

The Impact of Acculturation and Environmental Change on Dietary Habits, Weight Gain, and Cultural Practices among Hmong Adults and Children in Minnesota.

A DISSERTATION
SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL
OF THE UNIVERSITY OF MINNESOTA
BY

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

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August 2009

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Acknowledgements

First and foremost, I want to thank those in the Hmong community that shared a piece of their life through participating in this project. Their thoughts and experiences provided invaluable information about how changes in one's environment impacts food choice, food access, dietary intake, and health. I am especially grateful for the leaders and key informants in the Hmong community, their constant support and willingness to help provide access to the Hmong community for this project, their willingness to recruit participants, the space they provided us throughout the project, and overall, their genuine concern about the well-being of current and future generations of Hmong adults and children in their community.

I am also extremely thankful for my adviser, Dr. Chery Smith, for her constant support, guidance, advice, and knowing when to let me be more independent, but also providing assistance when needed throughout this project. I am grateful for all of the opportunities she has given me that have enhanced my professional skills and abilities through research, publishing, and teaching. I am also appreciative for her willingness to work on a project that has been rewarding not only professionally, but also personally given my unique academic interests. I would also like to extend a special thank you to my committee members, Drs. Mary Story, Lisa Harnack, and Jean Langford, for their advice, guidance, support, and encouragement throughout this project. The experiences I have gained from my entire committee have aided in strengthening my research and writing skills and will continue to help me in future endeavors.

I would also like to thank the graduate and undergraduate students that assisted with various aspects of the project. Hannah Miller, an undergraduate student, assisted with transcribing focus groups. Graduate students, Kristen Dammann and Amanda Martin, assisted with the data collection process for the Hmong child survey. Urvashi Pokhriyal assisted with recruitment, data collection, and data entry for the Hmong child survey, which was greatly appreciated and I truly enjoyed sharing the final phase of my dissertation project with her.

Finally, I would like to thank my family, friends, and my fiancé, who offered encouragement, support, advice, and listening ears, throughout my graduate school experience at the University of Minnesota. I especially thank them for having confidence in me, believing in me, and helping shape me into the person I am today.

Dedication

To all those in the Hmong community who supported the project and shared their thoughts and life experiences with us in the hopes of bettering the health of current and future generations of Hmong

Abstract

This study assessed the impact of environmental change and acculturation on Hmong adults and children, who have lived in the United States (US) for varying amounts of time, by investigating changes in food system access, grocery purchasing influences, eating behavior, BMI, and health status. This research has shown how the combination of quantitative (Geographical Informational Systems software and census data, food store surveys, acculturation assessment, food frequency questionnaire, theory based survey) and qualitative (focus group discussions) methodologies has the potential to provide a more complete picture of how immigrants adapt to their new food environments. As more immigrants become introduced to food secure, obesogenic environments, such as the US, it will be important to examine how this transition impacts the health of current and future generations.

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Chapter 1

Literature Review:

**The Impact of Acculturation and Environmental Change on Dietary Habits,
Weight Gain, and Cultural Practices among Hmong Adults and Children in
Minnesota**

INTRODUCTION

Throughout history the Hmong have undergone hardships and relocations, exposing them to environmental and lifestyle changes as they have adapted and borrowed from their surroundings. Their series of resettlements began between 1810 and 1820 when many left southern China for the highlands of Laos due to clashes with, and domination by, the Han Chinese¹. While in Laos many helped the US military during the Vietnamese conflict and consequently became a target of oppression and retaliation². During the Vietnam War, the Hmong were enrolled by the Central Intelligence Agency (CIA) to fight in what would later be called the ‘Secret Wars of Laos,’ which took place from 1961 to 1975³. The Wars were intended to halt Communist advances and stop the North Vietnamese Army from using Laos as a trail to fight American troops in South Vietnam³. Laos held an important geopolitical position being at the center of the Cold War in Southeast Asia⁴. There was a fear that if Laos fell to the Communists, Thailand would follow, and potentially Southeast Asia altogether⁵.⁶ Subsequently many left Laos and resettled in Thailand into refugee camps where living conditions were not optimal and they suffered many adversities including psychosocial distress and food insecurity^{7,8}. As the Indochinese war came to a close in the late 1970s, many sought refuge in Western countries such as France, Australia, and the US². According to the US Census Bureau almost 170,000 Hmong are living in the US⁹. Refugee resettlement services placed Hmong into several American cities irrespective of family clan associations and through secondary migration groups were reunited largely in California and Minnesota¹⁰. From 1990 to 2000, the Hmong population in Minnesota drastically increased by 135%⁹. It is estimated that between 42,000 and 70,000 Hmong live in Minnesota^{9,11}.

Obesity in the Hmong

The Hmong are a minority group in the US who have not only seen increases in population density but also in chronic diseases related to obesity. Obesity has been evaluated in Hmong children by taking anthropometric assessments, such as height and weight, then calculating body mass index (BMI)¹². Anthropometric assessments in adults, such as BMI, may be influenced by nativity, years lived in the US, and

socioeconomic status. Lauderdale and Rathouz¹³ found that Asian Americans born in the US were significantly more likely to be obese or overweight than their foreign-born counterparts and number of years foreign-born Asian Americans lived in the US was associated with an increased likelihood of being overweight or obese. Researchers have found that adult Hmong population samples have average BMI's in the overweight and/or obese category across ages and genders^{14, 15, 16, 17}. Research with Hmong infants and children has also shown a high incidence of stunting and overweight^{18, 19, 20, 12, 21}. And, compared to white counterparts, Hmong adolescents were at a higher risk for obesity, dissatisfaction with their body, and practicing unhealthy weight management behaviors²².

Dietary Acculturation

Traditionally, the Hmong have eaten a staple diet of long-grain rice, vegetables, and supplemented it with chicken, duck, pork, fish and wild game, with food typically boiled, roasted, or steamed¹⁰. In the US however, as with other immigrant families, the Hmong have experienced shifts in their cultural framework associated with daily life²³. As they have transitioned into the US, lifestyle changes have included decreased physical activity²⁴, increased consumption of “Western” foods and decline in traditional foods^{25, 21}, and a higher prevalence of chronic diseases such as diabetes, hypertension, and cancer^{26, 14, 27}. Harrison et al.²⁸ hypothesized that dietary acculturation occurs rapidly in their new environment because of heavily marketed unhealthy foods and a lack of reinforcement associated with traditional healthy foods. Researchers have shown that after immigration to Western countries, Asian cultures such as Chinese, Korean, Japanese, and Hmong usually have increased food consumption in variety, food groups, and “Western” foods, while traditional food consumption decreases^{29, 30, 31, 21, 32}. Acculturation often describes the progression of a minority group adopting cultural patterns of a dominant/host group³³. Throughout this process individual's are acquiring, sustaining, and/or discarding values and behaviors of the original and host culture^{34, 35, 36, 37}. Dietary acculturation occurs when individuals from a migrating group adopt eating behaviors similar to the host/dominant group^{38, 39}. Traditional foods may be

maintained or modified, while others are rejected, or dietary patterns of the host population may be fully adopted^{39, 40, 41, 42, 43, 44, 45}.

While acculturation happens at different rates, second generation immigrants typically display increased patterns of risk factors and disease that reflect individuals in their new surroundings. Harrison et al.²⁸ found that Asian American parents would frequently give in to their children's desire to consume and purchase heavily marketed products that were not as nutrient dense compared to healthier foods provided at home or school. Households where parents both worked also discussed the "lure of fast food" because of its accessibility, decreased price, and efficiency²⁸. Kudo et al.³⁰ found that US born Japanese-American daughters ate fewer meals per day, had higher mean frequencies of takeout foods and eating out, lower consumption of traditional Japanese complement foods, and had an elevated intake of salty snacks, soft drinks, and alcoholic beverages compared to US born Japanese-American mothers. Xiong et al.²³ looked at how Southeast Asian immigrant adolescence may modify their values and attitudes toward the country of residence, while parents may resist these shifts. Specifically, Hmong parents discussed providing clothes, cultural education, and food as qualities of good parents, whereas none of the adolescents discussed these qualities²³. Expectations and ideas concerning relationships and social conventions may be very different between parents and adolescents when faced with dueling cultural norms.

