos (Hispanos)…………………………………. (1) (2) (3) (4) (5)

27. Me gusta identificar me como Anglo Americano…………………………………………… (1) (2) (3) (4) (5)

28. Me gusta identificar me como Mexico Americano (_____ - Americano)………………….. (1) (2) (3) (4) (5)

29. Me gusta identificar me como Mexicano/_____.....................………….. (1) (2) (3) (4) (5)

30. Me gusta identificar me como un(a) Americano(a)…………………………………… (1) (2) (3) (4) (5)

Escala de Marginacion: **Lo siguiente refieren sus actitudes, valories, y comportamientos acerca de su cultura y la cultura de otros.**

1. Tengo dificultad aceptando ideas de
algunos Anglo Americanos (1) (2) (3) (4) (5)

2. Tengo dificultad aceptando ciertas actitudes
de los Anglo Americanos (1) (2) (3) (4) (5)

3. Tengo dificultad aceptando algunos comportamientos de los
Anglo Americanos (1) (2) (3) (4) (5)

4. Tengo dificultad aceptando algunos valores que tienen los
Anglo Americanos (1) (2) (3) (4) (5)

5. Tengo dificultad aceptando ciertas costumbres entre algunos
 Anglo Americanos (1) (2) (3) (4) (5)

6. Tengo, o creo que si tuviera, dificultad aceptando Anglo
Americanos como buenos amigo (1) (2) (3) (4) (5)

7. Tengo dificultad aceptando ideas de algunos Mexicanos/_____(1) (2) (3) (4) (5)

8. Tengo dificultad aceptando ciertas actitudes de algunos
Mexicanos/_____. (1) (2) (3) (4) (5)

9. Tengo dificultad aceptando algunos comportamientos de los
Mexicanos/_____ (1) (2) (3) (4) (5)

10. Tengo dificultad aceptando algunos valores que tienen los
Mexicanos/_____ (1) (2) (3) (4) (5)

11. Tengo dificultad aceptando ciertas costumbres entre algunos
Mexicanos/_____`   . (1) (2) (3) (4) (5)

12. Tengo, o creo que si tuviera, dificultad aceptando a Mexicanos/_____
como buenos amigos.. (1) (2) (3) (4) (5)

13. Tengo dificultad aceptando ideas de algunos
Mexico/_____-Americanos… (1) (2) (3) (4) (5)

14. Tengo dificultad aceptando ciertas actitudes de algunos
Mexico/_____-Americanos (1) (2) (3) (4) (5)

15. Tengo dificultad aceptando algunos comportamientos de los
 Mexico/_____-Americanos (1) (2) (3) (4) (5)

16. Tengo dificultad aceptando algunos valores que tienen
Mexico/_____-Americanos (1) (2) (3) (4) (5)

17. Tengo dificultad aceptando ciertas costumbres entre algunos
Mexico/_____-Americanos   **(1) (2) (3) (4) (5)**

18. Tengo, o creo que si tuviera, dificultad aceptando
Mexico/_____- Americanos como buenos amigos   **(1) (2) (3) (4) (5)**

Adapted from   Cuéllar, I., Arnold, B., & Maldonado, R. (1995).Acculturation Rating Scale for

Mexican Americans-II: A revision of the original ARSMA scale. *Hispanic Journal of*

Behavioral Sciences, 17(3), 275-304.**

Score Sheet for the Newest Vital Sign Questions and Answers

	ANSWER CORRECT?	
	yes	**no**

READ TO SUBJECT: This information is on the back of a container of a pint of ice cream.

1. If you eat the entire container, how many calories will you eat?

    Answer: 1,000 is the only correct answer

2. If you are allowed to eat 60 grams of carbohydrates as a snack, how much ice cream could you have?

    Answer: Any of the following is correct: 1 cup (or any amount up to 1 cup), Half the container Note: If patient answers "two servings," ask "How much ice cream would that be if you were to measure it into a bowl."

3. Your doctor advises you to reduce the amount of saturated fat in your diet. You usually have 42 g of saturated fat each day, which includes one serving of ice cream. If you stop eating ice cream, how many grams of saturated fat would you be consuming each day?

    Answer: 33 is the only correct answer

4. If you usually eat 2500 calories in a day, what percentage of your daily value of calories will you be eating if you eat one serving?

    Answer: 10% is the only correct answer

READ TO SUBJECT: Pretend that you are allergic to the following substances: Penicillin, peanuts, latex gloves, and bee stings.

5. Is it safe for you to eat this ice cream?

    Answer: No

6. (Ask only if the patient responds "no" to question 5): Why not?

    Answer: Because it has peanut oil.

Interpretation

Number of correct answers:

**Score of 0-1 suggests high likelihood (50% or more) of limited literacy
Score of 2-3 indicates the possibility of limited literacy.
Score of 4-6 almost always indicates adequate literacy.**

Nutrition Facts

Serving Size	½ cup
Servings per container	4

Amount per serving

Calories	250	Fat Cal	120

	%DV
Total Fat 13g	20%
Sat Fat 9g	40%
Cholesterol 25mg	12%
Sodium 55mg	2%
Total Carbohydrate 30g	12%
Dietary Fiber 2g	
Sugars 23g	
Protein 4g	8%

*Percentage Daily Values (DV) are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Ingredients: Cream, Skim Milk, Liquid Sugar, Water, Egg Yolks, Brown Sugar, Milkfat, Peanut Oil, Sugar, Butter, Salt, Carrageenan, Vanilla Extract.

The Newest Vital Sign

Hoja de Resultados para el Nuevo Signo Vital
Preguntas y Respuestas

	¿RESPUESTA CORRECTA?	
	si	no

LEA AL PACIENTE: Esta información aparece en el reverso de un envase de helado.

1. Si usted se come todo el helado en el envase, ¿cuántas calorías habrá consumido?

   Respuesta: 1,000

2. Si a usted le recomendaron consumir 60 gramos de carbohidratos en la merienda, ¿cuánto helado puede comer?

   Respuesta: Cualquiera de: Hasta un máximo de una taza, una taza, la mitad del envase." Nota: si el paciente responde "dos porciones", pregunte "¿Qué cantidad de helado sería si lo sirviera en un tazón?"

3. Su médico le aconseja reducir la cantidad de grasas saturadas en su dieta. Usted normalmente consume 42 gramos de grasa saturada al día, que incluye una porción de helado. Si deja de comer helado, ¿cuántos gramos de grasa saturada consumiría cada día?

   Respuesta: 33 gramos

4. Si usted normalmente come 2500 calorías en un día, ¿qué porcentaje de su valor diario de calorías habrá consumido si se come una porción?

   Respuesta: 10%

LEA AL PACIENTE: Imagine que es alérgico/a a las siguientes sustancias: Penicilina, cacahuate (maní), guantes de latex y picaduras de abeja.

5. ¿Puede comer este helado con seguridad?

   Respuesta: No

6. (Solamente si responde "no" a pregunta 5): ¿Por qué no?

   Respuesta: Porque tiene aceite de cacahuate (maní).

Interpretación

Número de respuestas correctas:

Resultado de 0-1 sugiere alta probabilidad (50% o más) de alfabetización limitada.
Resultado de 2-3 indica la posibilidad de alfabetización limitada.
Resultado de 4-6 casi siempre indica alfabetización adecuada.

Pfizer

Información Nutricional

Tamaño de la Porción	½ taza
Porciones por envase	4

Cantidad por porción

Calorías	250	Cal Grasa	120

	%DV
Grasa Total 13g	20%
Grasas Sat 9g	40%
Colesterol 28mg	12%
Sodio 55mg	2%
Total Carbohidratos 30g	12%
Fibras Dietéticas 2g	
Azúcares 23g	
Proteína 4g	8%

*Porcentaje de Valores Diarios (DV) se basan en una dieta de 2.000 calorías. Sus valores diarios pueden ser mayores o menores dependiendo de las calorías que usted necesite.

Ingredientes: Crema, Leche Descremada, Azúcar Líquida, Agua, Yemas de Huevo, Azúcar Morena, Aceite de Cacahuate (Maní), Azúcar, Mantequilla, Sal, Carragenina, Extracto de Vainilla.

ID #: _____   Name: _____

Think about your eating habits over the past month or so. About how often do you eat each of the following foods either at home or in restaurants? Mark an 'X' in **one** box for each food.

How often do you eat...	[A] Once per MONTH or less	[B] 2-3 times per MONTH	[C] 1-2 times per WEEK	[D] 3-4 times per WEEK	[E] 5 or more times per WEEK
Eggs	☐	☐	☐	☐	☐
Whole milk or chocolate milk (Not lowfat or skimmed)	☐	☐	☐	☐	☐
Flour tortillas (not corn)	☐	☐	☐	☐	☐
Hamburgers or cheeseburgers	☐	☐	☐	☐	☐
Tacos, burritos or enchiladas	☐	☐	☐	☐	☐
Other mixed dishes with meat	☐	☐	☐	☐	☐
Roast pork or chops, roast beef or steak	☐	☐	☐	☐	☐
Fried chicken	☐	☐	☐	☐	☐
Cheese or cheese spreads	☐	☐	☐	☐	☐
Pizza	☐	☐	☐	☐	☐
Refried beans	☐	☐	☐	☐	☐
French fries, fried potatoes	☐	☐	☐	☐	☐
Potato chips, corn chips, peanuts	☐	☐	☐	☐	☐
Cake, sweet rolls, doughnuts, Mexican sweet bread	☐	☐	☐	☐	☐
How often do you use fat or oil to fry, cook or	☐	☐	☐	☐	☐
Salad dressing	☐	☐	☐	☐	☐

Think about your eating habits over the past month or so. About how often do you eat each of the following foods either at home or in restaurants? Mark an 'X" in **one** box for each food.

How often do you eat...	[A] Less than once per WEEK	[B] About 1 time per WEEK	[C] 2-3 times per WEEK	[D] 4-6 times per WEEK	[E] Once per DAY	[F] 2 or more times per DAY
Fruit juice, like orange, apple, grape, fresh, frozen or canned (Not soda or other drinks)	☐	☐		☐	☐	☐
Not counting juice, how often do you eat any fruit, fresh, canned or in smoothies?	☐	☐	☐	☐	☐	☐
Green salad (like lettuce or spinach salad)	☐	☐	☐	☐	☐	☐
Tomatoes or salsa fresca	☐	☐	☐	☐	☐	☐
Vegetable soup or stew with vegetables	☐	☐	☐	☐	☐	☐
Potatoes, any kind, including baked, mashed or French fried	☐	☐	☐	☐	☐	☐
Any other vegetables, including green beans, peas, corn, broccoli or any other	☐	☐	☐	☐	☐	☐

Do you take vitamin or mineral supplements at least once a week?   ☐ Yes   ☐ No

Age: _____   Sex: ☐ Male   ☐ Female

Where were you born?   ☐ Mexico   ☐ Central America   ☐ South America   ☐ United States   ☐ Other place

185

ID #: _____   Nombre: _____

Piense en sus hábitos de alimentación en el último mes. Con qué frecuencia ha comido los siguientes alimentos? Marque la frecuencia con una "X" en el cuadro para cada alimento. Incluya alimentos que comió en casa o en restaurantes.

Con qué frecuencia come usted...	[A] Una vez por MES o menos	[B] 2-3 veces por MES	[C] 1-2 veces por SEMANA	[D] 3-4 veces por SEMANA	[E] 5 o mas veces por SEMANA
Huevos	☐	☐	☐	☐	☐
Leche entera o leche con chocolate (No leche semi-descremada-1%-2% o descremada)	☐	☐	☐	☐	☐
Tortillas de harina (no de maíz)	☐	☐	☐	☐	☐
Hamburguesas o hamburguesas con queso	☐	☐	☐	☐	☐
Tacos, burritos o enchiladas	☐	☐	☐	☐	☐
Otros alimentos mezclados con carne	☐	☐	☐	☐	☐
Puerco/cerdo, azado o chuletas, o rez azado, o bistec	☐	☐	☐	☐	☐
Pollo frito	☐	☐	☐	☐	☐
Queso o queso para untar	☐	☐	☐	☐	☐
Pizza	☐	☐	☐	☐	☐
Frijoles refritos	☐	☐	☐	☐	☐
Papas a la francesa, papas fritas	☐	☐	☐	☐	☐
Papitas, chips de maíz, o cacahuates	☐	☐	☐	☐	☐
Pastel, roles de dulce, donas, o pan dulce (Mexicano)	☐	☐	☐	☐	☐
Con que frecuencia usa grasa o aceite para freir, cocer o sazonar sus alimentos	☐	☐	☐	☐	☐
Aderezos o salsa para ensaladas	☐	☐	☐	☐	☐

Piense sobre sus hábitos de alimentación en el último mes. Con qué frecuencia ha comido los siguientes alimentos? Marque la frecuencia con una "X" en el cuadro para cada alimento.

Con qué frecuencia come usted...	[A] Menos de una vez por SEMANA	[B] 1 vez por SEMANA	[C] 2-3 veces por SEMANA	[D] 4-6 veces por SEMANA	[E] 1 vez por DÍA	[F] 2 o mas veces por DÍA
Jugo de fruta, como de naranja, manzana, o uva -- naturales, congelados, o de lata o en aguas frescas (no refrescos u otro tipo de bebidas)	☐	☐	☐	☐	☐	☐
Sin contar jugos, con que frecuencia come frutas — naturales, o de lata, congelada o en licuados	☐	☐	☐	☐	☐	☐
Ensalada verde (como de lechuga o espinacas)	☐	☐	☐	☐	☐	☐
Tomates o salsa fresca	☐	☐	☐	☐	☐	☐
Sopas de verduras o caldos con verduras	☐	☐	☐	☐	☐	☐
Papas, de cualquier tipo incluyendo horneadas, puré o a la francesa	☐	☐	☐	☐	☐	☐
Algunas otras verduras, incluyendo ejotes o habichuelas verdes, repollo, elote o mazorca (maíz), brócoli o algún otro	☐	☐	☐	☐	☐	☐

Está tomando vitaminas o suplementos minerales por lo menos una vez a la semana?   ☐ Si   ☐ No

Edad: _____   Sexo: ☐ Hombre   ☐ Mujer

Es de   ☐ Mexico   ☐ Centro America   ☐ Sudamerica   ☐ los Estados Unidos   ☐ o de otra lugar

Psychosocial and Environmental Questionnaire

Participant Code _____

The following questions inquire about factors that influence your dietary intake. Please indicate how much you agree by indicating on number on the scale from one to nine. One indicates "strong disagree" and nine indicates "strongly agree". If you do not know just say "don't know". You can use the hand card to help you remember what the numbers mean.