Physical Inactivity

A higher prevalence of overweight and obesity in the Hmong community has not only been the result of dietary modifications but also higher levels of physical inactivity. Energy expenditures have been on the decline in work, home, travel and leisure environments in the US⁴⁶ and the Hmong have followed this trend. Kandula and Lauderdale²⁴ found that, compared to US born non-Asians, Asian Americans did not meet recommended physical activity levels and had weekly energy expenditures that were significantly lower. Stang et al.²² found that Hmong adolescents had lower levels of physical activity and reported being more inactive than white counterparts. For some immigrant populations decreased physical activity levels have been associated with disproportionate provisions of activity-related resources and facilities⁴⁷. Pham et al.⁴⁸

found that low-income Hmong parents and youth viewed physically active lifestyles as crucial to good health, but action was deterred because they lacked access to safe spaces and time for sufficient physical activity.

Perceptions of Obesity

Another potential factor contributing to the obesity problem in this population relates to the misperception of what overweight/obesity means by Western standards. Many studies have focused on infant feeding practices both in the US and Australia by Hmong women^{49, 50, 51}. Maternal influence on eating patterns and weight status has also been studied. Kasemup and Reicks²¹ found that Hmong mothers may be more preoccupied with whether their child is too thin as opposed to too fat. Parental misperception of their child's weight may be because of a differential definition of what it means to be overweight or a deficit in knowledge about the significance of childhood obesity. When interviewing Special Supplemental Program for Women, Infants, and Children (WIC) counselors about mother's misperceptions of childhood obesity one of the dominant themes was that recipients associated a fat baby with a healthy baby⁵². Potentially focusing on their children being heavier may stem from previous food deprivation experienced in Laos and Thailand. From a cultural perspective, a child that was somewhat overweight and plump was recognized as being properly cared for and healthy⁵³.

Medicinal Practices

By tradition, the Hmong have had a tribal or clan social organization that is of patrilineal descent and strictly exogamous, with clan elders and Shamans being the most important functionaries in the community⁵⁴. To remedy and heal sickness Hmong have traditionally depended on shamans, community healers, and medicine women¹⁶. In Western society some alternative and complementary therapies have recently been adopted, but the principal treatments remain in biomedical methodology such as medication and surgical intervention⁵⁵. A traditional Hmong value challenged by the Western world is the religious belief of animism (physical and spiritual worlds coexist; life and death are joined in the life circle), with beliefs regarding illness organized into non-spiritual and spiritual causes⁵⁵. Treatment strategies involve those that are spiritual

in nature, home remedies, feeding practices, and some modern over-the-counter medications⁵⁵. Jintrawet and Harrigan⁵⁶ compared beliefs regarding causes of illness between mothers in Asian countries and Hmong mothers that had immigrated to the US to investigate differences in belief systems. The majority of expressions were similar, with an emphasis on traditional beliefs (founded on an explicit rationale recognized by their cultural group) while hardly any referred to the biomedical model⁵⁶. However, some segments of the Hmong community may be practicing medical pluralism as way of adapting to their US medicinal environment. Capps⁵⁷ found that Kansas City Hmong responded to swift cultural modifications by constructing an integrated medical culture, which included traditional ideas and therapies in combination with US biomedicine. Some traditional medical concepts were discarded, such as spirit illness and soul loss, but some still preserved components of these ideas with respect to illness and misfortune⁵⁷.

Cultural Shifts in the Hmong

Not only have Hmong encountered lifestyle changes associated with chronic disease, eating patterns, and activity levels, but also in their social structure, language use, and gender roles⁵⁵. As these areas show signs of increased acculturation with each generation^{32, 21} Hmong language use, cultural practices, and identity has the potential to shift. Younger generations may feel as though they are being pulled in two directions and trying to find a balance between Hmong and American culture. For example, Boshier⁵⁸ found that Hmong students at the postsecondary level had developed a bicultural adaptation to life in the US by maintaining certain parts of Hmong culture while adopting some aspects of American culture. Ying and Han⁵⁹ showed that Southeast Asian young adults (US born or in the US by age 5) had a strong ethnic pride and orientation that was Southeast Asian but at the same time reported enjoying American mass media and cultural activities over their ethnic media and activities, and had a higher fluency in English compared to their native language. When Brown et al.⁶⁰ interviewed Hmong parents and children, major themes in child interviews were finding a balance between Hmong traditions and American culture, whereas respecting authority and cultural traditions were themes in parent interviews. Adolescents reported

being aggravated with their parents' narrow appreciation for their want to blend in with both cultures⁶⁰. Parents wanted success for their children, but not at the cost of straying too far from their traditions⁶⁰.

Cultural shifts have been linked with individual and group values such as dietary habits, economics, education, religion, and language^{61, 62, 63, 64}. Ideas people have about language, children, self, and their placement in the interpretation of the social world may be crucial to comprehending why shifts in cultural practices occur⁶¹. Shifts in language use in particular have been studied as a marker for alterations in individual and group perceptions⁶¹. Warning signs of language loss or contraction have been shown to increase when middle-aged and elder segments of the population discontinue passing their native language onto offspring^{62, 65, 64}, which may be occurring with the Hmong.

The Hmong language includes dialects of the West Hmongic branch of the Hmong-Mien/Miao-Yao spoken by inhabitants of Sichuan, Yunnan, Guizhou, Guangxi, northern Vietnam, Thailand, and Laos^{66, 67, 68}. Traditionally there was no written form of communication, with culture and learning taught through memory, storytelling, and story cloths^{69, 70}. Elders were regarded as being the most knowledgeable concerning life skills and abilities⁷⁰. In the 1950's a written form of Hmong was developed in Asia by a group of French American missionary-linguists⁷⁰. The text was developed with a phonetic system, capturing Hmong tones based on the Roman alphabet⁶⁹. Globally, almost 4 million people speak Hmong, including 200,000 Hmong Americans⁷¹. The main dialects spoken are White and Green Hmong⁷², which differ in lexicon and phonology⁶⁷.

According to 2000 Census data, a trend is emerging with a large proportion of younger segments of the Hmong population (5-17 year olds) speaking English very well or well, with a lower percentage in the very well category and a higher percentage in the well category compared to those of the same age in the general US population⁷³. Compared to the US population overall, the 18 to 64 year old group, was underrepresented in the speak English very well category and over represented for the not speaking English well category⁷³. Lastly, Hmong ≥ 65 years old were mainly

categorized as not speaking English at all compared to the general US population of the same age, indicative of linguistic isolation in elderly Hmong-Americans⁷³. Studies looking at native language (L1) and majority language (L2) have found that L1 may be susceptible to quick reversion when L2 is systematically launched at the preschool level^{74, 75, 76}. Results of a survey with 1,100 US families proposed that negative modifications in L1 were associated with early L2 exposure⁷⁶. Specifically looking at Hmong preschoolers, Kan and Kohnert⁷⁷ found that older participants surpassed younger participants in English related lexical-semantic skills, but not Hmong, signifying a comparative stabilization of L1 skills, in conjunction with more vigorous growth in L2.