Enabling Factors

1. It easy to find traditional foods and/or ingredients from my country in southern Mississippi?

1   2   3   4   5   6   7   8   9   ___ Don't know

2. I have access to markets that have good produce?

1   2   3   4   5   6   7   8   9   ___ Don't know

3. I have transportation to the markets that have the foods I like to buy?

1   2   3   4   5   6   7   8   9   ___ Don't know

4. The prices of the food I like to eat within your budget.

1   2   3   4   5   6   7   8   9   ___ Don't know

5. It takes a lot of time to prepare traditional meals.

1   2   3   4   5   6   7   8   9   ___ Don't know

6. The following foods are expensive in Mississippi…
        Fruit
  1   2   3   4   5   6   7   8   9   ___ Don't know

        Vegetables
1   2   3   4   5   6   7   8   9   ___ Don't know

         Fish
1   2   3   4   5   6   7   8   9   ___ Don't know

Reinforcing Factors

7. My diet is influenced by the food that people I live with eat?

1   2   3   4   5   6   7   8   9   ___ Don't know

8. The people I live with eat mostly traditional foods?

1   2   3   4   5   6   7   8   9   ___ Don't know

9a. My children that are less than 18 years old prefer traditional foods over typical US foods?

1   2   3   4   5   6   7   8   9   ___ Don't know

9b. The food preference of my children affects the diet of the rest of my family.

1   2   3   4   5   6   7   8   9   ___ Don't know

10. I like the convenience of foods in the US?

1   2   3   4   5   6   7   8   9   ___ Don't know

11. Fruits and vegetables are fresh here in Mississippi?

1   2   3   4   5   6   7   8   9   ___ Don't know

Predisposing Factors

12. Traditional foods taste better than typical US foods.

1   2   3   4   5   6   7   8   9   ___ Don't know

13. Traditional foods cost less than typical US foods.

1   2   3   4   5   6   7   8   9   ___ Don't know

14. I believe traditional foods are healthier than typical US foods.

1   2   3   4   5   6   7   8   9   ___ Don't know

15. I believe that traditional foods are better than typical US foods for preventing diseases.

1   2   3   4   5   6   7   8   9   ___ Don't know

16. I eat mostly traditional foods.

1   2   3   4   5   6   7   8   9   ___ Don't know

17. I believe that what a person eats can affect their risk of getting cancer.

1   2   3   4   5   6   7   8   9   ___ Don't know

18. I believe that what a person eats can affect their risk of getting heart disease.

1   2   3   4   5   6   7   8   9   ___ Don't know

19.   It is personally important to me to eat a low-fat diet.

1   2   3   4   5   6   7   8   9   ___ Don't know

20. It is personally important to me to eat a diet high in fruits and vegetables.

1   2   3   4   5   6   7   8   9   ___ Don't know

21. I am aware of nutrition materials from the government.

1   2   3   4   5   6   7   8   9   ___ Don't know

22. My diet has changed notably since moving to the US or over the past few years.

1   2   3   4   5   6   7   8   9   ___ Don't know

Psychosocial and Environmental Questionnaire - Spanish

Participant Code _____

Por cada pregunta, contesta de uno a nueve cuanto esta de acuerda con el comentario. Uno significa que no está de acuerdo para nada y nueve significa que está completamente de acuerdo. Si no sabe, conteste "no se". Puede usar esta carta para ayudarle a recordar lo que significa los números.

Enabling Factors

1.   Es fácil de encontrar comidas tradicionales de mi país en Mississippi.

1   2   3   4   5   6   7   8   9   ___ No Se

2. Tengo acceso a los mercados que tienen buenas frutas y verduras.

1   2   3   4   5   6   7   8   9   ___ No Se

3. Tengo un medio de transporte a los mercados donde venden comidas que a mi me gustan.

1   2   3   4   5   6   7   8   9   ___ No Se

4. Los precios de las comidas que me gustan comer son accesibles.

1   2   3   4   5   6   7   8   9   ___ No Se

5. Me tarda mucho tiempo preparar comidas tradicionales.

1   2   3   4   5   6   7   8   9   ___ No Se

6. Las comidas siguientes están caros en Misisipi como…
        Fruta

1   2   3   4   5   6   7   8   9   ___ No Se

        Verduras

1   2   3   4   5   6   7   8   9   ___ No Se

        Pescado

1   2   3   4   5   6   7   8   9   ___ No Se

Reinforcing Factors

7. Me influye lo que come las personas con quien vivo yo.

1   2   3   4   5   6   7   8   9   ___ No Se

8. Las personas con quien vivo comen comida tradicional casi siempre.

1   2   3   4   5   6   7   8   9   ___ No Se

9a. Mi(s) niño(s) que viven conmigo prefieren la comida tradicional en vez de la comida típica de EEUU.

1   2   3   4   5   6   7   8   9   ___ No Se

9b. Esta preferencia de mi(s) niño(s) le afecta la dieta al resto de mi familia.

1   2   3   4   5   6   7   8   9   ___ No Se

10. Me gusta la rapidez de las comidas de EEUU.

1   2   3   4   5   6   7   8   9   ___ No Se

11. Las frutas y verduras están suficientemente frescas aquí en Mississippi?

1   2   3   4   5   6   7   8   9   ___ No Se

Predisposing Factors

12. La comida tradicional tiene el mejor sabor en mi opinión.

1   2   3   4   5   6   7   8   9   ___ No Se

13. La comida tradicional cuesta menos que la comida típica de EEUU aquí en Misisipi.

1   2   3   4   5   6   7   8   9   ___ No Se

14. Yo creo que la comida tradicional es más saludable que la comida típica de EEUU.

1   2   3   4   5   6   7   8   9   ___ No Se

15. La comida típico de EEUU es lo mejor para prevenir las enfermedades en comparación a la comida tradicional.

1   2   3   4   5   6   7   8   9   ___ No Se

16. Yo como comida tradicional lo mayor del tiempo.

1   2   3   4   5   6   7   8   9   ___ No Se

17. Yo creo que lo que una persona come puede afectar el riesgo de contraer cáncer.

1   2   3   4   5   6   7   8   9   ___ No Se

18.   Yo creo que lo que una persona come puede afectar el riesgo de contraer una enfermedad del corazón?

1   2   3   4   5   6   7   8   9   ___ No Se

19. Personalmente, es importante que yo coma una dieta que está bajo en grasa.

1   2   3   4   5   6   7   8   9   ___ No Se

20. Personalmente es importante que yo coma una dieta alta en frutas y verduras.

1   2   3   4   5   6   7   8   9   ___ No Se

21. Estoy consciente que hay información de nutrición por parte del gobierno.

1   2   3   4   5   6   7   8   9   ___ No Se

22. Mi dieta he cambiado notablemente desde que traslado a EEUU? (o "durante los últimos años" si la persona es segunda generación)

1   2   3   4   5   6   7   8   9   ___ No Se

Dietary Pattern Interview Guide

A. <u>Food choice</u>
First, I'd like to get an idea of how food and meals are organized in your home.

1. How would you describe the role you play in getting food on the table in your home?

    Who else is involved?
    What part do they play?
    Anyone else?

2. What are the kinds of things you usually eat at home?

3. If I followed you through a typical food shopping trip, what things would I see you choose?

    Tell me about those foods... How would you classify the foods you choose?

    How different are these foods than the foods you would buy in your country of origin?

4. What things influence the way you choose foods?
    Probes: For yourself? For others?

    What are some of the ways you use the foods you choose?

    How much would you say your upbringing has influenced your present food choices? How?

5. Where else do you eat besides at home?
    Probes: Examples? (e.g., eating out, etc.)?

6. Do you choose differently in different situations?
    Probes: Examples? What kinds of foods? How do you decide on what foods to choose?

7. What sorts of foods do you tend to choose most? ...choose least?

    What foods could you substitute for others if what you wanted were not available?

    What are some of your favorite foods?

There are different tastes such as bitter, sweet, rich, sour, salty etc.. When thinking of these tastes what are some of your favorite tastes? Probe: do you like savory, sweet, or rich/heavy etc…

In what ways have your food choices changed over the years?

How important is it for you to chose foods that are from your host country? What are some reasons why it is or isn't important for you?

How much does your desire to make a financial contribution to your family affect the foods you purchase?

B. Food roles
Now I'd like to get an idea about how other people influence your food choice.
1. How is the way you eat influenced by others in your family?
   Probe: by friends? others?

   Do other people ever make comments about the way you eat?

   Who comments? What do they say? What effect does it have on you?

2. How do you think that you influence the ways others in your family (friends, co-workers) eat?
   Probe: Examples?

   How do you do that?

   What responsibility do you feel for the way other members of your family (friends, co-workers) eat?

3. Traditionally, the women in families have been responsible for making sure that everybody eats right.
   How true is that in your family now?

   How true was that in the family you grew up in?

4. Can you give me an example of a time when there was a difference of opinion in your family about what would be served or eaten in your home?
   What was the disagreement about?

   What happened?

C. Diet Changes
 People sometimes make changes in the way they eat over time.

1. How has the way you eat changed in the last couple of years (if person is second generation) or since moving to the US (if person is first generation)?
        Probe £or each change: What were some of the reasons for that change?
        Who initiated the change?

        What are some factors in your life that caused this change?

        When did this change take place?

2. Specifically can you tell me about any changes you have made in the fruits and vegetables you eat in the last couple of years?
        Probe: kinds, amounts, preparation.

        What caused these changes?

        Any other changes?

D. Food and Nutrition Knowledge
Now I'd like to ask you some questions about how you learned what you
know about food and eating.

1. How do you know what you know about foods and cooking?
        Probes: mother, father, other family, doctor, news media, friends, other...

2. How do you know what you know about eating and health/nutrition?
        Probes: mother, father, other family, doctor, healer, news media, friends, other...

        What ways do they believe eating and nutrition affect a person's health? What
        ways do you believe eating and nutrition affects a person's health? Can you give
        me an example?

3. How do you think your family background affects the way you eat?
        How do you think that affects the way you eat?

        How do your religious or spiritual beliefs affect the way you eat?

4. Do you ever discuss nutrition/eating and health in your family?
        What kinds of things do you talk about?

5. What about eating do you think does or does not affect your risk of cancer? For heart
disease? (__ out of ___)

6. You indicated that traditional foods are healthier – not healthier – both the same (___ out of _____) as typical US foods, what are some reasons that you believe this?

7. We hear a lot these days about choosing more fruits and vegetables in our diets.

        What do you think about that?

        What do other people you know think about that? ...the people you usually eat with [or...your family]? Probe for examples: [who? what? Why]?

        What do you like about them? ...not like about them?

        What would make you choose them? ...keep you from choosing them?

        When and where do you eat them?

8. If you wanted to try and include more fruits and vegetables among your food choices, what would make that easier? ...make that harder?

9. Some people say that if you eat lots of fruits and vegetables you might not get sick; what do you think about that?

        Probe: Have you tried to do that? What happened?

        What would it take for you to eat more fruits and vegetables?

        You indicated that eating fruits and vegetables was important – not important – somewhat important (___ out of ___); tell me more about this.

10. If you were to give us advice about how to get other people to eat more fruits and vegetables, what would you tell us?

E. Environmental Influences
How do you think the way you personally eat is affected by:
        Probe for/try to get examples of:
                Food manufacturers?
                Farmers?
                Supermarket owners?
                The government?
                Where you live?
                Others outside of your family?

        Listen for/note examples of:
                What you read in newspapers and magazines?
                What you hear on TV or the radio?

F. <u>Life Stage</u>
Now I have some questions about your life in general.

Thinking about your life as chapters in a book, what would be the title of the chapter you are living in now?

The title of the chapter you just left?

What's your best guess for the title of the next chapter of your life?

Compared with other periods in your life, do you feel that your life is stable or changing right now?
What do you see as advantages of living in the US? Disadvantages?

How does life in the use compare to life in your country of origin?

Adapted from: Falk, L., Sobal, J., Bisogni, C., Connors, M., Devine, C. M. (2001). Managing

Healthy Eating: Definitions, Classifications, and Strategies. *Health Education and*

Behavior, 28(4), 425-439.

<u>Dietary Pattern Interview Guide – Spanish</u>

Un Análisis integrada de la comunidad de consumo de comida especifica de plantas:
Ruta de pregunta por una entrevista Cualitativo de individuales

Opciones de la comida:

Primero, me gustaría tener una idea como la comida y los tiempos de comida estén
organizados en su hogar.
1. a. ¿Qué papel juega usted en traer la comida en su mesa?
   Probes? (Planificando, comprando,   cocinando, y limpiando)

   b. ¿Quiénes están involucrados en poner comida a su mesa?

   c. ¿Qué parte le toca usted?

   d. ¿Hay otros?

2. a. ¿Qué clase de comida usualmente come en su casa?

3. a. ¿Si, yo lo acompañara a una compra normal de comida, que cosas son las que vería
yo?
   b. ¿Cuénteme acerca de estas comidas… Como clasificaría usted estas
   comidas que escoge?

   c. ¿Qué diferencias hay entre de lo que compraba en su país de origen?

4. a. ¿Qué cosas le influyen a usted en escoger estas comidas?
   Puntos de prueba: Por sí mismo? Por otros?

   b. ¿Cómo podría decir usted que la educación de su niñez ha influido su selección
   de comida?

   c. En qué forma prepara usted las comidas que escoge?

5. a. ¿Donde más come si no está en casa?

   Puntos de prueba: Ejemplos? (comiendo afuera, etc…)

6. a. ¿Usted escoge otras comidas, en diferentes situaciones? Por ejemplo, emocional,
   económica, habitacional etc…

Puntos de prueba: Ejemplos? Que clases de comida? Como decide en escoger las comida?