Social Cognitive Theory (SCT)

In research involving nutrition and health behaviors, the application of behavioral theories has been very useful and shown to be appropriate for use when examining dietary behavior^{78, 79, 80, 81, 82, 83, 84, 85, 86}. A theoretical framework frequently used in human research, and has provided insight into factors influencing behavior, is the SCT. The SCT, grounded in psychological and sociological principles, evaluates the triadic and dynamic interactions between personal, behavioral, and environmental factors (Figure 1)^{78, 79}. The SCT was developed from the Social Learning Theory (SLT), which suggested that observational learning was how animals as well as humans acquired behaviors considered favorable⁷⁸. Upon additional analysis of the SLT, the idea of external (motivation external to oneself) and internal (motivation from within) loci of control were thought to also play a contributing role in predicting human behavior and behavior change⁸⁷. Several years after Bandura established the SLT, he proposed the theory's primary constructs inadequately explained human behavior^{78, 79}. He then developed the idea that someone's environment, behavior, and personal characteristics constantly interact with each other, and that modifying one will cause change in the others^{78, 79}. These reformulated ideas became the basis for the ten primary constructs of what is now known as the SCT⁸⁸. These constructs included environment, situation, observational learning, behavioral capability, outcome expectations, outcome

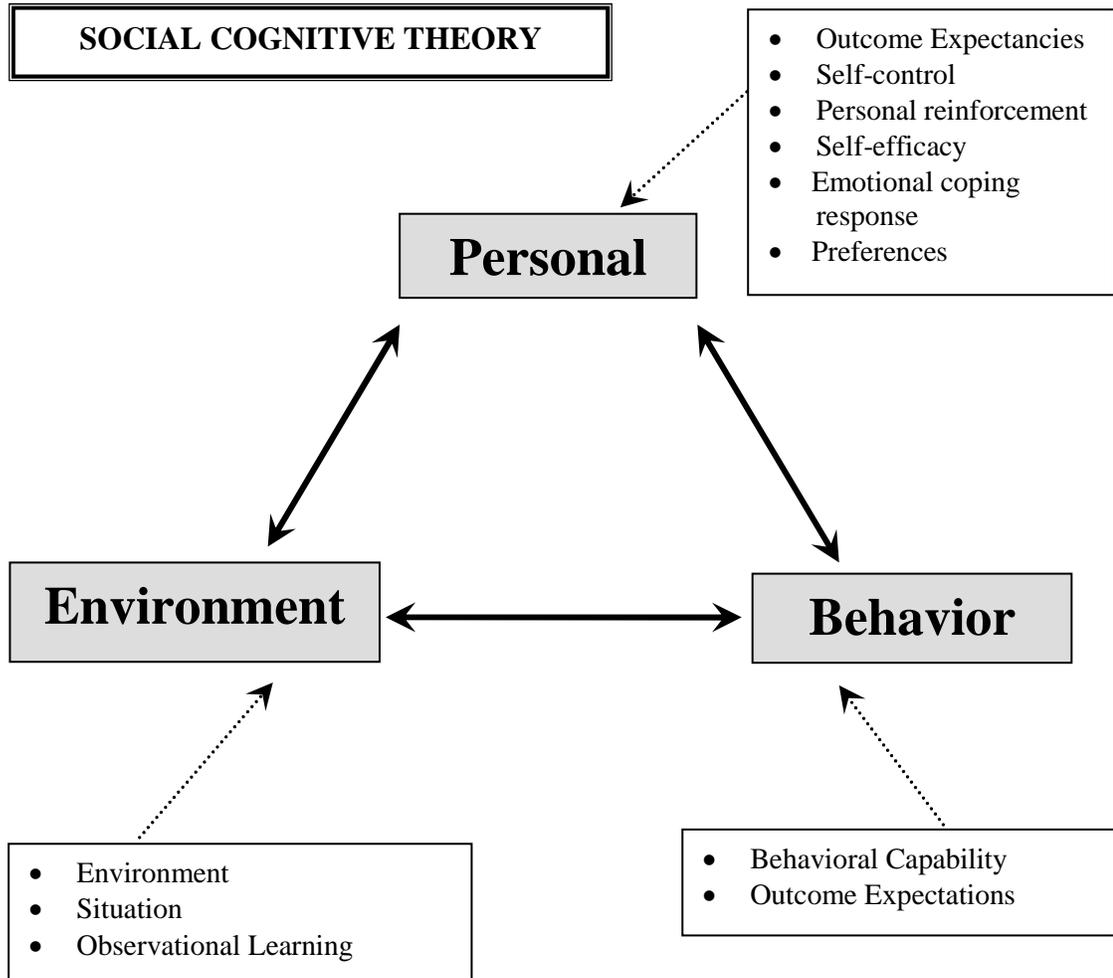
expectancies, self-control, reinforcements, self-efficacy, and emotional coping response (Figure 1)⁸⁸.

An individual's external surroundings, including family, friends, neighborhood features, and food accessibility, refer to the environment, whereas situation is associated with how an individual actually perceives their environment⁸⁸. Performing a behavior is influenced by whether or not it is perceived as positive (likely to imitate) or negative (likely to avoid), skill and knowledge level one has for the behavior (behavioral capability), the expected outcome of performing the behavior (outcome expectations), and values towards the expected outcome of the behavior (outcome expectancies)⁸⁸. Confidence level in enacting the behavior (self-efficacy) and perceptions related to the control one has over behavior performance (self-control) also play a role⁸⁸. The approach individuals create for coping with circumstances involving heightened emotional responses, like anxiety or anger, are referred to as emotional coping responses and may also influence behavior⁸⁸. The use of this model will permit the assessment of environmental influences on behavioral and personal factors.

Purpose Statement

This project investigated how Hmong adults and children living in the Twin Cities have responded to acculturation and environmental change from a behavioral and biological standpoint, as well as how this process of adaptation has altered their dietary patterns, health, and BMI status. To address the following research questions Hmong/Asian grocery stores were surveyed, community mapping with Geographical Informational Systems (GIS) software and Asian census data was done, focus groups were conducted with Hmong children and adults, newly immigrated and well established, and a quantitative, theory based survey was developed and administered to Hmong children in St. Paul/Minneapolis, MN.

Figure1. Social Cognitive Theory Model.



Hypothesis Statement

After collecting exploratory information through focus groups, community mapping, and food store surveys, we hypothesized that perceived environmental factors have a stronger influence than personal and behavioral factors on BMI and acculturation level of Hmong children ($\geq 9 \leq 18$) living in the Twin Cities and this was tested through a SCT survey and BMI status assessment.

Research Questions:

Food System Access

- 1) How do Hmong adults access food from the food system (i.e. do Hmong shop at local/neighborhood stores, Asian stores, or larger chain grocery stores?) What factors influence food purchases?
- 2) Which foods (American, Hmong, convenience/processed foods) are most frequently purchased and consumed and do food assistance programs mediate/expedite consumption of non-Hmong foods?

Environment, personal, and behavioral factors influencing food intake (SCT)

- 3) Do environmental factors have a stronger effect on dietary intake than personal and behavioral factors?
- 4) Who (parents, grandparents, siblings, peers) and/or what (home, school, and community environments) has the most influence on food choice and dietary behavior?
- 5) How do personal and cultural characteristics influence food choice (i.e. what traditional Asian/Hmong foods are still consumed and at what frequency, and what American foods are consumed and at what frequency?).
- 6) Does dietary acculturation differ by age, point of migration, and/or length of time in the US?
- 7) What are the Hmong's perceptions of their health and diet quality? How do their perceptions of health and diet quality affect their BMI and health status? Do perceptions vary by age, gender, length of time in the US, or age of migration?

History of Food Insecurity

- 8) How does previous food insecurity affect current dietary behavior and BMI status?

METHODS

Study Design

This study involved three phases of data collection and analysis, which employed both quantitative and qualitative research methods. The first phase involved a community mapping project, using GIS software⁸⁹ and census data, and a food store survey of Asian/Hmong and American grocery stores. The second phase entailed conducting focus groups that evaluated personal, environmental, and behavioral factors influencing food access, food choice, and overall health of unrelated Hmong adults (>18 years of age) and children ($\geq 9 \leq 18$ years of age) residing in the Twin Cities. Adults completed a FFQ. Demographic information, acculturation level, and height and weight status data were also collected and assessed for adults and children. For phase three, quantitative surveys were developed for Hmong children and were organized and evaluated the theoretical constructs underlying the SCT. A cross-sectional study design was used for survey implementation and analysis. Surveys were administered to Hmong children ($n=335$) $\geq 9 \leq 18$ years of age, including a 9-item youth food security scale, acculturation assessment, and a FFQ. Heights and weights were also collected. This study was approved by the Institutional Review Board (IRB) at the University of Minnesota.

Data Collection and Analysis

Phase 1: Community Mapping and Food Store Survey Project

Using Geographical Informational Systems (GIS) software⁸⁹, with census data⁹⁰, Hmong businesses, churches, ethnically specific grocery stores, clinics serving Hmong clients, and concentrations of the Hmong population were identified. Key informants were instrumental in identifying grocery stores commonly used by Hmong.

Fifteen grocery stores (13 Hmong/Asian and 2 American) were evaluated. The survey instrument included foods in USDA's Thrifty Food Plan (TFP), a government plan establishing food stamp allocation for low-income individuals⁹¹, foods in ethnic stores, and foods identified by informants as important in Hmong diets (~250 items) (**Appendix D**). Smaller Asian stores ($n=7$) with fewer products (≤ 125) were reduced into one group and prices were averaged. For the final comparison there were 2

American (store A and B), 6 major Asian, and 1 combined Asian group grocery stores. The most current consumer price index (CPI) per pound of food was compared to the price per pound (PPP) of selected grocery store foods. If current CPI data was unavailable, the most recent pricing year was used, Midwest Urban or US City Average, ranging from 1981 to 2005. The most economical price for foods was recorded. For packaged items, the expiration date was a surrogate measure of quality. Produce and meat were subjectively measured and those with signs of rot/loss of freshness were labeled “overripe,” foods not rotting but had lost some freshness were “slightly overripe,” and all others were labeled as “fresh/edible.”

Phase 2: Adult and Child Focus Groups

Focus Groups

Eleven adult groups (n=69) were conducted, with 7 in English only and four in Hmong and English, with translators provided. Twelve child groups (n=68) were conducted, with 9 in English only and 3 in Hmong and English, with translators provided. The same two trained researchers (Lisa Franzen and Chery Smith) conducted all of the focus groups. Participants were recruited through community leaders, ads in Hmong newspapers and by posting flyers at various locations and groups were held in conference rooms at a variety locations in the community.

This study intentionally sampled unrelated Hmong adults and children with varied history and life experiences. Adults born in Thailand or Laos and lived in the US ≤ 5 years (latest wave of migration) were designated as B-TL¹ (n=19). Adults born in Thailand or Laos, spent their developmental years there, with 38 years being the oldest age of migration, could recall food memories (>8 years of age) from Thailand/Laos during focus groups, and lived in the US >5 years were labeled as B-TL² (n=20). Adults born in the US or Thailand/Laos but could not recall food memories during focus groups, because of the short amount of time spent there (1 month to ≤ 8 years of age), were designated as B-US (n=30). Child focus groups included those born in the US and 9-13 years old (B-US¹, n=22), those born in the US and 14-18 years old (B-US², n=25), and those born in Thailand or Laos, had lived in the US ≤ 5 years, and 14-18 years old (B-TL, n=21).

Each focus group lasted approximately 90 minutes and participant incentives were \$20 in cash. Adult participants were asked open-ended questions with prompts regarding dietary habits, food assistance program usage, challenges met in transitioning from refugee camps in Asia to America, how dietary behavior changes impacted health, weight, and BMI, where they shopped for groceries, what influenced shopping behavior, and how location and transportation impacted store frequency (**Appendix A**). Open-ended questions and prompts were used to generate discussion with child participants related to food likes and dislikes, traditional and current dietary habits, food insecurity and food assistance program usage, media influences, losing cultural traditions, and health issues related to nutrition knowledge and medicinal practices (**Appendix E**).

Focus groups were conducted according to standard protocol and questions were developed using the SCT as the theoretical framework, along with a review of the literature⁹². All focus groups were audio-taped, transcribed verbatim, and evaluated independently to categorize themes⁹², with discrepancies resolved. Transcripts were then coded using NUD*IST Vivo (Nvivo, Thousand Oaks, CA)®, a qualitative data analysis software program⁹³. Height and weight were measured using a portable stadiometer and calibrated scale with shoes and outer clothing removed. Adult BMI was calculated as kg/m^2 and categorized as: underweight [BMI <18.5]; normal weight [BMI $\geq 18.5 < 25$]; overweight [BMI $\geq 25 < 30$]; and obese [BMI ≥ 30]⁹⁴. Epi Info™ Version 3.3.2, a data analysis program created by Centers for Disease Control and Prevention, was used to calculate BMI-for-Age percentiles from child height and weight measurements⁹⁵. Child underweight was defined as < 5th percentile, normal weight as $\geq 5^{\text{th}}$ to < 85th percentile, at-risk for overweight as $\geq 85^{\text{th}}$ to < 95th percentile, and overweight as $\geq 95^{\text{th}}$ percentile⁹⁶. Demographic information, acculturation assessment, and food frequency questionnaire (FFQ) data were collected for adults. Children and their parents filled out a demographic information sheet and acculturation assessment. All forms were reviewed by Hmong informants to ensure appropriate interpretation prior to administration.

Acculturation Assessment

Marin et al.⁹⁷ developed an instrument to measure acculturation, “A Short Acculturation Scale for Hispanics,” which has been modified and used with Mexican Americans⁹⁸, Puerto Ricans⁹⁹, Cambodian refugees¹⁰⁰, and Filipino Americans¹⁰¹, but to our knowledge has not been used with Hmong. Adult studies have shown acculturation level is associated with language, social connections, and obesity^{102, 103} and this information may offer important insights into Hmong acculturation. Questions about language use were, a) What language(s) do you speak at home? b) What languages do you speak with friends? and c) In what language do you usually think? Possible responses were, a) Only in Hmong, b) More Hmong than English, c) both Hmong and English equally, d) More English than Hmong, and e) Only English. Questions on social connections were, a) Most of your children’s parent’s friends are ____, and b) Your closest friends are _____. Possible responses were, a) All Hmong, b) More Hmong than Americans, c) about half and half, d) More Americans than Hmong, and e) All Americans. Dietary acculturation was measured by asking, “I eat ____.” Possible responses were, a) Only Hmong foods, b) mostly Hmong foods, c) equal amounts of Hmong and American foods, d) Mostly American foods, and e) Only American foods. During focus groups participants were asked how they defined Hmong versus American food and they consistently voiced clear distinctions between them.

To obtain perceptions of diet and health two additional questions were asked, which were, a) Overall, how would you describe your diet? and b) Overall, how would you describe your health? Possible responses for these questions were, a) Poor, b) Fair, c) Good, d) Very Good, and e) Excellent. Results of these questions will be referred to as perception of diet/health. For the child focus groups, to attain additional information concerning eating patterns, children and parents were asked on their demographic information sheet if breakfast, lunch, and dinner were mostly Hmong or American food.

Food Frequency Questionnaire for Adult Focus Group Participants

To our knowledge, no FFQ for Hmong exists therefore one was developed to assess changes in food consumption patterns for B-TL¹ and B-TL² before and after moving to the US. B-US only completed the second part of the FFQ. The FFQ was also available in Hmong for those who could not read English. Foods in the survey were

identified from the literature, by using informants, and food observations made by the PI traveling into Hmong communities in Thailand and Laos. The first section had participants check the option most closely related to how often foods were consumed (daily, 2-3 times/week, 1 time/week, 2-3 times/month, special occasions, or holidays) prior to coming to the US. The second section had participants repeat this task with the same food list after coming to the US.

Statistical Analysis

Data were compared using the Statistical Packages for Social Sciences (SPSS, v. 17). Group means (demographic information, anthropometric measurements, FFQ, and acculturation assessment data) were compared using one-way analysis of variance (ANOVA) and post-hoc Tukey Honestly Significant Differences (HSD) multiple comparisons test to determine significance. Paired samples t-test was used to compare average adult FFQ scores before and after moving to the US within the B-TL¹ and B-TL² group.

Phase 3: Survey and Nutritional Status Assessment of Hmong Children

A survey was developed (**Appendix M**) using formative information collected from child focus groups, a review of the literature, and questions were developed using SCT constructs (personal, environmental, and behavioral). SCT constructs included in the survey were three environmental, six personal, and two behavioral components (**Chapter 1, Figure 1**).