7. a. ¿Qué tipos de comidas escogen más? Que escogen menos?

b. ¿Que comidas podría substituir si lo que quisieras no estuvieran disponible?

b. ¿Cuáles son sus comidas favoritos?

c. Hay diferente sabores como amargo, dulce, pesado, cremoso, salada, acido etc…¿Cuáles son sus sabores favoritas?
Punto de Prueba: Le gusta más dulce o cremoso/pesado o salada?

e. ¿Cómo ha cambiado la comida que escogen durante los años que ha estado aquí?

f. ¿Qué importante es para usted el consume de comida de su país de origen? Cuénteme algunas razones porque es o no es importante a comer estas comidas.

g. ¿Si usted manda dinero a su familia en su país de origen, como le afecta esto en las comparas de comida?

B. El papel que toque en lo que usted come
Ahora, como me gustaría obtener una idea, de cómo otras personas han influido en escoger su comida.

1. a. ¿Cómo ha influido su familia en la comida que usted ingiere?
    Puntos de prueba: Por amigos? Por otros?

b. ¿Hay personas que hacen comentarios acerca de como come usted?

c. ¿Quién? ¿Qué dicen? ¿Qué efectos la causan a usted?

2. a. ¿Cómo piensa que usted influye en la forma en cómo comen: su familia, sus amigos, y sus compañeros del trabajo?
    Puntos de prueba: ¿Ejemplos?

b. ¿Como hace esto?

c. ¿Qué responsabilidad siente en la forma de cómo comen otros miembros en su familia?

3. Tradicionalmente, las mujeres en las familias han tenido la responsabilidad para estar seguros que todos comen bien.

      a. ¿Qué tan cierto es eso en su familia ahora?

      d. ¿Qué cierto era esto cuando creció en su familia?

4.a. Puedes darme un ejemplo de una vez cuando había una diferencia en opiniones en su familia acerca de lo que comía?

      b. Cual fue el desacuerdo?

      c. Que ocurrió?

D. <u>Cambios en su dieta</u>

A veces la gente hace cambios en la forma de que comen en un cierto plazo.

1. a. ¿Cómo ha cambiado la forma que usted come desde que se traslado a EEUU?
    Puntos de prueba: ¿Cuáles eran las razones por los cambios?

      b. ¿Quién o quienes iniciaron el cambio?
       Por ejemplo: ambiente, economía, trabajo, etc…

      d. ¿Cuándo ocurrió el cambio?

2. a. Específicamente, podría contarme acerca de los cambios que usted ha tenido en el consumo de las frutas y verduras en los últimos años?
    Puntos de prueba: Tipos, cantidades, preparación.

      b. ¿Que causo estos cambios?

      c. ¿Otros cambios?

D. <u>Conocimiento acerca de la comida y nutrición</u>

Ahora, me gustaría hacerle algunas preguntas de como aprendió acerca de la comida y la nutrición.

1. a, ¿Cómo sabe acerca de la comida y la cocina (como cocinar)?
    Puntos de prueba: ¿Padre, madre, otros en la familia, doctor, las noticias, amigos, etc…?

2. a. ¿Cómo sabe acerca de la alimentación, la salud, y la nutrición?
       Puntos de prueba: Madre, padre, otras en la familia, doctor, la media, amigos, otros?

b. ¿En qué forma creen ellos que la nutrición y lo que comen afecta la salud de una persona? ¿En qué forma cree usted que la nutrición y lo que come afecta la salud de una persona?

        Punto de prueba: ¿Puede darme un ejemplo?

3. a. ¿Cómo piensa usted que su familia ha afectado en la forma que usted come?

b. ¿Los hábitos de comida le reflejan una tradición particular?

c. ¿Donde creció?

d. ¿Donde crecieron sus papas?

e. ¿Cómo piensa que esta afecta la forma en que come?

f. ¿Cómo le afecta usted sus creencias religiosos y espirituales en la forma en que come?

4. a. ¿Usted habla acerca de la nutrición, la alimentación y la salud con su familia?

b. ¿Qué clase de temas hablan ustedes?

5. a. ¿Piense que nutrición afecta el riesgo de contraer cáncer? ¿Cuál es su razón?
    b. ¿Enfermedad del corazón?

6. a. ¿Usted indico en una escala de uno a nueve que la comida tradicional era mas saludable – menos saludable – es lo mismo saludable; que la comida típico en EEUU, cuales son las razones porque usted cree en eso?

7. Nosotros escuchamos mucho durante estos días sobre escoger más frutas y verduras en nuestra dieta.

a. ¿Qué cree usted acerca de esto?

b. ¿Qué creen otras personas que conoce usted acerca de esto? La gente con quienes usualmente come usted…[o… su familia]? Puntos de probar por ejemplo [¿Quienes? ¿Qué? ¿Por qué?]

8. a. ¿Si usted quisiera probar e incluir más frutas y verduras en sus opciones de comida, que factor(es) haría más fácil? Que factor haría más difícil?

9. a. ¿Algunas personas dicen que si usted come muchas frutas y verduras, posiblemente no se enferma, que cree usted acerca de esto?

¿Puntos de prueba: Ha intentado hacer esto? Que ocurrió?

b.. ¿Qué le hace escogerlas? Porque escogerlas?

c. ¿Donde y cuando las come usted?

d. ¿Qué tendría que pasar para que usted comería mas frutas y verduras?

e. Usted indicó que las frutas y verduras son importante, no importante, algo de importancia (___ en la escala de ___); cuéntame más acerca de por qué cree en eso?

10. a. ¿Si usted estuviera dándonos consejo acerca de como influir en otras personas en comer más frutas y verduras, que nos diría?

E. Influencias del ambiente

1. ¿Cómo cree usted que le ha afectado en la forma en que usted come…

a. Fabricantes de comida?
b. Agricultores?
c. Dueños de tiendas y supermercados?
d. El gobierno?
e. Donde vive?
f. Otros afuera de su familiares?

For the Interviewer: (Listen for/note examples of:
What you read in newspapers and magazines?
What you hear on TV or the radio?)

F. Etapa de la vida

Ahora, tengo preguntas sobre su vida general.

1. ¿Pensando que su vida es un capítulo de un libro, cual sería el título del capítulo en que usted está viviendo ahora?

2. ¿El titulo del capituló que acabas de dejar?

3. ¿Qué pensaría que el titulo de su próximo capituló será?

4. ¿Comparado con otros periodos de su vida, usted siente que está estable o en un cambio ahora?

5. ¿Cuáles son las ventajas de vivir en EEUU? Desventajas?

6. ¿Como compararía su vida en los EEUU a la vida en su país de origen?

<u>Dietary Pattern Guide Interview – Focus group</u>

Opening:
Tell me what your name is and where you are originally from.?

Introduction:
1. If you thought about a flavorful (good) meal, what food(s) come to mind?

2. When you think about different tastes such as bitter, sweet, rich, sour, salty etc.. what are some of your favorite tastes? Probe: do you like savory, sweet, or rich/heavy etc…

3. What are the kinds of things you usually eat at home? What are things you usually at in your home country?

  What sorts of foods do you tend to choose most? ...choose least?

Transition questions:

4. How has the way <u>you</u> eat changed in the last couple of years (if person is second generation) or since moving to the US (if person is first generation)?
  Probe £or each change: What were some of the reasons for that change?

5. If I followed you through a typical food shopping trip, what things would I see you choose?

  Tell me about those foods... How would you classify the foods you choose?

  How different are these foods than the foods you would buy in your country of origin?

6. Where else do you eat besides at home?

Main questions:

7. What things influence the way you choose foods?
  Probes: For yourself? For others?
  How is <u>the way you eat</u> influenced by others in your family?
  How do you know about food and cooking?
  Wanting to make a contribution to family in home country?
  How do your religious or spiritual beliefs affect the way you eat?
  How important is it for you to chose foods that are from your host country? What are some reasons why it is or isn't important for you?

8. How would you describe the role you play in getting food on the table in your home?

> Who else is involved?
> What part do they play?
> What <u>responsibility</u> do <u>you</u> feel for the way other members of your family in your home country eat? For friends, co-workers, family here eat?

9. How do you know what you know about eating and health/nutrition?
> Probes: mother, father, other family, doctor, healer, news media, friends, other...

> What ways do they believe eating and nutrition affect a person's health? What ways do you believe eating and nutrition affects a person's health? Can you give me an example? Probe: nutrition and cancer? Heart disease?

> Think about whether you believe traditional Hispanic foods or traditional foods from the US are more healthy, tell me what you believe? What are some reasons that you believe this?

10. We hear a lot these days about choosing more fruits and vegetables in our diets.
> What do you think about that?

> What do other people you know think about that? ...the people you usually eat with [or...your family]? Probe for examples: [who? what? Why]?

> Specifically can you tell me about any changes you have made in the fruits and vegetables you eat in the last couple of years?
> Probe: kinds, amounts, preparation.

> If you wanted to try and include more fruits and vegetables among your food choices, what would make that easier? ...make that harder?

11. How do you think the way you personally eat is affected by your environment where you live?
> Probe for/try to get examples of:
> > Food manufacturers?
> > Farmers?
> > Supermarket owners?
> > The government?
> > Where you live?
> > Others outside of your family?

Ending Questions:

12. What do you see as advantages of living in the US? Disadvantages?

13. How does life in the use compare to life in your country of origin?

Photovoice Group Interview Questions

Welcome and thank you for coming tonight. This is the last part of the photovoice process. You all took pictures over a few weeks of what you eat regularly, where you eat and from where you obtain your food. I want to thank you for all your hard work, I truly appreciate it. It has been fun to work with you all.

During this focused interview, I will ask you questions about your pictures, food habits and influences of your food intake. If you do not understand the question please ask me to repeat it again. Please be honest when answering the questions and speak from your own experience. Speak clearly and if someone else is speaking please wait until he is finished before speaking.

The session will be tape recorded and then transcribed you're your permission. Do I have your permission for to tape record this session? Everything you answer will be confidential as was indicated in your informed consent at the beginning of this project.

Introductory Question
1) Find your favorite food among the pictures shown, which is it? Do you consider this a food from the US or your country of origin? Tell me what makes this one of your favorite foods?

Transition Questions
2) Describe how your photos would look if you participated in a similar photo project in your birth country?

3) When looking at all the foods in the pictures are there any foods that are not there that you would like to be there? What inhibits you from obtaining them?

Key Questions

4) When looking at ALL the photos which foods do you perceive as "traditional" foods?

What influences you to choose the traditional foods?

When looking at ALL the photos which foods to you perceive as the US foods? What influences you to choose the "US" foods?

Probe: Food preferences? Wife or roommates? Friends? Tradition/Customs? Money/Price? Food availability? Marketing? Health? Knowledge?

5) If you have kids in the US, looking at the pictures, which of these pictures were influenced by your child's food preference?

   How would you classify this food as traditional or from the US?

   If you do not have kids here but you do in your country of origin, what are some of their favorite foods? How do they eat different know compared to you when you were their age?

6) When looking at ALL the photos which restaurants do you perceive as having mostly "traditional foods".
   Which do you perceive as having mostly "US" foods?

   What are some reasons why you eat at these restaurants?

   If needed…..How are these restaurants different from those you ate at in your country of origin. How often did you eat out in your country of origin. What are some of the reasons why you ate out?
   Probe: Street vendors, buffets, comedores, restaurants

7) Which of the pictures in your photos would you consider to be convenience foods? Processed foods? Packaged foods? Out of these foods you just mentioned which ones did you also eat in your country of origin?

8) Show me meals from your pictures that you also ate in your home country? What was the same about it? What was different? Probe: Taste, portions, preparation methods.

9) Out of the meals in the pictures, which ones did you prepare? Your roommates? Your wife/woman in the household? Traditionally, do you think it is the duty/role of the woman to do the cooking? Explain. If you cook here in the US, how does that make you feel?

   For the meals that you pointed out in the pictures, who made the decision about what would be prepared? Who made the decision in your country of origin about what would be prepared? Did you, your wife, your mom, etc..?

   If your food role has changed since coming to the US or moving to Hattiesburg, how has this affected the way you eat?

10) What are some of the healthy foods you see in your photos?? Unhealthy? What are some reasons why you perceive these foods as Unhealthy? What were reasons for choosing these foods?

11) If you do not eat as healthy as you would like to what are some of the factors that inhibit you from eating healthier?

12) Find different fruits and vegetables that you ate in your photos. What were the reasons for choosing these fruits and vegetables? Where did you get them from here in the US?

Did you consume these in your country of origin?

Where would you have gotten them from in your country of origin?

How are the fruits/vegetables that you eat here different from the ones you would have bought in your country of origin?

From these fruits and vegetables in your pictures, when do you buy them here? Probe: Year round, during a specific season, when they are   on sale etc…

For example, if you could get mangos in Wal-mart year round then do you eat them year round or only during a particular time?

When do you buy them in your country of origin?

What are some fruits and vegetables you would like to see in your pictures that are not there? What are some reasons for them not being in your photos?

13) Looking at your pictures and others pictures, where did you buy the majority of your food? What are the reasons you bought the majority of your foods where you did? How many times/week do you shop there?

Where are some other places you shop that are not in the photographs? What are the reasons for shopping at these other places?

If you or the person responsible for buying the foods was going shopping for foods in your country of origin, what would the shopping trip look like? Probe: What food stores/markets would I see in your pictures?

How are the foods that you buy here different from those in your country of origin? Probe: Variety? Price? Freshness? Packaging? Canned? Meats? Tortillas?

Do you know that there are farmer's markets in Hattiesburg? Why do you or don't you shop at them?

End Question

14) What else would you like to tell me about your diet and/or food environment that was not depicted in the photos?

APPENDIX C

PHOTOVOICE PROTOCOL AND TRAINING MATERIALS

Photovoice Protocol:
The three goals of photovoice as outlined by Wang (1999) are:

1) To record and reflect community concerns and strengths
2) To promote critical and dialogue and knowledge about personal and community issues through group discussions using photographs
3) To reach policymakers.

In this project photovoice will be utilized to enquire about the perception Hispanic men living in southern Mississippi have on their diet and nutrition environment.

The stages that will be used are listed below:

1) Conceptualization of the problem
   - There is a negative correlation between decrease in fruit, vegetable and fiber intake with acculturation in the Hispanic population living in the U.S.
   - A low diet quality has been correlated with low income and low educated persons.
   - The food environment does not cater to healthy eating especially in low income areas.
   - Mexican-Americans have a high rate of diabetes and Mexican-American children have the highest rate of obesity amongst racial groups (CDC, 2006, 2004) .
   - There is a lack of research evaluating the factors that influence dietary intake in the Hispanic population particular in the southeastern US. Horn (2009), Gray, Cossman, Dobson, Byrd, 2005) commented that generalizations across geographical areas are not appropriate or accurate.
   - Interventions that address the issues relating to dietary acculturation are needed for this population (Dave, Evans, Saunders, Watkins, Pfeifer, 2009).