This phase included 335 Hmong youth $\geq 9 \leq 18$ years of age and at least one of their parents to complete a demographic and acculturation assessment. This phase of the project required children to meet with us twice within a two week period. For the first visit, the child took the survey, did a 24-hour dietary recall, and had their height and weight measured. The first visit lasted approximately one hour and thirty minutes. During the second visit, which lasted approximately thirty to forty-five minutes, the child's diet was assessed again using another 24-hour dietary recall and completing a kid's FFQ. Completed parental consent and parent information/demographic sheets were required for the child to participate in the study. Measurements on the parents, such as height and weight, were optional and not required for the child to participate in

the study. The child received \$25 for the first visit and another \$25 for completing the second visit. The surveys were self-administered, and assistance was given to children whenever needed. Researchers discussed with children that the aim of the survey was to understand more about their diet, health, and acculturation issues as well as emphasized that there were no right or wrong answers to the questions. Children were asked to read each questions carefully and only select one response. All surveys were checked for multiple and/or blank responses and children were asked to complete problematic responses.

The survey was evaluated for content, breadth of coverage, and readability (Flesch Reading ease was 84.3 and Flesch-Kincaid readability was grade level 4.1). Responses to the questions were on a 5-point Likert scale, which was entered as -2 through 2, analogous to strongly disagree through strongly agree. Additionally, USDA has developed a food security survey model for children ages 12 years and older to assess food insecurity and hunger during the last month¹⁰⁴, which was included in the survey. An acculturation assessment was also added to the survey and to the parent demographic information sheet. The reliability of the acculturation assessment was tested with adults and children, small groups completed the instrument at two different points in time. A paired samples t-test detected no significant differences, indicating the modified instrument was reliable to use. The modified instrument asked questions regarding language (at home, with friends, and think in), social connections (friends), and overall dietary acculturation (I eat). To attain additional information concerning eating patterns, questions were asked regarding what children and parents ate for breakfast, lunch, dinner, and snacks. Also, a question pertaining to identity perception was added (I see myself as).

The survey was pilot tested (n=35) prior to final distribution to determine the internal consistency of the construct scales for environment, personal, and behavior using cronbach- α scores (0.80-0.90). Pearson correlations were also run between construct mean scores, with significantly positive ($p < 0.01$) interactions found between each of them. Anthropometric measurements (height and weight) were measured twice

following procedures described above. All survey data was entered and analyzed via SPSS.

The data were entered and checked for data entry errors prior to statistical analyses. Descriptive statistics were used to determine means and standard deviations of all constructs as well as age, gender, BMI, and acculturation level. Mean values for the constructs were compared using independent t-tests to identify any gender or age differences. Age and gender differences were noted in responses for SCT survey questions; however, only age differences were noted for responses to the acculturation assessment questions.

Data for sum acculturation scores were normally distributed, however BMI-for-Age percentile data were not. Thus, Pearson and Spearman Rho correlations were used as a data reduction method respectively to determine which questions within each construct (environment, behavior, and personal) were significantly correlated to the sum acculturation score and BMI-for-Age percentiles for each of the four sub-groups (B-US¹ and female, B-US¹ and male, B-US² and female, B-US² and male). To examine SCT constructs most predictive of BMI percentiles and sum acculturation score, multiple linear regression analyses using the enter method were performed respectively with only the significantly correlated questions. The enter method, or simultaneous multiple regression, assumes that all of the predictor variables entered are important and that you want to know the multiple correlation of all these variables with the outcome variable of interest. Questions that were highly correlated with each other ($R^2 > 0.50$) were tested as a group because high intercorrelation among independent/predictor variables (collinearity) can cause problems in the interpretation of the multiple regression. For instance, the questions "*I use Hmong medicine because my parents use them*" and "*I use Hmong medicine because my grandparents use them*" had a correlation value of $R^2 = 0.80$. When we compared the regressions run with and without these questions the change in the p-value for R^2 was significant, indicating that the combination of these questions added significantly to the prediction of the variance, whereas when they were run with the group they appeared non-significant because of collinearity. Pearson correlations were also conducted on the acculturation assessment questions and the sum

acculturation score for the two age groups (B-US¹ and B-US²). The level of significance was set at $p < 0.05$ for all statistical tests.

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CHAPTER 2:

**Acculturation and Environmental Change Impacts Dietary Habits
among Adult Hmong**

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Appetite. 2009;52(1):173-183

Introduction

A minority group in the United States (US) that has not only seen increases in population density but also chronic diseases related to obesity are the Hmong. They migrated from Southeast Asia as the war in Indochina was ending in the late 1970s, and suffered hardships in Laos and Thailand including food insecurity (Goldfarb, 1982; Pfaff, 1995). Irrespective of family clan associations refugee resettlement services dispersed the Hmong to American cities, but later through secondary migration clan groups were reunited with between 42,000 and 70,000 Hmong settling in Minnesota (Kittler & Sucher, 2004; Leslie, 2001; US Census Bureau, 2003).

Immigrant families that are in the process of shifting from one “cultural framework to another” are in a continuous process of reciprocal modifications (Xiong, Eliason, Detzner, & Cleveland, 2005). It has been suggested that in new food environments dietary behaviors are altered because of heavily marketed unhealthy foods and a reinforcement deficit of traditional healthy foods (Harrison, Kagawa-Singer, Foerster, Lee, Pham, Nguyen, et al. 2005). As Hmong families become more acculturated, first and second generations have been reported to consume less healthy “American foods,” which is linked to obesity and associated chronic diseases (Kasemsup & Reicks, 2006). Lauderdale and Rathouz (2000) found that US born Asian Americans were significantly heavier than their foreign-born counterparts. Research with Hmong infants and children has shown a high incidence of stunting and overweight (Clarkin, 2005; Gjerdingen, Ireland, & Chaloner, 1996; Himes, Story, Czaplinski, & Dahlberg-Luby, 1992). However, little research exists regarding the dietary behavior of adult Hmong. Therefore, the purpose of this study was to qualitatively examine how Hmong adults living in the Twin Cities have responded to changes in their environment and how the process of acculturation relates to health, body mass index (BMI), and weight gain.

METHODS

Design and Sample

Ten focus groups were conducted with Hmong adults ≥ 18 years of age in St. Paul and Minneapolis, MN. Participants were recruited through community leaders, ads

in Hmong newspapers, and by posting flyers at various locations. This study purposefully sampled Hmong having varied history and life experiences. Participants who were born in Thailand or Laos and had been in the US for ≤ 5 years (latest wave of migration to the area) were designated as B-TL¹ (n=19). Participants who were born in Thailand or Laos, spent their developmental years there, with the oldest migrating at 38 years of age, could recall food memories (generally >8 years of age) from Thailand or Laos during focus group discussions, and had been in the US for >5 years were labeled as B-TL² (n=16). Participants who were born in the US or were born in Thailand or Laos but could not recall food memories during focus group discussions because of the short amount of time spent there (participants reported anywhere from 1 month to ≤ 8 years of age) were designated as B-US (n=30). The majority of their early to middle childhood was spent in the US and they had been exposed to American foods through the school system and food assistance programs during their formative years. B-TL discussants arrived between 1975 and 2005 and most left Asia because of Communist takeover, involvement with the Vietnam War, poor conditions in refugee camps, and refugee camps closing.

Participants were asked open-ended questions with prompts regarding dietary habits, factors influencing food choice, changes in dietary intake, participation in community nutrition programs, perceptions of the food system, challenges met in transitioning from refugee camps in Asia to America, and perceptions of how dietary behavior changes impacted health, weight, and BMI. Demographic information, acculturation assessment, and height and weight information were collected. Acculturation is a term often used to indicate a group's progression, generally a minority group, of adopting cultural patterns (language, beliefs, religion) of a host or dominant group (Satia-Abouta, 2003). Park first described acculturation as a distinct set of irreversible stages (contact, competition, accommodation, and assimilation) where completion of one stage is needed before progressing to the next (Park & Burgess, 1924). However, Park's theory has been criticized because it was based on a European immigrant model, which does not accurately reflect the acculturation process for migrant groups such as African and Asian groups, who do not seem to pass through

irreversible stages of acculturation or become absolutely homogenous with their host/dominant group (Marger, 2000). Another acculturation model, proposed by Gordon (1964), had seven assimilation stages which range from cultural to civic and is described as a dynamic process with the potential for bidirectional movement between stages. Throughout this process, individual's are obtaining, maintaining, and/or abandoning values and behaviors of the original culture and host culture (Park & Burgess, 1924; Gordon, 1964; Szapocznik & Kurtines, 1980; Marger, 2000). Whichever theory is used, a constant remains that acculturation is thought to take place at the macro (social/group) and micro (individual) level (Satia-Abouta, 2003). We chose to look at social connections, language use, dietary habits, length of time in the US, and BMI status to address acculturation level in our sample population, which is described in detail in the measures and analysis section of the paper. The Institutional Review Board (IRB) at the University of Minnesota approved this study.