2) Defining broader goals and objectives
   - To use photovoice to explore factors that affect dietary intake in the Hispanic male population in southern Mississippi due to the limited data assessing this population's dietary intake patterns.
     - Disseminate the data to the Mississippi Department of Health for policymaking and program/intervention implementation in this population.
     - Disseminate results to Hispanic health non-profit organizations for program implementation: MIRA, Pueble (Biloxi, MS).
     - Disseminate the findings back to the Hispanic community through the religious sector to create awareness in this community (Sacred

Heart Catholic Church, Temple Baptist, Seventh Day Adventist: Hattiesburg, MS).

3) Recruiting policy makers as the audience for the findings
- To contact and meet with the direct of the Department of Health in District 8 which includes the southeastern part of Mississippi.
  Thomas Dobbs, MD
  District Medical Director

  David Caulfield
  District Administrator

  District Office
  602 Adeline Street
  Hattiesburg, MS 39401
  Telephone: 601-544-6766

- To create a plan with the Department of Health on disseminating the results throughout the district.

4) Training the trainers

5) Photovoice Training (Appendix II)

- Discuss ethics of the process, the rational of the process and the use of the cameras
- Discuss the photovoice process and post focus groups

6) Initial themes for taking the pictures

- A picture of everything eaten or drank over three days (all snacks, meals, breakfast, and beverages). Two days should be a week day and one should be a weekend day. There is an example on page ___of your handout. (Appendix II)
  - Write down the times you ate the meal, snack or drank a beverage and where. (Appendix III).
  - Write how the food was prepared.
  - Note the portion of the meal you ate (make sure to include second and thirds)
  - Note whether you perceive the food or beverage as being a traditional food/beverage or one of the US.

- A picture of each restaurant, convenient store or supermarket entered and where food is bought over one week (from Monday through Sunday).

               - A picture of the outside of the store

               - If in the supermarket a picture of the food basket during checkout

or the   items in house.

               -If at a restaurant a picture meal/drink.

               - If at a convenient store a picture of the food/beverage(s) bought.

               - Write down the day and what was bought in your food journal. If in a supermarket only need a general idea of what was bought; for example: fruits/vegetables and dairy products.

- During the week pictures of cooking methods that occur in the home.
  - Note what was cooked and how it was cooked in the journal.
- Pictures of anything else that participant perceives as important to his food intake/environment

7) Taking Pictures
- The cameras will be disposable indoor/outdoor that have 36 disposals.
- Participants will be instructed to not take pictures of any persons, addresses, or cars where the licenses plate can be seen. Any pictures that are controversial will be destroyed upon development by the PI.
- Pictures should be taken at three feet from the food plate.
- Once the pictures have been taken the cameras will be mailed to the PI with stamped envelops given to them by the PI during the Photovoice training.

8) Facilitating group discussion
- Pictures will be developed by the PI
- Each participants' pictures will be kept separate.
- Pictures will be chosen per focus group questions to guide the focus groups.
- Participants will gather together one month after the photovoice training to participate in the focus group.
- The focus groups will encourage discussion around the photos presented so the PI can gain a better grasp on psychosocial and environmental factors that affect food intake patterns.

9) Critical Reflection and dialogue
- Selecting photographs for the focus groups will be done …
- Focus groups will be used to help contextualize the participants' stories of the factors affecting food intake.
- Coding will be done through open and axial coding methods. The codes will be compared with the codes from the semi-structured interviews.
- Main quotes will be extracted from the focus group discussions.

10) Documenting the stories and conducting the formative evaluation

- Interpretation guided by critical consciousness
- The results will be written in a simple 1-2 page document and mailed to the participants.
- The participants will each be called and invited to one more meeting at a neutral place where their feedback on the results will be asked for.
    a) What findings do they believe do not reflect factors associated with their food intake and why
    b) What factors did they find interesting and surprising?
    c) What suggestions would they provide to the researchers in terms of information dissemination or program development?

11) Reaching policy makers, donors, media, researchers, and others who may be mobilized to create change.

- The results will be written up in manuscript form and sent to relevant journals for publication.
- The results will be disseminated to local governmental health agencies through a 1 page summary and a meeting.
- The results will be disseminated to local groups that work with the Hispanic population such as El Pueblo in Biloxi, Family Network Partnership in Hattiesburg, MS, and local Hispanic churches.
- A photograph show will be presented called "The Latino US diet" a perspective from Latino men.

12) Conducting participatory evaluation of policy and program implementation.

Photovoice Training Protocol

Photovoice is a process used to empower people to have a voice through photography, assess issues within their communities and lastly to reach policy makers. In this study, photovoice will be used to identify different factors that influence dietary intake in Hispanic males residing in southern Mississippi. The information gained from this process will then be disseminated back to the (you) community, to non-profits working with Hispanics and to governmental health agencies in southern Mississippi for policymaking and program/intervention implementation for this population.

Power

How can this study help to empower you? Our interest is to identify specific influences that cause healthy and unhealthy diet change in the Hispanic population. With your help we will be able to do so and then to hopefully influence policy and promote program implementation such as cooking classes, food accessibility etc… that will encourage healthy eating in the Hispanic population.

Ethics
You have already read the informed consent. I just want to reiterate that if at anytime in this study you do not wish to participate you can stop and there will be NO repercussions. Also, all information you provide will remain confidential meaning that your name or any other information about you will not be released. I will be the only one who will have your information and it will be kept in a locked cabinet in room 208 in the Fritsche-Gibbs building at the University of Southern Mississippi. In the photograph process there are a few regulations that will protect your identity and others.

1) Do not take pictures of any persons including you. If there are any pictures of others or you they will be destroyed upon development
2) Do not take pictures of any street signs or houses.
3) All pictures that you take will be on a memory card that you may keep after the study
finishes.
4) If there is a picture in the set that you believe could bring you or others harm you may indicate that you want it taken out and destroyed and it will be done.
5) What else would you like to discuss in regards to your and others protection during this process? If you do have any questions during the process please call me! (9373608535)

Cameras

The camera you will receive is a digital camera that will have a memory card. It has a flash so you can use it indoor. You will take pictures over two weeks.

- A picture of everything you eat over three days. One day should be a weekend day and two should be a weekday: this includes snacks, beverages, and meals. An example is on page 4. You will put this card beside the plate of food you are eating.

- A picture of each restaurant, convenient store or supermarket you enter and buy food in during the two weeks. Also take a picture of what you bought in the place. If in the supermarket take a picture of the items once you put them in your car or when you enter your house. If at a restaurant take a picture of your meal/drink. If at a convenient store take a picture of the food/beverage(s) bought.
    - Write down the day and what you bought. If it was at a supermarket only write down a general idea of what you bought for example: fruits/vegetables and dairy products (page 5).

- During the two weeks you take the pictures also take pictures of your cooking methods when you cook or someone in your house cooks at home.
    - Journal about different things cooked during the week and preparation methods used (Page 6).

- MOST IMPORTANT: Please take a picture of anything else that you believe creates a clear picture of your food intake/environment.

Camera Instruction

1) Cameras
2) Practice taking pictures and looking at the pictures. (Take practice pictures of the   food)
3) Are you comfortable taking pictures? Any questions about the cameras and taking the   pictures?

Explanation of Post-photo taking

1) You all will have two weeks to carry this out. When you finish taking your pictures over the fourteen days you can just drop your memory card into this envelop and place it in the mail or call/email me and I will pick it up from you (937-360-8535 or diana.cuycastellanos@eagles.usm.edu). If I do not receive your camera within 3 weeks, I will give you a call to make sure all is okay. After I receive all the memory cards, I will then develop the pictures. In one month we will all come back together and have a discussion about your

pictures to identify different factors that influence your eating pattern. Refreshments will be provided.

2) Are there any questions about the process? What comments or doubts do you have regarding the process: taking pictures, sending the cameras, having the group discussion?

3) Is it okay for me to call you if I do not receive your cameras before 3 weeks? Please call me if you have any questions during the process.

4) Lastly, we need to set up a time for the focus group. Which day is best? What time? Where? I will call to remind you have the time and date a week before and the day before the focus group. If for some reason you can not participate during this time please let me know *a priori.*

5) Thank you for your time and wiliness to do this project.

Photovoice Training Protocol- Spanish

Entrenamiento

El foto voz es un proceso utilizado para tener una voz de la gente por fotografía y examinar situaciones en sus comunidades. En este estudio, la foto voz será utilizada para identificar diferente factores que influyen en la alimentación de hombres Latinos que viven en el sur de Misisipi. La información que recibiremos atrás de este proceso, estará diseminado a la comunidad, a organizaciones que trabajan con Latinos y agencias de la salud para que ellos pueden implementar programas efectivos de nutrición para la población Latina.

Poder

Como puede ayudarte esta investigación? Nuestro interés es identificar influencias específicas que causan dietas saludables y no saludables en la población Latina. Con su ayuda podremos y después influir en el desarrollo y implementación de clases de cocina, accesibilidad de la comida etc…y que va a crear una alimentación saludable en la población Latina.

Etica

Usted ya ha leído y firmado un formulario de consentimiento. Solo quiero reitérate que si hay un tiempo en que no quiere participar más durante la investigación, usted puede dejar de participar sin un repercusión. También, todo información que usted provee es confidencial y significa que su nombre o otra información acerca de usted no sera expuesto. Y voy a ser la única persona que va a tener la información y que va a estar asegurada en un gabinete en la oficina 218 en Fritshe-Gibbs en la Universidad de Misisipi del Sur. Hay algunas regulaciones en el proceso de tomar las fotos que protege su identidad y de los demás.

1) NO tome fotos de otras personas incluyendo de sí mismo. Si tiene un foto con otra persona la foto será destruido.
2) NO tome fotos de los carteles en las calles o en las casas/apartamentos.
3) Todas las fotos que será tomados en la memoria de la camera que puede ser guardado después de la investigación.
4) Si hay un foto que usted tomo y cree que la foto podría traer daño a usted o otros, usted puede decirme y la foto será destruido.
5) Hay mas preguntas que quiere hablar acerca de su protección en el proceso? Si tiene preguntas durante el proceso por favor llámame. (9373608535)

Cameras

La camera que usted va a recibir es digital y tiene una tarjeta de memoria. Tiene "flash" para que puede usarlo dentro de la casa o edificio. Usted toma fotos durante dos semanas.

- Todas fotos de lo que come durante de los tres dias.
  - Un será una día de la fin de semana y las otras dos será días durante de la semana. Tome foto de cada comida que come durante los tres días, incluyendo refacciones, bebidas y platos de comida. Si es un plato de comida tome foto antes de comerla y después. Un ejemplo esta en pagina 4. Pondra esta carta a la par de su plato antes de comer.
- Un foto de cada restaurante, tienda (como gasolinera), o supermercado que usted entra para comprar durante los dos semanas. Tambien una foto de lo que compra. Si es en un supermercado y compra mucho que tome una foto de la comida cuando esta desempacando en su casa. Si es en un restarante tome una foto de su plato de comida y su bebida. Si es una tienda tome foto de lo que compra.
  - Escriba el día de lo que compro en su diario. Si compra mucho como en un Supermercado, solo escriba de lo que compra en general. Refiere a pagina 5 para ver un ejemplo.
- Durante los dos semanas, tome fotos de los métodos de cocinar durante que usted o la persona que cocina en su casa está cocinando. (ejemplo en pagina 6.
  - Escriba en su diario acerca de las comidas que ha cocinado en su casa durante la semana y los método de preparación.

   Lo Mas Importante: Por favor tome fotos de cualquiera otra cosa que   usted cree que representa completamente su alimentación o/y su ambiente de alimentación

Instrucciones de cómo usar la Camera

1) Cameras
2) Ensayar de tomar las fotos y verlas.
3) Se siente confiado tomando las fotos? Hay preguntas acerca de la camera o/y el tomo de fotos?

Explanación de lo que pasa despues de que toma las fotos.

1) Usted tendrá dos semanas para terminar de tomar las fotos. Cuando termina de tomar las fotos, puede mandarme la tarjeta de memoria por correo en este sobre y ponerla en el correo o puede llamarme y puedo recogerlo (937-360-8535). Si no lo recibo después de tres semanas de hoy, lo llamare para ver como va. Después,

yo revelare las fotos. En un mes reunimos para la ultima vez para hablar acerca de las fotos e identificar diferente influencias alrededor de su alimentación. Los grupos focales se realizaran en mi casa o otra lugar escogido por ustedes. Cuando es una buena fecha para ustedes? Donde? Refacción y antojitos serán servidos durante los grupos focales.

2) Hay preguntas acerca del proceso? Tiene comentarios o dudas acerca del proceso: como tomar fotos, mandar fotos, o los grupos focales?

3) Está bien que lo llame si no he recibido su tarjeta de memoria en tres semanas?

4) Finalmente, si hay un razón porque no puede participar en el grupo focal durante el tiempo indicado, avísame antes.

5) Por favor llámeme si tiene alguna duda durante el proceso.

6) Gracias por su tiempo y voluntad de participar en esta investigación.

Participant Handout
Photovoice Training

Participants

- ≥ 18 years old
- Have resided in Mississippi for at least 6 months
- Be Latino male from Mexico or Central America
- Be 1st or 2nd generation

Ethics
In the photograph process there are a few regulations that will protect your identity and others.

1) Do not take pictures of any persons including you. If there are any pictures of others or you they will be destroyed upon development

2) Do not take pictures of any street signs or houses.

3) All pictures that you take will be developed into doubles so you may have one set.

4) If there is a picture in the set that you believe could bring you or others harm you may indicate that you want it taken out and destroyed and it will be done.

5) What else would you like to discuss in regards to your and others' protection during this process? If you do have any questions during the process please call me!

6) We will now take time for you to sign the informed consent if you do agree with the contents on the form and what we just discussed.

Cameras and Photograph Protocol

The camera you will receive is a disposable camera that has 36 pictures. It has a flash so you can use it indoor. You will take pictures over one week.

1) A picture of everything you eat over two days. One day should be a weekend day and one should be a weekday: this included snacks, beverages, and meals. There is an example on page ___of your handout
    - Write down the times you ate the meal, snack or drank a beverage. (page ___)
    - Write how the food was prepared.
    - Note the portion of the meal you ate (make sure to include second and thirds)
    - Note whether you perceive the food or beverage as being a traditional food/beverage or one of the US.
2) A picture of each restaurant, convenient store or supermarket you enter and buy food in for one week (from Monday through Sunday). Also take a picture of what you bought in the place. If in the supermarket take a picture of your basket or items once you enter your house. If at a restaurant take a picture of your meal/drink. If at a convenient store take a picture of the food/beverage(s) bought.

3) During the week, take the pictures also take pictures of your cooking methods when you cook or someone in your house cooks at home. Everytime you or someone cooks for you take a picture while you/her/him are cooking. (Just remember – Do NOT take a picture of the face of the person cooking)

4) Take a picture of your cabinets and refrigerator i.e. where you store your food in you home.
5) Please take a picture of anything else that you believe creates a clear picture of your food intake/environment.

Explanation of Post-photo taking

6) You all will have two weeks to carry this out. When you finish taking your pictures over the seven days you can just drop your camera into this envelop and place it in the mail or you can contact me and I will pick it up when and where you designate. If I do not receive your camera within 2 ½ weeks I will call you to make sure all is okay. I will then develop the pictures. In one month we will all come back together and have a discussion about your pictures to identify different factors that influence your eating pattern. The focus group will happen in a neutral place.

Entrenamiento para Voz de Photo - Espanol

Participantes

> 18 anos de edad
Ha vivido en Misisipi por lo menos 6 meses
Es un hombre Latino de Mexico o America Central
Es primer o seguna generacion

Eticas
En el proceso de la fotographia hay algunas regulaciones que puede proteger su identidad y los de mas:

1) No tome fotos de una persona incluyendo a su mismo. Si hay fotos con gente o a su mismo, los fotos habrá destruidos después de su desarrolló.
2) NO tome fotos de la cartel de un calle o de una casa.
3) Todo los fotos que usted tome ser> a desarrollados y ustedes van a recibir una copia de sus fotos.
4) Si hay un foto que usted crea podría traer usted o otros daño, usted pude indicárselo y esta foto va a estar destruido.
5) Acerca de que mas le gustaria hablar acerca de su y otros protección durante este proceso? Si tiene usted preguntas durante el proceso, por favor llámeme!
6) Ahora vamos a tomar un tiempo para que firme el consentimiento informado si este de acuerdo con los contenidos de la forma y lo que hablamos

Cameras

Las cameras que vas a recibir son disponibles y pueden tomar 36 fotos. Ellas tienen flash entonces puede usarlos al dentro. Vas a tomar fotos durante una semana del siguiente.
- Un foto de cada comida o bebida que ingesta durante de tres días. Un día debería ser un día del fin de semana y las otras dos deberían ser de la semana. Toma una foto antes que coma la comida y una cuando termine. Hay un ejemplo en pagina ___.
  - Escribe los tiempos de cuando coma el plato de comida, refacción o tome un bebida (incluye bebidas alcohólicas)
  - Escribe como preparo la comida si tenía que preparar la comida como si estaba frito, horneado, hervida, al vapor, crudo etc…
  - Note la porción del plato de comida que comió (sea seguro a incluir según y tercer porciones). En pagina ___ hay en papel que puede usar como una referencia acerca de cuanto es una porción.
  - Note como si percibe la comida de una comida de EEUU o una comida tradicional.
- Tome una foto de cada restaurante, tiendita de conveniencia, tienda Latina, supermercado etc… que entre y compre comida durante la semana

(de Lunes a Domingo). Si es en un supermercado, tome una foto de lo que tiene en su canasta. Si esta en un restaurante tome fotos de su plato de comida y/o bebida. Si este de una tiendita tome una foto de la comida o bebida que compra.

- Durante la semana, tome una foto de los métodos que usted usa o que usa la persona que cocine para usted en su casa. Cada vez durante la semana que usted o la persona que cocine, tome una foto durante la preparación de la comida a las ollas, horno, y cosas que usan para cocinar (aceite, margarina, agua etc…). Solo recuerde que NO deberías tomar fotos de la cara de la persona que esta cocinado.
- Tome una foto del parte al dentro de tus gabinetes y refregadura. (Donde guarda su comida.)
- Por favor tomo un foto de cualquier otra cosa que use crea que hace una foto claro de su ambiental de comida o su alimentación nutricional.

Explanation of Post-photo taking
Explanación de los fotos después del desarrollo de los fotos

7) Usted va a tener dos semanas para terminar este proyecto. Cuando usted termine de tomar los fotos durante los siete días usted puede dejar sus cameras en el sobre que le di durante el entrenamiento y poner lo en el correo o usted puede contactarme y yo puede recogerlo donde y cuando usted quiere. Si no lo recibe las cameras antes de 2 semanas y media, le llamare para chequear a su progreso. Cuando tenga sus cameras voy a desarrollar los fotos. En un mes le llamare para que todo ustedes y yo podemos reunirnos, discutir los fotos, y identificarse factores que influye su alimentación. El grupo focal va a pasar en un lugar neutral y acesible.

!GRACIAS Y TENGA MUCHO DIVERSION!

APPENDIX D

REFLECTIVE MATRICES FOR THE BICULTURAL, TRADITIONAL AND

MARGINALZIED GROUP

Core Category: Bicultural group	Changing Gender Roles				
Processes (action/interaction)	Financial Provision	Cooking	Shopping	Gender roles	
Properties (characteristics of category)	Wife/husband share responsibility	Having part in cooking responsibility	Having part in food selection	Changed since moving to US	
Dimensions (property location on continuum)	Only man in COO, necessary, food expensive	Mom cooked in COO, learned to cook in US by mom/wife, prepares foods that aren't complicated	Does food shopping with wife, decision making, shared responsibility	Sharing responsibility, cooking, shopping, financial	
Contexts	Not being the sole provider	Changing foods in home b/c mom cooked traditional homemade meals in COO	Did not shop in COO	Increased decision making in terms of food	
Modes for understanding the consequences (process outcome)	Foods are expensive and needing two incomes	Mixes convenience (US foods) with traditional foods	Helping make food decisions	Accepting role	

Core Category: Bicultural group	Changing food Intake					
Processes (action/interaction)	Traditional foods	US foods: Convenience and processed	Fresh fruits and vegetables	Meats	Food diversity	Alcohol
Properties (characteristics of category)	Eating less	Eating more	Decreased	Eating some meat	Eating different foods	Change in intake
Dimensions (property location on continuum)	Decrease ingredient availability, time, expense, no mom, prefers	Price, availability, time, children's preference, lack cooking skills	Lack variety, quality, expensive, less flavor, lack of fresh markets, lack of farms	Vegetarian, differing flavor, eating healthy meats, fish, cleaner packaging, wife	Restaurants, wife, taste	More beer, less liquor, expensive
Contexts	Making them on weekends or occasionally	Increase intake of these foods	Eating fruits/vegetables less	Meat intake not changed much	Being exposed to different foods in COO and here	Exposure to alcholo
Modes for understanding the consequences (process outcome)	doesn't place high value on traditional foods places some value on trad. But less than OOC	Dimensions outweighing preference	Wanting to eat fruits but due to dimensions not having them as much as used to	Wanting to eat "healthy" meats.	Liking different foods, Not placing high value on one food	Drink less or same

Core Category Bicultural group	Nutrition related knowledge, values and attitudes					
Processes (action/interaction)	Traditional foods	US foods	Values	Struggle with healthy eating	Attitudes	Nutrition literacy
Properties (characteristics of category)	Healthy foods	Perception of foods	Healthy eating and traditional foods	Barriers to eating healthy	Diet change	High
Dimensions (property location on continuum)	Fresh, natural/organic, high in fruits, homemade, taking time to eat	Greasy, vending machines, snacks, chemicals, processed foods, packaged goods, nutrition label	Wife influence, reading labels, vegetarian, eating f/v, avoiding red meat/pork, eating fish, limiting sugars and salt, eating balanced, eating beans, traditional foods, social time	Time, money, lack of knowledge, lack of availability and access	Likes Diversity, likes traditional,	Food labels Pays attention
Contexts	Healthy eating environment	Non healthy accept have nutrition label	Valuing health and tradition (foods and social customs around food)	Wanting to eat more healthy	Prefers traditional and diverse foods	High literacy
Modes for understanding the consequences (process outcome)	Healthy eating in US not facilitated by environment	Incorporating these foods into diet more due to convenience.	More conscious about nutrition here due to not having the built environment; trying to eat traditional foods at times but okay if doesn't	Having knowledge to eat healthy but environment and personal economic status inhibits it.	Ok with not eating traditional foods	Using high literacy to make informed nutrition decisions

Core Category Bicultural group	Diet and Nutrition Related Disease				
Processes (action/interaction)	Learned	Heart Disease	Fruit/vegetables	Unhealthy	Cancer
Properties (characteristics of category)	Nutrition information	Affected by nutrition	Healthy	Processed, fast foods	Affected by nutrition
Dimensions (property location on continuum)	Parents School Wife books	High fat foods, cholesterol, obesity, overeating	Less available, less access, less natural, less fresh juices	Western diet, chemicals/preservatives, Not fresh, time, money, lack of knowledge	Red meats, processed foods
Contexts	Nutrition affecting health	Connecting nutrition to heart diesae	Plays some role in illness	Foods more unhealthy in US	Connecting nutrition to cancer risk
Modes for understanding the consequences (process outcome)	Understands and tries to apply knowledge gained to dietary behaviors	Preventing disease through healthy eating…making informed choices	Views organic, natural as healthy but hard to access here due to availability and cost	Not eating as healthy as one would like here; easier to eat healthy in COO due to environment…don't have to think about it.	Making informed choices

Core Category Bicultural group	Social Influence				
Processes (action/interaction)	Roommates	Wife	Mom	Kids	
Properties (characteristics of category)	N/A	Influencer	Traditional	Changing preference	
Dimensions (property location on continuum)		Health conscious preferences Cooking Shopping Traditional Western Special diets New foods	In home country Preference Shopped Prepared Taught Vegetarian Middle class	Traditional Western Processed Exposure Influences family	
Contexts		Eating according to wife	Mom cooked in home country	Child preference different than parents	
Modes for understanding the consequences (process outcome)		wife introduced him to new foods…influenced diet change	He or/and wife cook now	Parents prepare foods child will like/eat	

Core Category: Bicultural group	Adapting to Food Environment			
Processes (action/interaction)	Restaurants	Supermarkets	Grocery	Hispanic stores
Properties (characteristics of category)	Eating out 1/month to several times/week	Shopping in supermarkets 1- 4X/week	Occasionally	Shopping occasionally now but daily in COO
Dimensions (property location on continuum)	American food, Mexican, Italian, buffet, deli, steak, local, fast food, depends on personal preference or wife's, food variety, convenience, price, marketing, family	In COO (globalization), processed items, drive, US influenced, convenient. Less traditional items, not good produce/not natural, cheaper	More expensive, convenient	Exposure to convenience items in COO, traditional items in US,
Contexts	Eating diversity of foods	Shops there often	Not primary shopping spot	Shopping there as 2nd option
Modes for understanding the consequences (process outcome)	Likes foods from other countries	Convenience outweighs quality	Price outweighs convenience and quality	Offers some traditional items

Core Category Bicultrural group	Environment…continued				
Processes (action/interaction)	Community/social	Home environment	Eating out	Farmer's markets	Government
Properties (characteristics of category)	Valuing social time around food	Prefering to eat at home	Eating out but not often	Different than in COO	Food regulation
Dimensions (property location on continuum)	With family/friends, in home or restaurant, relaxing	Cooking with wife, cheaper, time, food decision making, ate in home in COO	Diversity of restaurants, time/tired, preference, quantity and price, special occasions, special dietary needs, sit down US restaurants, buffets, Mexican, delis	not good hours here, fresh/natural foods, more expensive	food packaging, food labeling
Contexts	Food environment changing	Prepares mixture of traditional and non-traditional foods	Increased availability and convenience; Becoming a part of lifestyle	Knows about it but most haven't shopped there	Safer food
Modes for understanding the consequences (process outcome)	Less social in US	Eating a variety of foods in home; no big value on traditional meals	Eating out more in US then in COO	Has availability but time and price outweigh want for fresh foods.	Cleaner food with nutrition info in US

Core Category Bicultural group	Accessing foods				
Processes (action/interaction)	Traditional	F/V	Convenience foods	Budget	
Properties (characteristics of category)	Readily eaten in home country	Not as accessible here	Readily accessible	Accounts	
Dimensions (property location on continuum)	Weekends here, cheaper/free in COO, markets, tiendas	Expensive, less variety, less fresh, imported, taxes, transportation	Cheaper..on budget, available	Eating healthy Supermarkets Eating at home	
Contexts	Spending more on food now	Buying less	Buying more	Eating healthy on budget	
Modes for understanding the consequences (process outcome)	Consuming less F/V	Intake decreasing	Consuming more	Trying to eat as healthy as possible on particular budget	

Core Category Traditional Group	Changing Gender Role			
Processes (action/interaction)	Financial (Low Economic)	Shopping	Cooking	Gender role beliefs
Properties (characteristics of category)	Sharing cost with roommates/wife	Going with roommates/wife	Cooking foods; sharing responsibility with roommates	Struggling with new food role
Dimensions (property location on continuum)	More money, employment, normal role, physical labor, wife works	Supermarket, once per week (less often), Hispanic stores,	Learning in US, calling home for recipes, trying different foods, cooking short cuts, traditional foods, canned/processed ingredients	Macho, social pressure, emotional issue, familism
Contexts	Having money for foods one wants	Did not do in home country, shops less often than in home country	Now having to cook foods; not as tasty	Food preparation Woman's obligation
Modes for understanding the consequences (process outcome)	Not spending as much of income on food in US although low economic for US standards	Having say in foods selected	Foods aren't ready when arrive home and not made with woman's love (familism), lacking skills	Adjusting to new role but prefer women to take care of the food role (Don't want to be hungry though)

Core Category Traditional group	Changing food intake					
Processes (action/interaction)	Traditional foods	US foods: Convenience and processed	Fresh fruits and vegetables	Meats	Food diversity	Alcohol
Properties (characteristics of category)	Decreasing	Pizza, hamburgers, fast food, convenience and processed foods	Decreased intake	Increase intake	Increasing diversity	Increased consumption
Dimensions (property location on continuum)	More processed ingredients, lacking mom/woman, time, emotional attachment, culture, Mexican restaurants, less fresh ingredients	Not accustomed, available, time (fast), inexpensive, US social influence, Supermarkets, frozen meals	Less fresh, less variety, less availability, less markets, expensive, less gardens/access	Packaged, high availability, income, less wild game, fish	Roommates cooking, eating out, US social pressure, availability, access	Availability, access, social pressure, emotion
Contexts	Eating mostly traditional foods although some from different regions	Increased consumption although not preference and significantly less than other acculturation groups.	Negative perception of F/V in US	Increased intake from 1-2/week to daily	Eating foods from other "Hispanic regions" made by roommates or Gringo provides	More variety and access to beer
Modes for understanding the consequences (process outcome)	Preparing for self or roommates preparing	Purchasing due to convenience, availability and time	Wanting to eat but not as much as COO due to dimesions (attitudes, beliefs, availability, access)	More income to buy meats and highly available, (Belief ..package = safe)	Tries new foods but prefers own traditional foods…struggles with this. Very grounded in own trad foods.	Drinking with friends; nothing else to do? Significant in social situations. Enjoying alcohol, price and availability make easy to increase consumption.