Measures and Analysis

Focus groups were conducted by two researchers trained in focus group facilitation, methodology, and assessment (Morgan & Krueger, 1998) and were audiotaped and transcribed verbatim. Four groups were conducted in English and Hmong because some had difficulty speaking English and translators were provided. Six groups were conducted in only English. Each focus group transcript was coded independently by researchers to identify common themes/subthemes (Morgan & Krueger, 1998) and discrepancies were resolved. Coded transcripts were then evaluated using NUD*IST Vivo (Nvivo, Thousand Oaks, CA)®.

Degree of acculturation was assessed by adapting a previously developed instrument, "A Short Acculturation Scale for Hispanics" (Marin, Sabogal, Marin, Otero-Sabogal, & Perez-Stable, 1987). The validity and reliability coefficients for this acculturation scale with Hispanics were comparable to those obtained for other published scales. The original scale included 12 items related to language use, media, and ethnic social relations (Marin et al. 1987). The acculturation scale permits researchers to quickly and consistently classify populations of interest who are low or high in acculturation. The scale has been used with respondents from a variety of

groups including Mexican Americans (Smart, 1993), Puerto Ricans (Planos, Zayas, & Buschcrossnagel, 1995), Cambodian refugees (Palinkas & Pickwell, 1995), and Filipino Americans (Cruz, Padilla, & Agustin, 2000), but not with Hmong adults or children. Three questions asked about language usage, which were, a) What language(s) do you speak at home? b) What languages do you speak with friends? and c) In what language do you usually think? Possible responses for these questions included, a) Only in Hmong, b) More Hmong than English, c) both Hmong and English equally, d) More English than Hmong, and e) Only English. Two additional questions were, a) Most of your children's parent's friends are ____, and b) Your closest friends are _____. Possible responses were, a) All Hmong, b) More Hmong than Americans, c) about half and half, d) More Americans than Hmong, and e) All Americans. One question was added to measure dietary acculturation and it was, "I eat ____." Possible responses were, a) Only Hmong foods, b) mostly Hmong foods, c) equal amounts of Hmong and American foods, d) Mostly American foods, and e) Only American foods.

Prior to administration of the acculturation assessment the dietary assessment question was reviewed by Hmong informants to ensure that participants would correctly interpret the acculturation questions. Additionally, we spent a sufficient amount of time, prior to the administration of the acculturation assessment, during the focus groups asking participants how they defined American versus Hmong food. Consistently, participants had distinct definitions and characteristics associated with Hmong and American food that were clearly different from one another. In the minds of our participants there was a clear divergence between Hmong and American foods. Dietary acculturation refers to the process that takes place when individuals of a migrating group adopt eating patterns/food choices in their new environment (Negy & Woods, 1992; Satia, Patterson, Kristal, Hislop, Yasui, & Taylor, 2001). It is a multifaceted and dynamic process, in that an individual does not simply accomplish it in a linear fashion (Berry, 1980; Szapocznik & Kurtines, 1980; Sodowsky & Plake, 1991; Negy & Woods, 1992, Satia et al. 2001). Immigrants may preserve traditional foods, reject others, put new twists on traditional foods, and/or adopt dietary patterns of the host population (Satia et al. 2001; Satia, Patterson, Taylor, Cheney, Shiu-Thornton, Chitnarong, &

Kristal, 2000; Lee, Sobal, & Frongillo, 1999; Pan, Dixon, Himburg, & Huffman, 1999; Raj, Ganganna, & Bowering, 1999; Bermudez, Falcon, & Tucker, 2000; Pinhas, Toner, Ali, Garfinkel, & Stuckless, 1999).

Furthermore to obtain perceptions of diet and health two additional questions were asked, which were, a) Overall, how would you describe your diet? and b) Overall, how would you describe your health? Possible responses for these questions were, a) Poor, b) Fair, c) Good, d) Very Good, and e) Excellent. We will refer to the results of these questions as perception of diet/health.

Height and weight were measured with outer clothing/shoes removed. BMI was calculated as kg/m^2 and classified as: underweight [BMI <18.5]; normal weight [BMI $\geq 18.5 < 25$]; overweight [BMI $\geq 25 < 30$]; and obese [BMI ≥ 30] (Centers for Disease Control and Prevention, 2007).

Data were compared using the Statistical Packages for Social Scientists (SPSS) software, version 14. The means of the sub-groups were compared using one-way analysis of variance (ANOVA) and post-hoc Tukey HSD multiple comparisons test to determine which specific means were significant between sub-groups.

RESULTS

Sample Characteristics

Sixty-five adult Hmong (17 males [M] and 48 females [F]), ages 18 to 63 years, participated in the focus groups (Table 1). B-TL¹ participants were 33.5 ± 9.8 years old, had less than a high school education, and average total household size was 6.6 ± 2.1 people, with 4.4 ± 2.1 children. B-TL² participants were 44.4 ± 11.3 years old, 54% had schooling beyond high school, and average total household size was 6.3 ± 2.9 people, with 3.1 ± 2.8 children. B-US participants were 26.4 ± 4.7 years old, 73% had schooling beyond high school, and average total household size was 4.2 ± 2.1 people, with 1.3 ± 1.5 children. B-TL¹ participants had an average BMI of 27.1 ± 3.6 (M= 28.8 ± 2.6 ; F= 25.8 ± 3.9), B-TL² participants had an average BMI of 27.4 ± 4.1 (M= 28.9 ± 3.4 ; F= 26.9 ± 4.2), and B-US participants had an average BMI of 30.1 ± 7.1 (M= 32.4 ± 7.4 ; F= 29.1 ± 6.8) (Table 2). BMI was not significantly different among the groups. B-US participants had a significantly higher education level, but lower total household size

compared to B-TL¹ and B-TL² participants ($P \leq 0.05$). Within the B-TL group, B-TL² had a significantly higher income and education level compared to B-TL¹ participants. B-US participants had a significantly higher income level compared to B-TL¹ participants.

Acculturation Level

Acculturation level was assessed by looking at length of time in the US, language usage, social connections, eating behaviors, and BMI status (Table 2). The average length of time in the US for B-TL¹ participants was 2.3 ± 0.7 years, for B-TL² participants it was 25.3 ± 6.6 years, and for B-US participants it was 24.6 ± 3.9 years. Length of time in the US was positively associated with acculturation scores, education, and income levels and negatively associated with food assistance program usage (Special Supplemental Program for Women, Infants, and Children [WIC], the Food Stamp Program [FSP], and the National School Lunch Program [NSLP]), total number of people in the household, and perception of diet. More than 90% of B-TL¹ participants reported speaking at home, thinking, and speaking with friends only in Hmong or more Hmong than English. Approximately two thirds of B-TL² participants reported speaking at home, thinking, and speaking with friends in both Hmong and English equally or more English than Hmong. Whereas approximately 90% of B-US participants reported speaking at home, thinking, and speaking with friends in both Hmong and English equally or in more English than Hmong. Approximately 80% of B-TL¹ participants reported that their closest friends were all Hmong, whereas B-TL² and B-US participants reported 50-70% of their closest friends were all Hmong or more Hmong than Americans. Approximately 70% of B-TL¹ participants reported their children's friends parents were all Hmong or more Hmong than Americans, whereas the other two groups reported about half were all Hmong or more Hmong than Americans. Across all groups, about 80% reported eating mostly Hmong foods or equal amounts of Hmong and American foods and reported their perception of health as fair to good. About 90% of B-US participants reported their perception of diet was fair to good, whereas about 75% of B-TL¹ and B-TL² participants reported their perception of diet was good to very good. Both B-TL¹ and B-TL² men and women had BMI's in the overweight category,

whereas B-US men were on average obese and the women were on the upper edge of the overweight category.