Core Category Traditional group	Food and nutrition-related beliefs/knowledge/attitudes					
Processes (action/interaction)	Traditional foods	US foods	Values	Struggle with healthy eating	Social influences	Nutrition literacy
Properties (characteristics of category)	Healthier, taste	Unhealthy but cleaner	Tradition	Barriers	Family and friends and kids	Low
Dimensions (property location on continuum)	More fresh, natural, more vegetables, less meats, 3 meals/day, best prepared by Mom, takes time/work especially without house wife. (not indicated on PS questionnaire)	Clean…packaged, chemicals, factory made, canned, pre-prepared, hamburgers, pizza, frozen meals (burritos), canned foods, mircrowaveable, stomach ache, not fresh (See food perception quantitative)	Woman cooking with love, food ready, freshness, homemade, 3 square meals, eating with others/family	Lack markets, cooking skill, preparation time, social influence, lacking knowledge, increased availability of processed/convenience foods	Roommates tension, change in gender role, housing structure, wife works (here), not knowing vendors here	Food label
Contexts	Lacking these dimensions in US	Not food preference	Connecting traditional food with being taken care of	Desires to eat healthy but dimensions inhibit	Influenced by roommates attitude to gender role change and food preference, women different in US, kids desiring American foods	Interpretation
Modes for understanding the consequences (process outcome)	Connects freshness with healthy; believs meats less healthy but eat more in US; attempts to recreate traditional foods with Processed ingredients found in	Believes not as healthy or good accept packaged meats	Emotional attachment to traditional food and meal times around traditional foods; feels no one takes care of him	Disconnect between wanting to eat healthy and eating healthy for has increase in fast food, processed foods and meat but decrease in fruit/vegetables	Tension between roommates over food, eat out more due to not wanting to cook (macho), sharing responsibility with wife, seeing change in kids food preferences (giving into kids wants)	Not accurate. Although not understanding labels, views them as containing truth about food health.

	US supermarkets in order to cut down on cooking time. Result of work schedule/lack of house wife.				

Core Category Traditional group	Diet and nutrition related to disease				
Processes (action/interaction)	Learned	Heart Disease	Fruit/vegetables	Unhealthy	Cancer
Properties (characteristics of category)	Places learned	Connecting	Healthy	Concern/lack of concern	Not related to nutrition
Dimensions (property location on continuum)	School, church, herbalife, low nutrition lit; "falty" nutrition health beliefs, DOCTOR, not much from family	Heart disease, fatty foods, grease, pork, high tortillas, meats, fast food, increase protein, fruit, vegetable	High in protein, emphasize, fresh (in home country), no pesticides/preservatives,	Meats, fast food, fryig, pork, tortillas, meat, chemicals	Injury, hereditary, not taught by parents
Contexts	Concerned about health	Concern about heart disease	Perceives as good	Eating more since moved to US	Lack of knowledge about cancer and nutrition
Modes for understanding the consequences (process outcome)	High respect for nutrition advice from doctors; parents not concerned…eat to survive.	Diet doesn't reflect heart disease knowledge/or high concern.	Doesn't eat diet high in F/V compared to COO.	Recognizing unhealthy diet but has minimal avoidance of these.	Disconnect between nutrition and cancer.

Core Category Traditional group	Social Influence			
Processes	Roommates	Wife	Mom	Kids
Properties	Reside with now	Cooking before	Cook	Preferences
Dimensions	Machismo, cooking, tension, shopping, sharing, eating with or alone, taking turns	IN home country, household obligation, decisions	Best, traditional foods, nurture, love, Not in US, recipes, food decisions	Changing to US, exposure, advertising, parenting
Contexts		Misses or desires wife	Misses food/MOm	Most live in Home country
	Prepares foods from other regions; eats out	Likes food ready when come home	Tries to recreate	globalization

Core Category: Traditional group	Adapting to food environment			
Processes (action/interaction)	Restaurants	Supermarkets	Grocery	Hispanic stores
Properties (characteristics of category)	Mexican and Chinese buffets, fast food, convenience stores	Walmart	Local stores	Local stores
Dimensions (property location on continuum)	Taste, traditional, cost, convenient/time, lacking cooking skills, time, taste, social influence (roommates, boss), eating alone	Familiar, convenient, some traditional ingredients, frozen foods, processed foods, packaged meats, canned, not fresh produce, one stop shopping, alcohol	Convenient, produce access	Traditional ingredient availability, alone or with roommates
Contexts	Eating traditional foods and US foods high in fat	Going once per week	Not primary shopping place	Shops there if supermarket lacks specific ingredient especially tortillas.
Modes for understanding the consequences (process outcome)	Eating out more in US	Walmarts also in home country so used to it although buys most of food items there here in US	Finds some produce,	Shopped in these stores daily in home country but less here

Core Category Traditional Group	Continuing…Environment			
Processes (action/interaction)	Community/social	Home environment	Eating out	Fresh markets
Properties (characteristics of category)	Missing in US	Roommates or wife/kids	More often	Farmer's markets
Dimensions (property location on continuum)	No relationship with vendors, eating meals alone, not with family, eating on the go	Taking turns, sharing, on own, tension, missing family/wife	Tired, convenient, lack cooking skills, social pressure	Not aware of, not convenient hours or location, lack comfortability (?), lacks transportation, not knowing vendors
Contexts	Not having social time around food lacking community with food vendors	Feels lonely unless has wife	Convenient stores, fast food, Mexican, buffets (Chinese)	Does not shop at farmer's markets in US
Modes for understanding the consequences (process outcome)	Feels there is a void around food b/c not with family but eats with roommates if they are home	Struggles with making foods or with roommates that refuse to make food due to machismo	Due to change in environment and gender role increase eating out; did not eat out often in home country although it is becoming more popular in urban areas due to globalization	Finds fresh produce daily at markets in home country and has relationship with vendors but lacking here. Decrease consumption of fruits and vegetables

Core Category Traditional group	Accessing food			
Processes (action/interaction	Traditional	Fruit/Vegetable	Convenience foods	Food budget
Properties (characteristics of category)	Traditional convenience ingredients inexpensive traditional fresh expensive	Inexpensive in home country; expensive here	Inexpensive in US	Having more money in US (more dispensable income)
Dimensions (property location on continuum)	Taste differences, Mexican stores expensive; decrease fresh and variety ingredients, lacking mom/woman, expensive	Government, no local produce…import, fertilizers	Processed, chemicals, frozen	Sending money home, alcohol, meat, employment, sharing cost
Contexts	Some traditional ingredients expensive	Decrease consumption in US	Increased intake of these foods	Higher intake of alcohol and meats due to more money
Modes for understanding the consequences (process outcome)	Trying to make traditional foods with processed ingredients b/c cheaper and less time/more convenient	Had local grown in home country or grew own. Markets close to house and shopped daily. Here f/v imported and expensive.	Seen as less expensive and more available than fruits and vegetables, only try to buy when fresh foods are not accessible although time influences.	Disconnect b/c see F/V as expensive here and do not eat as much but eat more meats/alcohol b/c spend less of income on food than in home country. With F/V other factors affect: convenience, availability, freshness, shopping only 1/week.

Core Category: Marginalized group	Changing gender role			
Processes (action/interaction)	Financial	Shopping	Cooking	Gender role
Properties (characteristics of category)	Sharing or sole provider (if single)	Sharing responsibility with wife or shops if single	Sharing with wife (75% wife, 25% male) or alone	Shares food responsibility with wife
Dimensions (property location on continuum)	Lifestyle, wife and husband work	Transportation, supermarkets, groceries, Hispanic stores, 2-4x/week	Having time, busy, both work, healthy foods, precooked, frozen, quick meals, grilling, traditional foods	American wife, grills, change
Contexts	Man sole provider in home country	Mom shopped in home country	Mom cooked in Home country	Woman responsible in home country
Modes for understanding the consequences (process outcome)	Both work to provide for lifestyle	Woman made decision in home country but he shares decision with wife	Teaching wife to make traditional dishes, cooking quick meals (non traditional) but grew up with homemade meals	Doesn't resist change

Core Category: Marginalized group	Changing food intake					
Processes (action/interaction)	Tradition al foods	US foods: Convenience and processed	Fresh fruits and vegetables	Meats	Food diversity	Alcohol
Properties (characteristics of category)	Consuming less	Consuming more	Consuming more or same	Consuming same but healthier meats	Exposed to different foods	Intake is frequent
Dimensions (property location on continuum)	America n wife, lifestyle (busy), ingredien t availabili ty	Quick, convenient, available, wife, cheap, busy lifestyle, sandwiches, chicken patties, hamburgers, fast food, lean cuisine, canned foods, microwaveable, frozen meals, supplements	Wife, child, health, less availability/a ccess, less fresh	Preference, grills, traditional meats, less red meat, more fish/chicke n	Wife, job, friends, travel, availabilit y	After work, beer
Contexts	Ate traditiona l , homema de foods growing up	Eating convenient/process ed foods	Mom did not make eat while growing up	Eating meats often	Accept food diversity	Drinking daily
Modes for understanding the consequences (process outcome)	Consumi ng on occasion when he cooks them; taught wife to cook them	Biggest factors are time and price (quote)	Wife prepares f/v and also eats to be example to child or because healthy	No change in intake and most do not worry about meat intake and health	Accept it but seem bitter that can't have traditional foods as often b/c of differ culture, lack of availabilit y	Consumi ng beer regularly for some to relax

Core Category: Marginalized group	Food and nutrition-related beliefs/knowledge/attitudes					
Process	Traditional foods	US foods	Values	Struggle with healthy eating	Attitudes	Nutrition literacy
Properties (characteristics of category)	Preferring foods	Negative and positive attitude	Differing	Indifferent; price and time	Negative towards US/Mississippi foods	Can interpret nutrition information
Dimensions (property location on continuum)	Prefers Mom's cooking, taste, traditional, restaurant, connection, cook it for self, big meals, family, healthy/unhealthy, filling	Hamburgers, pizza, convenience, quick, diverse, not fresh, less variety, genetic engineering, greasy. Less healthy	Health, traditional, family connection, taste, filling, fresh	Access, availability, job, travel, time, not important, did not eat healthy growing up, low f/v intake	Price, time consuming, lacking flavor, snacking too much, incomplete meals, lacking availability/traditional foods and ingredients	Reading Food label, not caring
Contexts	little availability of traditional foods	Eating majority US foods	*Missing values from COO	Food environment or attitude inhibits	Not always eating food preference; missing mom's cooking	Can read but some pay attention others don't care
Modes for understanding the consequences (process outcome)	Connects traditional foods to mom and has disconnect between wanting traditional and being okay with US and convenience/pref. of US foods (seems to struggle with wanting to be recognized as Latino but then wanting to fit into US society)	Liking taste of some US foods but really liking convenience of foods. Others eat b/c wife makes these foods	Bitter b/c not being able to obtain what one values here	Most do not put high importance on eating healthy although some did mention hard to due to time and price	Feeling "stuck" here for food preference not available Possibly using Mississippi/US factors as way to resolve struggle/bitterness with a diminished intake of traditional foods (and with it a diminished latino identity).	Understanding of healthy foods but price, food preference and convenience trump health at times

Core Category Marginalized group	Social influence			
Processes (action/interaction)	Roommates	Wife/Girlfriend	Mom	Kids
Properties (characteristics of category)	N/A	Food decisions together or wife mostly	Traditional cooking	Preferences and examples
Dimensions (property location on continuum)		Decision Influence health Fruits and vegetables Lowfat meats Western foods Restaurant choice meals	According to preference, traditional foods, always cooked, large meals, bought foods	US foods Snacks Vegetables Being an example Eating out preference
Contexts		Influencing intake	Doesn't live close to mom	Child negatively and positively impacts family eating
Modes for understanding the consequences (process outcome)		Prepares nontraditional foods	Desires/prefers traditional mom's cooking	Setting good example; buying foods child prefers

Core Category Marginalized group	Diet and nutrition related disease				
Processes (action/interaction)	Learned	Heart disease	Fruit/vegetables	Unhealthy	Cancer
Properties (characteristics of category)	Family and society	Related to nutrition	Perception around disease	High fat foods and processed foods	Some relation to nutrition but no important
Dimensions (property location on continuum)	School, media, military, family, sports	Salt, cholesterol, fatty foods	Bowel movements Weight loss Immune system No role Chemicals Preservatives	Heart disease	Everything related Healthy people and cancer Sun Environment Smoking
Contexts	Has heard about nutrition and disease	Connecting diet to heart disease	Connected to some diseases	Associated with US	Doesn't matter b/c everything can cause cancer
Modes for understanding the consequences (process outcome)	Able to connect some diseases to nutrition	Talking about being healthy but eating according to preference	Associated with some role in health but more unfresh in US	Feels can't avoid these foods due to price, convenience or preferences	Ignores link between cancer and diet