Although B-TL² and B-US participants had spent on average a similar length of time in the US, B-TL² thought their diets were significantly better and had lower acculturation scores for questions related to language use compared to B-US participants. Within the B-TL group, B-TL² reported using food assistance programs less, having similar perceptions of health and diet, and had higher acculturation scores on all 6 acculturation questions except for the question regarding dietary acculturation compared to the B-TL¹ group. Compared to the B-US group, B-TL¹ reported using food assistance programs more, had higher perceptions of the quality of their diets, and had lower acculturation scores on all six acculturation questions. Overall, based on a summation of the 6 acculturation questions, B-US participants were significantly more acculturated (19.17 ± 3.12) than B-TL¹ (9.4 ± 2.3) and B-TL² (15.9 ± 3.9) participants ($P \leq 0.05$). Within the B-TL group, the B-TL² participants were significantly more acculturated than B-TL¹ participants based on total acculturation scores. Total acculturation scores were also positively associated with years lived in the US and household income and negatively associated with total number of people in the household, and food assistance program usage (WIC, NSLP, and FSP). Living in an extended family was also associated with decreased acculturation for language usage and social connections and with increased reporting of Hmong food consumption over American.

Focus Group Data

Five dominant themes, with associated subthemes, were identified through evaluation of the focus groups and these were, a) cultural values impact eating and lifestyle behaviors, b) food insecurity history influences post-migration behavior, c) acculturation level impacts BMI through diet and exercise, and d) health status is influenced by changed environments.

Cultural Values Impact Eating and Lifestyle Behaviors

Subthemes for this theme included a) traditional eating patterns and b) gender roles.

Traditional Eating Patterns: Traditional eating patterns involved rice consumption for

at least 2, if not 3 meals per day. One participant identified it as “the main dish and we ate it from morning until night (B-TL², F).” The type of rice varied in usage, which included “everyday” and “fancy” rice. One discussant stated, “My mom’s theory is if you just make plain white rice that’s fine, but if you do that extra step to make it purple or black then it means...you’re really a go getter and want to make it fancy (B-US, F).” Household rice consumption ranged from 25 to 50 pounds of uncooked rice per month and 100 pounds for a large family or if guests were frequent.

A traditional Hmong meal was described as rice, vegetables, and a meat dish. Several participants said specific foods were not tied to meal times. One commented, “there isn’t a food designated as the breakfast food, lunch food, or dinner food. Every time we eat it’s cooked the same way (B-TL², F).” Traditional food was portrayed as being bland with few herbs and spices added. The herb/spice used was determined by the protein source. As one said, “if you do boiled fish then its lots of different herbs, like cilantros, peppers, onions...where if you do chicken its really just lemon grass (B-US, F).” Another stated that at dinner there needed to be, “three main dishes and the squash and vegetable boiled without salt, always have to have that with your grandparents in there...not much of the fruits (B-TL², F).”

Fruit was not viewed as an important component of the diet traditionally. One participant stated, “...sometimes it was too expensive and they didn’t have enough [money] to buy [it] or sometime they think that fruit is not important like the other food [vegetables, rice] to support a family (B-TL¹, M).” Fruit was described as an appetizer, coffee table item, or present at special occasions. If participants farmed or lived near the jungle their fruit access and consumption was higher. Another meal component typically absent was dessert. One participant reflected, “...in Laos they don’t have the luxury of that [desserts], they don’t have that much money to have a three course meal (B-US, F).” Another participant described how desserts were rare even when growing up in the US and said, “...I guess we never got it into our heads that anything should follow dinner (B-US, M).” Snacking was typically not practiced in Laos or Thailand mainly because of food shortages.

Gender Roles: Both men and women stated that traditionally the daughter-in-law or the

eldest daughter were responsible for cooking and cleaning, done out of obligation or desire for acceptance, while the mother and/or grandmother typically served in a supervisory capacity. One participant reflected, “I feel that it’s my obligation...and she [mother-in-law] feels that I have to do it too. She [mother-in-law] knows it and says, ‘well it’s your job’ (B-US, F).” Women highlighted a hierarchy of cooking responsibilities among female siblings and one echoed a common theme that, “luckily I had two older sisters so I didn’t have to take the brunt of it, but since we were very little we had always done the cooking and the cleaning, even with sisters-in-laws we were expected to be in there with them (B-US, F).” Both genders stated that traditionally men were not as active in cooking and cleaning. One participant said, “I think its girls work so I don’t really do the cooking. I just wait until they [women] cook and I eat...I used to clean when I was little, but now its just like I’ll throw a dish in the sink and it gets washed off (B-US, M).” However, food preparation was conducted by men after hunting or fishing. As one stated, “the male side they have a traditional thing where every year they go deer hunting and they come back and then the men actually cooks the food and they don’t let none of the women touch the food (B-US, F).”

Food Insecurity History Influences Post-migration Behavior

Food insecurity subthemes were examined according to time frame of the event. Food insecure participants living in Laos and Thailand devised strategies such as working, food support networks, and food stretching to reduce it. During the transition period from Asia to the US, alterations in dietary behavior were described. Lastly, food insecure adults living in the US (B-TL¹, B-TL², and B-US) discussed using the American food safety net system (i.e. food assistance programs).

Occupation: Participants discussed working as a way to circumvent food insecurity, though at times wages were inadequate. Many women sewed as a means to make money. Participants stated proficiency in other languages increased job marketability. One participant said, “my oldest brother went to school in Laos so he...pretty sufficient in English and French so he start teaching so we got a little income from there and later he went around the different camps translating for folks (B-TL², M).” Farming was also mentioned as a form of income for adults and children. As one mother reflected,

“children as young as 8 or 10 years old can work in the farm. My children worked for the money so they gave half of it to me and they kept half (B-TL¹, F).”

Food Support Networks: Participants recalled that food support in refugee camps lacked consistency. As one said, “I think there are certain weeks when they’re short, there are the weeks that you have plenty (B-TL², M).” The location of the refugee camp also affected food supplies as another commented, “...I do remember lots of times we don’t have food because we live in a northern refugee camp in Thailand so the UN doesn’t supply that much food, so for many days we had to go out into the Thai village and buy food (B-TL², M).” And, although participants said meat, rice, and vegetables were usually provided, fruits were rarely given. Some had relatives in the US who sent money to help with financial insecurity. Other family members within the village would share food if they had it.

Food Stretching: Adding different foods such as corn, beans, herbs, or seasonings to rice was a common food stretching strategy. Participants also reported that in tough times meat was rarely bought and rice was flavored with salt, hot pepper, lemon grass, cucumber, and ginger. In highly food insecure situations the youngest children were fed first as one recalled, “I remember my mom said save the rice for my youngest brothers so we eat [the] rice but we had to add beans and corn with it...you really don’t want to eat but you had to (B-TL², F).”

Alterations in Dietary Behavior: Participants reported changing their eating behavior when they moved from Laos/Thailand to the US. Most said they were able to eat more in the US than previously. One stated, “you didn’t have that much money back then but now its like you’re so much better off and you consume all this stuff that you don’t need...we know its there and we buy it even though we don’t want it and we don’t need it, its just there so we’ve got to finish eating it (B-TL², F).” Another added, “there’s a Hmong phrase that when you were in Laos you [were] so poor and you get here [to the US and] eat all you want and we forgot about our health and then in time you notice you start to get sick or you eat too much. Food that contain a lot of fat and sugars and things, but I would prefer to be a little poorer that I can stay healthy (B-TL², F).” Generally, participants reported consuming food in excess with greater food access and financial

stability.