Core Category Marginalized group	Adapting to food environment				
Processes (action/interaction)	Restaurants	Supermarkets	Grocery	Hispanic stores	Fresh Markets
Properties (characteristics of category)	Variety	Common to shop there	Common to shop	Occasionally	Never
Dimensions (property location on continuum)	Fast food, Mexican, American restaurants, Sitdown, convenient, taste, family/social time	1/week, lacking quality, cheap, variety, convenient, affordable, lacking traditional ingredients	Better quality, increase traditional ingredients, expensive	Traditional ingredients, lacks variety and quality	Inconvenient hours Expensive Organic
Contexts	Exposure to US foods but limited traditional foods	Primary food shopping place	Secondary shopping place	Shopping when need specific ingredient that can't be found in other stores	Main shopping place in home country but decreases access here
Modes for understanding the consequences (process outcome)	Eating out is common but doesn't have authentic traditional options	Decrease availability of traditional foods and quality foods but cheap and convenient	Finding some traditional ingredients and better produce but limited shopping due to price	Shopped daily in home country due to convenience and was exposed to convenience/processed foods; here only at times.	Due to poor access to fresh markets do not have as much access to fresh, inexpensive produce

Core Category	Continuing…Environment		
Processes (action/interaction)	Community/social	Home environment	Eating out
Properties (characteristics of category)	Change from home to US	Eating with family or alone	Variety of restaurants
Dimensions (property location on continuum)	Family time, convenience/processed foods	Kids, convenience/processed foods, grill, snacks, quick meals	Social (family/friends/coworkers), taste, convenience/time
Contexts	Social time around homemade foods in COO here around restaurants or convenience foods	Time, kids and wife affecting foods eaten	Social time and food availability when busy
Modes for understanding the consequences (process outcome)	Less community/social time around foods, less homemade foods	Snacks for kids, being example of healthy eating, consuming quick meals	Exposure to different foods

Core Category Marginalized group	Accessing foods			
Processes (action/interaction)	Traditional	F/V	Convenience foods	Budget
Properties (characteristics of category)	Accessible in home country	Expensive in US	Cheaper in US	Food purchase
Dimensions (property location on continuum	Inexpensive, different economy, market variety, fresh foods, gardens	Supermarket, grocery, no gardens	Supermarket, grocery, time, affordable, different environment	Expensive foods Middle class
Contexts	Decreasing access to traditional foods	Decreasing due to affordability	Increasing consumption	Can afford preferred foods
Modes for understanding the consequences (process outcome)	Adapting to US foods	Not buying/accessing as many as in home country although some didn't prefer them in either place	Feel more affordable and available and have to eat them even if don't want to all the time.	See healthy foods as expensive so buy processed others buy according to preference

REFERENCES

Abraido-Lanza, A. F., Armbrister, A. N., Florez, K. R., & Aguirre, A. N. (2006). Toward a theory-driven model of acculturation in public health research. *American Journal of Public Health, 96*(8), 1342-1346.

Akresh, I. R. (December 2007). Dietary assimilation and health among Hispanic immigrants in the United States. *Journal of Health and Social Behavior, 48*, 404-417.

Angel, R. J., Angel, J. L., & T. D. (2008). A comparison of the health of older Hispanics in the United States and Mexico: Methodological Challenges. *Journal of Aging and Health [Serial Online], 20*(1), 3-31. Retrieved from http://jah.sagepub.com

Baranowski, T., Cullen, K., & Baranowski, J. (1999). Psychosocial Correlates of dietary intake: Advancing dietary intervention. *Annual Review of Nutrition*, *19*(1), 17.

Bazzano, L. A., Serdula, M. K., & Liu, S. (2003). Dietary intake of fruits and vegetables and risk of cardiovascular disease. *current Atherosclerosis Reports, 5*(6), 492-9.

Bermudez O. I., & Tucker K. L. (2003). Trends in dietary patterns of Latin American Populations, *Cadernos de Saude Publica, 19(Supl. 1)*, S87-S99.

Berry, J.W. (1997). Immigration, acculturation, and adaptation. *Applied Psychology: An International Review, 46*(1), 5-68.

Brisbois-Clarkson, T. D., McIsaac, T. M., Goonewardene, L. A., &Wismer, W. V. (2009). Modification and validation of a Macronutrient Preference Checklist for use in North America. *Appetite, 53,* 461-464.

Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology, 1*, 185–216.

Buriel, R. (1993). Acculturation, respect for cultural differences, and biculturalism among three generations of Mexican American and Euro-American school children. *Journal of Genetic Psychology*, *154,* 531-543.

Cabassa, L. J. (2003). Measuring acculturation: where we are and where we need to go. *Hispanic Journal of Behavioral Sciences, 25,* 127-146.

Carrera, P. M., Gao, X., Tucker, K. L.(2007). A study of dietary patterns in the Mexican-American population and their association with obesity. *Journal of the American Dietetic Association, 107,* 1735-1742.

Center of Disease Control (CDC). (2007). *Behavioral risk factor surveillance system: Prevalence and trends data, 2007* [Data file]. Retrieved from http://apps.nccd.cdc.gov

Centers for Disease Control (CDC) (2009). *Summary health statistics for U.S. Adults: 2007.* Table 2. Retrieved from http://www.cdc.gov/nchs/data/series/sr_10/sr10_240.pdf

Champagne, C. M., Bogle, M. L., McGee, B. B., Yadrick, K., Kramer, T. R., Allen, H. R., Dramer, T. R…Weber, J. (2004). Dietary intake in the lower Mississippi delta region: Results from the Foods of our Delta Study. *Journal of the American Dietetic Association, 104,* 199-207.

Chance, P. (1999). *Learning and behavior*. Pacific Grove, CA: Brooks/Cole.

Chavez-Martinez, A., Cason, K. L., Nieto-Monenegro, S., Williams, J. E., &Helay-Zitin, V. (2010). Assessment of predisposing, enabling, and reinforcing factors toward food choices and healthy eating among Hispanics in South Carolina. *Topics in Clinical Nutrition, 25*(1), 47-59.

Cooper, H. R. 1987. Texture in dairy products and its sensory evaluation. In H. R. Moskowitz (Ed.), *Food Texture* (pp. 251–272). New York, NY: Marcel Dekker.

Contento, I., Randell, J., & Basch, C. (2002). Review and analysis of evaluation measures used in nutrition education intervention research. *Journal of Nutrition Education & Behavior*, *34*(1), 2-25.

Cordain, L., Boyd Eaton, S., Sebastian, a., Mann, N., Lindeberg, S., Watkins, B.A.,…Brand-Miller, J. (2005). Origins and evolution of the Western diet: Health implications for the 21st century. *American Journal of Clinical Nutrition, 81,* 341-354.

Corbin, A., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology, 13*(1), 3-21.

Coronado GD, Thompson B, McLerran D, Schwartz SM, &Koepsell TD. (2005). A short acculturation scale for Mexican-American populations. *Ethnicity and Disease, 15*(1), 53-62.

Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions.* Thousand Oaks, CA: Sage.

Cuellar,I., Arnold, B., & Gonzalez, G. (1995).Cognitive referents of acculturation: Assessment of cultural constructs in Mexican Americans. *Journal of Community Psychology, 23,* 339-356.

Cuéllar, I., Arnold, B., & Maldonado, R. (1995). Acculturation Rating Scale for Mexican Americans-II: A revision of the original ARSMA scale. *Hispanic Journal of Behavioral Sciences, 17*(3), 275-304.

Cuellar, I., Harris, L. C., & Jasso, R. (1980). An acculturation scale for Mexican-American normal and clinical populations. *Hispanic Journal of Behavioral Sciences, 2*(3), 199-217.

Cuy Castellanos, D. K., Connell, C., Lee, J. (in press). Factors affecting weight gain and dietary intake in Latino males residing in Mississippi: A preliminary Study. *Hispanic Healthcare International.*

Dixon, L. B., Sundquist, J., & Winkleby, M. (2000). Differences in energy, nutrient, and food intakes in a US sample of Mexican American women and men: Findings from the hird national health and nutrition examination survey. *American Journal of Epidemiology, 152*(5), 548-557.

Drewnowski, A. (1997). Taste preference and food intake. *Annual Review in Nutrition, 17,* 237-253.

Drewnoski, A. & Hann, C. (1999). Food preferences and reported frequencies of food consumption as predictors of current diet in young women. *The Journal of Clinical Nutrition, 70,* 28-36.

Duffey, K. J., Gordon-Larsen, P., Ayala, G., X., & Popkin, B. M. (2008). Birthplace is associated with more adverse dietary profiles for US-born than for Foreign-born Latino adults. *Journal of Nutrition, 138*, 2428-2435.

Elder, J.P., Ayala, G.X., Parra Medina, D., & Talavera, G.A. (2009) Health promotion in the Latino community: Communication issues and approaches. *Annual Review of Public Health*, *30*, 227-251.

Falk, L., Sobal, J., Bisogni, C., Connors, M., & Devine, C. M. (2001). Managing healthy eating: Definitions, classifications, and strategies. *Health Education and Behavior, 28*(4), 425-439.

Fitzgerald, E., Bunde-Birouste, A., & Webster, E. (2009). Through the eyes of children: Engaging primary school-aged children in creating supportive school environments for physical activity and nutrition. *Health Promotion Journal of Australia, 2,* 127-132.

Flores, G., Bauchner, H., Feinstein, A. R., & Nguyen, U. S. (1999). The impact of ethnicity, family income, and parental education on children's health and use of health services. *American Journal of Public Health, 89*(7), 1066-1071.

Ford, E. S., Giles, W. H., & Dietz, W. H. (2002). Prevalence of the metabolic syndrome among US adults: Findings from the third National Health and Nutrition Examination Survey. *Journal of the American Medical Association, 287,* 356-359.

Franzini, L., Ribble, J. C., &Keddie, A. M. (2001) Understanding the Hispanic paradox. *Ethnicity and Disease, 11,* 496-518.

Gao, X., Yao, M., McCrory, M. A., Ma, G., Li, Y., Roberts, S. B., & Tucker, L. K. (2003). Dietary pattern is associated with homocysteine and B vitamin status in an urban Chinese population. *Journal of Nutritional Epidemiology, 133,* 3636-3642.

Garcia, L., Hurwitz, E. L., &Kraus, J. F. (2005). Acculturation and reported intimate partner violence among Latinas in Los Angeles. *Journal of Interpersonal Violence, 20,* 569-590.

Glaser, B. G. (2007). Remodeling grounded theory. *Historical Social Research, 19,* S47-S68.

Glenn, S. S., Ellis, J., & Greenspoon, J. (1992). On the revolutionary nature of the operant as a unit of behavioral selection. *American Psychology, 47*(11), 1329–1336.

Goel, M. S., McCarthy, E. P., Phillips, R. S., & Wee, C. C. (2004). Obesity among US immigrant subgroups by duration of residence. *Journal of the American Medical Association, 292,* 2860-2867.

Goody, C. M., & Drago, L. (2010). *Cultural food practices*. Diabetes Care and Education Dietetic Practice Group: American Dietetic Association: Chicago, IL.

Gordon-Larsen, P., Harris,K. M.,Ward, D. S., & Popkin, B. M. (2003). Acculturation and overweight-related behaviors among Hispanic immigrants to the US: The National Longitudinal Study of Adolescent Health. *Social Science &Medicine, 57*, 2023-2034.

Greene, J.C., Caracelli, V.J., & Graham, W.F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis, 11*, 255-274.

Green, L., & Kreuter, M. (1999). *Health promotion planning: An educational and environmental approach*, (3rd ed.). Mountain View, CA: Mayfield.

Gregory-Mercado, K. Y., Staten, L. K., Ranger-Moore, J., Thomson, C. A., Will, J. C., Ford, E. S…Marshall, J. (2006). Fruit and vegetable consumption of older Mexican-American women is associated with their acculturation level. *Ethnicity & Disease, 16*, 89-95.

Grundy, S. M., Blackburn, G., Higgins, M., Lauer, R., Perri, M. G. & Ryan, D. (1999). Physical activity in the prevention and treatment of obesity and its comorbidities. *Medicine & Science in Sports & Exercise, 31*(11), S502.

Grutzmacher, S. (2009, November). *Nutrition literacy among food stamp eligible adults: Implications for nutrition label, MyPyramid and food advertising policies*. Presented at the 137th American Public Health Association, Philidelphia, PA. Abstract retrieved from http://apha.confex.com

Guendelman, S. & Abrams, B. (January 1995). Dietary intake among Mexican-American women: Generational differences and a comparison with White non-Hispanic women. *Journal of Public Health, 85*(1), 20-25.

Harnack, L., Block, G., & Lane, S. (1997). Influence of selected environmental and personal factors on dietary behavior for chronic disease prevention: A review of the literature. *Journal of Nutrition Education*, *29*(6), 306-312.

Hartwegg, D. L. &Isabelli-Garcia, C. (2007). Health perceptions of low-income, immigrant Spanish-speaking Latinas in the United States. *Hispanic Health Care International, 5*(2), 53-63.

Hinkle, A. J., Mistry, R., McCarthy, W. J., & Yancey, A. K. (2008). Adapting a 1% or less milk campaign for a Hispanic/Latino population: The Adelante Con Leche Semi-descremada 1% experience. *American Journal of Healthy Promotion, 23*(2),108-111.

Hoepfl, M. E. (1997). Choosing qualitative research: A primer for technology education researchers. *Journal of Technological Education, 9*(1), 47-63.

Horacek, T., Koszewski, W., Young, L., Miller, K., Betts, N., & Schnepf, M. (2000). Development of a peer nutrition education program applying PRECEDE-PROCEED: A program planning model. *Topics in Clinical Nutrition*, *15*(3), 19.

Howat, P., Jones, S., Hall, M., Cross, D., & Stevenson, M. (1997). The PRECEDE-PROCEED model: Application to planning a child pedestrian injury prevention program. *Injury Prevention, 3*(4), 282-287.

Huh, J., Prause, J., & Dooley, C. (2008). The impact of nativity on chronic diseases, self-rated health and comorbidity status of Asian and Hispanic immigrants. *Journal of Immigrant & Minority Health*, *10*(2), 103-118.

Husseini, A., Abu-Rmeileh, N. M. E., Mikki, N., Ramahi, T. M., Ghosh, H. B., Barghuthi, N…Jervel, J. (2009). Cardiovascular diseases, diabetes mellitus, and cancer in the occupied Palestinian territory. *Lancet, 373,* 1041-1049.

Institute of Medicine. (2004). *Health literacy: A prescription to end confusion*, Washington, DC: National Academies Press.

Jurkowski, J. M., & Paul-Ward, A. (2007). Photovoice with vulnerable populations: Addressing disparities in health promotion among people with intellectual disabilities. *Health Promotion Practice Online First*, *X,* 1-8. doi:10.1177/1524839906292181

Johnson, R. B., Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Education Research, 33*(7), 14-26.

Kaplan, M.S., Huguet, N., Newsom, J.T. & McFarland, B.H. (2004). The association between length of residence and obesity among Hispanic immigrants. *American Journal of Preventive Medicine, 27*(4), 323-326.

Kegler, M., & Miner, K. (2004). Environmental health promotion interventions: Considerations for preparation and practice. *Health Education & Behavior*, *31*(4), 510-525.

Keith, S., & Doyle, E. (1998). Using PRECEDE/PROCEED to address diabetes within the Choctaw Nation of Oklahoma. *American Journal of Health Behavior*, *22*(5), 358-367.

Kemp, C. (2005). *Mexican & Mexican-Americans: Health beliefs & practices. Medical/Spanish site at South Texas Community College.* Retrieved from http://bearspace.baylor.edu?Charles_Kemp/www/hispanic_health.htm

Kittler, P. G., & Sucher, K. P. (1998). *Food and culture.* Florence, KY: Cengage Learning.

Lancaster, K., Walker, W., Vance, T., Kaskel, P., Arniella, G., & Horowitz, C. (2009). Food for life/Comida para la vida: Creating a food festival to raise diabetes awareness. *Program Community Health Partnership, 3*(4), 359-363.

Lara, M., Gamboa, C., Iya Kahramanian, M., Morales, L.S., & Hayes Bautista, D.E.,
(2005). Acculturation and Latino health in the United Status: A review of the
literature and its sociopolitical context. *Annual Review in Public Health, 26,* 367-
397.

Landrine, H.,&Klonoff, E. A. (2004). Culture change and ethnic-minority health
behavior: An operant theory of acculturation. *Journal of Behavioral Medicine,
27*(6), 527-552.

Lerman, IG., Villa, A.R., Martinez, C.L., Turrubiatez, L.C., Salina, C.A.A., Wong, B.,…
Gutierrez Robledo, L. M.. (1998, November). The prevalence of diabetes and
associated coronary risk factors in urban and rural older Mexican populations.
Journal of the American Geriatrics Society, 46(11), 1387-1395.

Loftas, T., Ross, J., Lean, G., Hinrichsen, D., Lean, M., Graves, C., & Lowrey, P.
(Eds.). (1995). *Staple foods what do people eat? Dimensions of Need – An atlas
of food and agriculture.* Rome, Italy: Food and Agriculture Organization.

McCabe-Sellers, B. J., Bowman, S., Stuff, J. E., Champagne, C. M., Simpson, P. M. &
Bogle, M. B. (2007). Assessment of the diet quality of US adults in the Lower
Mississippi Delta. *American Journal of Clinical Nutrition, 86*(3), 697-706.

Mirsa, A., & Ganda, O.P. (2007). Migration and its impact on adiposity and type 2
diabetes. *Nutrition, 23,* 696-708.

Marin, G. (1992), Issues in the Measurement of Acculturation among Hispanics. In
Kurt F. Geisinger (Ed.), *Psychological testing of Hispanics* (pp. 235-251).
Washington, DC: American Psychological Association.

Marin, G., &Gamba, R.J. (1996) A new measurement of acculturation for Hispanics: the bidimensionalacculturation scale for Hispanics (BAS). *Hispanic Journal of Behavioral Sciences*, *18*, 297–318.

Marín, G., Sabogal, F., Marín, B. V., Otero-Sabogal, R., & Perez-Stable, E. J. (1987). Development of a short acculturation scale for Hispanics.*Hispanic Journal of Behavioral Sciences*, *9*, 183-205.

Matsushita, Y., Mizoue, T., Takahashi, Y., Isogawa, A., Kato, M., Inoue, M.,… Tsugane, S. (2009). Taste preferences and body weight change in Japanese adults: The JPHC Study. *International Journal of Obesity, 33,* 1191-1197.

Mazur, R. E., Marquis, S., & Jensen, H. H. (2003). Diet and food insufficiency among Hispanic youths: Acculturation and socioeconomic factors in the third National Health and Nutrition Examination Survey. *American Journal of Clinical Nutrition, 78*, 1120-1127.

McArthur, L. H., Viramontez Anguiano, R. P., & Nocetti, D. (2001). Maintenance and change in the diet of Hispanic immigrants in Eastern North Carolina. *Family and Consumer Sciences Research Journal, 29,* 309-335.

Mier, N., Ory, M., & Medina, A. (2010). Anatomy of culturally sensitive interventions promoting nutrition and exercise in Hispanics: A critical examination of existing literature. *Health Promotion Practice*, *11*(4), 541-554.

Montez, J. K., & Eschbach, K. (2008). Country of birth and language are uniquely associated with intakes of fat, fiber, and fruits and vegetables among Mexican-American women in the United States. *Journal of the American Dietetic Association, 108*, 473-480.

Murtaugh, M.A., Sweeney, C., Giuliano, A. R., Herrick, J. S., Hines, L., Byers, T...Slattery, M. L. (2008). Diet patterns and breast cancer risk in Hispanic and non-Hispanic white women: The Four-Corners Breast Cancer Study, *American Journal of Clinical Nutrition, 87*(4), 978-984.

National Research Council. (2002). *Emerging issues in Hispanic health: Summary of a workshop.* Washington, DC: National Academy Press.

Neuhouser, M., Thompson, B., Coonado, G. D., & Solomon, C. C. (2004). Higher fat intake and lower fruit and vegetable intakes are associated with greater acculturation among Mexicans living in Washington State. *Journal of the American Dietetic Association, 104*, 51-57

Nguyen, AM. D., & Benet-Martinez, V. (2007). Biculturalism unpacked: Components, measurement, individual differences, and outcomes. *Social and Personality Psychology Compass, 1*(1), 101-114.

Neuhouser, M., Thompson, B., Coonado, G. D., & Solomon, C. C. (2004). Higher fat intake and lower fruit and vegetable intakes are associated with greater acculturation among Mexicans living in Washington State. *Journal of the American Dietetic Association, 104*, 51-57

Perez-Escamilla, R., Hromi-Fiedler, A., Vega-Lopez, S., Bermudez-Millan, A., & Segura-Perez, S. (2008). Impact of peer nutrition education on dietary behaviors and health outcomes among Latinos: A systematic literature review. *Journal of Nutrition Education & Behavior*, *40*(4), 208-225.

PEW Hispanic Center. (2007). *Demographic profile of Hispanics in Mississippi – 2007.*

[Data File]. Retrieved from http://pewhispanic.org/states/?stateid=MSone

Pierce, R. C., Clark, M. M., & Kiefer, C. W. A. (1972). "Bookstrap" scaling technique.

Human Organization, 31, 403-410

Popkin, B. M. (1993). Nutritional patterns and transitions. *Population Development*

Review 19, 138–57.

Popkin, B. M., & Udry, J. R. (1998). Adolescent obesity increases significantly in second

and Third generation US immigrants: The national longitudinal study of

adolescent health. *The Journal of Nutrition, 128*(4), 701-706.

Psychosocial. (n.d.). In *Stedman's* (6th ed.). Philadelphia, PA:

Lippincott Williams & Wilkins

Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in

the general population. *Applied Psychological Measurement, 1*(3), 385-401.

Rissanen, T. H., Voutilainen, K. N., Salonen, R., Kaplan, G. A., & Salonen, J. T. (2003).

Serum lycopene concentrations and carotid atherosclerosis: The Kuopio

Ischaemic heart disease risk factor study. *American Journal of Clinical Nutrition,*

77(1), 133-138.

Rozin, P., & Vollmecke, TA. (1986). Food likes and dislikes. *Annual Review of*

Nutrition, 6, 433–56.

Ryder, A.G., Alden, L.E., &Paulhus, D.L. (2000). Is acculturation unidimensional or

bidimensional? A head-to-head comparison in the prediction of personality, self-

identity, and adjustment. *Journal of Personality and Social Psychology, 79*(1), 49-

65.

Santibanez, T. A., Zimmerman, R. K., Nowalk, M. P., Jewell, I. K., & Bardella, I. J. (2004). Physician attitudes and beliefs associated with patient pneumococcal polysaccharide vaccination status. *Annals of Family Medicine, 2*(1), 41-48.

Satia-Abouta, J. (June 2003). Dietary acculturation: Definition, assessment, and implications. *International Journal of Human Ecology, 4*(1), 71-86.

Satia-Abouta, J. Patternson, R. E., Kristal, A. R., Teh, C., & Tu, S. (2002). Psychosocial predictors of diet and acculturation in Chinese American and Chinese Canadian women. *Ethnicity and Health, 7*(1), 21-39.

Skinner, B. F. (1953). *Science and human behavior.* NewYork: Macmillan.

Schwartz, L. R., Sable, M. R., Dannerbeck, A., & Campbell, J. D. (2007). Using Photovoice to improve family planning services for immigrant Hispanics. *Journal ofHealth Care of the Poor and Underserved, 18*(4), 757-766.

Silk, K. J., Sherry, J., Winn, B., Keesecker, N., Horodynski, M. A., & Sayir, A. (2008, January-February). Increasing nutrition literacy: Testing the effectiveness of print, we site, and game modalities. *Journal of Nutrition Education and Behavior, 40*(1), 3-10.

Smith, A.B. &Ramirez, R. (2000) & Reines, L. (2005). *Mexican: cultural profile*. *Harborview Medical Cente/University of Washington.* Retrieved from http://ethnomed.org/ehtnomed/cultures/hispanic/mexican_cp.html.

Smith, J., Lensing, S., Horton, J. A., Lovejoy, J., Zaghloul, S., Forrester I.,…Bogle ML. (1999). Prevalence of self-reported nutrition-related health problems in the Lower Mississippi Delta. *American Journal of Public Health*, *89*, 1418-1421.

Sobal, J. (2001). Sample extensiveness in qualitative nutrition education research. (2001). *Journal of Nutrition Education and Behavior, 33*, 184-192.

Stein, K. (2009). Cultural competency: Where it is and where it's headed. *Journal of the American Dietetic Association*, *109*(3), 388-394.

Strauss, A., & Corbin, J. (1989). Grounded theory's applicability to nursing diagnostic research. *Monograph of the Invitational Conference on Research Methods for Validating Nursing Diagnoses: Palm Springs, California* (pp. 4-24). Philadelphia, PA: North American Nursing Diagnosis Association.

Streng, J. M., Rhodes, S. D., Ayala, G. X. Eng, E., Arceo, R., & Phipps, S. (2004, November). Realidad Latina: Latino adolescents, their school, and a university use photovoice to examine and address the influence of immigration. *Journal of Interprofessional Care, 18*(4), 403-415.

Townsend, M. & Kraiser, L. (2005) Development of a tool to assess psychosocial indicators of fruit and vegetable Intake for 2 federal programs. *Journal of Nutrition Education and Behavior*, *37*(4), 170-184.

Ulin, P. R., Robinson, E. T., &Tolley, E. E. (2004). *Qualitative methods in public health: A field guide for applied research*. San Fransisco, CA: Jossey-Bass A. Wiley.

US Census Bureau. (2002). *American Community Survey 3 year estimates* [Data file]. Retrieved from http://www.census.gov

US Census Bureau. (2007). *American Community Survey 3 year estimates, 2005-2007* [Data file]. Retrieved from http://www.census.gov

US Census Bureau (2008). *State and County QuickFacts.*[Data File]. Retrieved from http://quickfacts.census.gov/qfd/states/28000.html

US Census Bureau (2009). *Table 4: Estimates of the resident population by race and Hispanic origin for the United States and States: July 1, 2008 (SC-EST2008-04).*Washington, DC : U.S. Census Bureau.

Vaughn, L. M., Rojas-Guyler, L. & Howell, B. (2008). "Picturing" health: A photovoice pilot of Latina girls' perceptions of health. *Family Community Health, 31*(4), 305-316.

Wakimoto, P., Block, G., Mandel, S., & Medina, N. (2006). Development and reliability of brief dietary assessment tools for Hispanics [serial online]. *Prevention and Chronic Disease, 3*(3). Retrieved from http://www.cdc.gov/ped/issues/2006/jul/05_0117.htm

Wang, C. (1999). Photovoice: A participatory action research strategy applied to women's health. *Journal of Women's Health, 8*(2), 185-192.

Wang, C., & Pies, C. (2004). Family, maternal and child health through photovoice. *Maternal and Child Health Journal, 8*(2), 95-102.

Wei, M, Valdez, R., Mitchell, B., Haffner, S., Stern, M., & Hazuda, H. (1996). Migration status, socioeconomic status, and mortality rates in Mexican Americans and non-Hispanic Whites: The San Antonio Heart Study. *Annals of Epidemiology, 6,* 307–313.

Weiss, B. D., Mays, M. Z., Martz, W., Castro, K. M., DeWalt, D. A., & Pignone, M. P. (2005). Quick assessment of literacy in primary care: The newest vital sign. *Annual Family Medicine, 3,* 514-522.

Wilson, L. L. (2009). Parenting practices, adolescent health behaviors, acculturation, and perceptions about family education: Implications for developing culturally appropriate Latino family interventions. *Hispanic Health Care International, 7*(4), 213-223.

Wilson Scott, K., & Howell, D. (2008). Clarifying analysis and interpretation in Grounded Theory: Using a conditional relationship guide and reflective coding matrix. *International Institute for Qualitative Methodology, 7,* 1-15. Retrieved from http://creativecommons.org/licenses/by/2.0

Wolcott, H. F. (1994). *Transforming qualitative data: Description, analysis and interpretation.* Thousands Oak, CA: Sage

Yeh, M., Viladrich, A., Bruning, N., & Roye, C. (2009). Determinants of Latina obesity in the United States: The role of selective acculturation. *Journal of Transitional Nursing, 20,* 105-115. Retrieved from http://tcn.sagepub.com