Food Safety Net System: Newly arrived immigrants found food assistance programs readily available and helpful in providing food. Commonly used programs were WIC, the FSP, and the NSLP. Newly immigrated refugees stated, “if you want to go make some more money [in Thailand] to eat more you don’t have more money [so] eat less. Here [in the US] he has the food stamp he can go by the store and buy more food and eat more here (B-TL¹, M).” Second generation Hmong (B-US) tended to shift away from food insecurity and usage of food assistance program with only a few using the FSP or WIC for formula.

Acculturation Level Impacts BMI through Diet and Exercise

Subthemes identified under this theme included a) nutrition transition, b) diverging meal patterns, and c) physical inactivity.

Nutrition Transition: The Hmong appear to be an adaptive culture, as demonstrated by relocation and adaptation experienced when they left Laos and immigrated to Thailand and later to the US. This adaptive nature was also expressed regarding eating behaviors. Participants stated many of their foods were adapted or borrowed from other cultures, including American foods. Participants defined American foods as pizza, hamburgers, hot dogs, meats and cheeses, steak and potatoes, spaghetti, hamburger helper, fast food, frozen or pre-made foods, bread, and desserts. Nutrition transitions experienced by the Hmong included decreased consumption of rice in younger generations, altered food preparation methods, increased consumption of convenience/processed foods, the introduction of snacking, and food assistance programs introducing foods outside cultural norms to younger generations. Rice was previously identified as a staple in the diet, however, some younger participants expressed decreased rice consumption as they aged. One commented, “I’m not really into rice right now. I’ve learned to live without it. I think there was a time where I just couldn’t go a day without it at all, but I think now I’m okay (B-US, F).” Rice intake was said to be decreased if they felt it was not necessary everyday, they got tired of it, or because of a low carbohydrate diet. Rice consumption was often associated with weight gain and decreased intake was associated with weight loss. One discussant stated, “...I cut down on my rice intake and my BMI

started going down so I just started cutting rice out of my diet (B-US, F).”

Another aspect of the dietary transition was the inclusion of more fried and processed/convenience foods in the diet. One woman recalled, “...when I was in Thailand we usually don’t stir fry, it’s always boiled. Stir fry is something new...probably something they have adopted here [in the US] (B-TL², F).” Changes in preparation methods were attributed to increased oil access and absence of parents or grandparents in the household. Many participants consumed processed/convenience foods because of busy lifestyles, cooking time needed for traditional food, and cost of fresh foods. As one stated, “when you get off work you’re so lazy you just don’t feel like cooking all that food and I think Hmong food takes a lot of preparation, so we’ll just throw in like a pizza or we’ll make spaghetti, something really fast or ramen noodles (B-US, F).” Snacking between meals was identified as a change from the traditional diet. Snacks were identified as papaya salad, candy bars, fast food, cereal, Asian crackers, egg rolls, cheese and crackers, fruit, and American foods. One participant commented, “my son mostly every night pizza, pizza. I told him you eat lots of junk food you’ll be junk (B-TL², F).” Another stated her son would, “...eat like a main dish with Hmong food and then have American food in between (B-TL², F).”

Food assistance programs were seen as catalysts for introducing foods outside of cultural norms into Hmong diets. One participant recalled, “I realized that I was introduced to American food through WIC and the FSP because we were forced to eat it (B-US, F).” Another reflected that, “Hmong people we don’t know about cheese. [We] come to the US and you know there’s this block of yellow stuff there and it’s different (B-US, M).” Some participants recalled enjoying school lunch whereas others felt forced to eat it and complained of small portion sizes and still feeling hungry afterwards. Participants stated their kids ate school lunch because it was more convenient than packing a lunch.

Diverging Meal Patterns: Meal patterns diverged within households, between weekdays and weekends, and between generations. Participants stated that meal preparation methods differed for younger and older generations within the same household. One stated, “they [kids] like stir fry more than boiled so when we’re cooking

we all try to do some kind of like baked dish or stir fry just so they'll eat too, otherwise they usually won't eat anything and they'll just go to McDonalds or White Castle (B-US, F).” In many instances, parents would give their children American foods while they would eat traditional Hmong foods.

Meal patterns differed between the weekdays and weekends for some families. For breakfast, one commented, “...for the weekdays its cereal for the kids but if it's a regular breakfast it is Hmong food on weekends (B-TL², F).” For dinner, another commented, “most of the time it's TV dinner food and pizza...but on the weekends is when we do serious cooking (B-TL², F).” Overall, when participants discussed generational differences, older generations preferred boiled foods whereas younger generations preferred stir fried dishes. Desired sweetness level of foods also differed among generations. One discussant noted, “the older ladies, when it comes to sweet, like banana bread is pretty much the farthest you would go with the sweetness. For us [younger] we'll love it and like our parents will like it, but if its cake with frosting...that would be too much for them (B-US, F).”

Physical Inactivity: Physical inactivity was attributed to the rise in obesity in the Hmong community. Many parents said children were inactive partly because of competing non-exercise activities. As one commented, “my dad's house has got three computers. When I get home from work he's [her son] sitting at the computer. When it's hot they don't want to get out and play they want to sit in the house, watch cable, or play on the computer (B-US, F).” Many participants noted that as their parents became more “Americanized” their physical activity level, as well as the participants' younger siblings, declined. One participant stated, “...my parents farmed every summer when I was younger so we used to always go out with them...we went to parks like a couple times a week, but later on they had full time jobs and were so tired they couldn't come out and take the kids to the park anymore and they didn't want to farm because they were more Americanized and working. My younger siblings didn't have the active lifestyle (B-US, F).” Some participants felt exercise had little cultural value because in Laos and Thailand working was exercise. One participant noted, “you carry heavy stuff...or you would be out at the farm for the whole day do[ing] labor work so that was

part of your livelihood every day...so to actually set aside thirty or twenty minutes or an hour to do real exercise, people don't do that (B-TL², M)." And, when participants discussed attempts to lose weight the method was typically dietary alterations as opposed to physical activity and was not met with much success.

Health Status is Influenced by Changed Environments

Subthemes under this theme included a) alterations in dietary behavior, and b) body image.

Alterations in Dietary Behavior: Many participants changed their eating behaviors in conjunction with individual or family-related health problems. One participant altered their dietary habits because of a diabetes diagnosis and said, "I like to eat all kinds before, anything on table I eat it. Since 2000 I found out I have it [diabetes] so I not really eat a lot and not really much for sweet. Mostly pop or something like that I never drink, but maybe once a month (B-TL², M)." Several participants changed their eating habits because one of their parents was ill and living in the household. One commented, "my mom had a stroke probably ten years ago so she lives with me so since then...we started to eat more vegetables and also eat less meat, even the rice (B-TL², M)." In addition, another participant stated, "because of my husband's health issue we kind of stick more to vegetables and fruits and not a lot of meat, even though he likes meat (B-US, F)."

Body Image:

As obesity increased and health declined in this population, perceptions about body image have also changed. Several B-US participants stated cultural values tied to weight placed more emphasis on being plump. One obese participant stated, "they always say eat up so you'll grow big right? Now my response is, you told me to eat so I would grow big but you didn't tell me which direction (B-US, F)." The preference for larger sizes in the past appeared to be linked to food shortages and survival rates. One participant said, "having them [children] be healthy and big showed that you loved them [children] and that they were gonna survive because...they would outlast the skinny little one (B-US, F)." However today, young women commented on struggling to please their families by preparing foods they liked while trying to maintain a healthy body

weight. One commented, "...we are forced to cook a lot because our families tend to be big, we are forced to cook high fat foods [be]cause that tastes the best...but then you want to be skinny (B-US, F)." The younger generation expressed not only feeling pressured about their own weight but also their children's, which reflected their parenting skills. One commented, "they [in-laws] think that the chunkier the child comes out the healthier they are...I hear about it a lot. My daughter is too skinny...because she's not bigger like her cousins or I'm not feeding her enough or the things I'm feeding her are not the right stuff (B-US, F)."

Participants born in Thailand and Laos discussed how they were thin prior to living in the US and that being plump was considered a status symbol or a sign of hardiness. One participant commented, "in the old days...everybody was out in the garden all the time they were active and they were always doing heavy labor so everybody was skinny... and so they considered women who was bigger as beautiful (B-TL², F)." A plumper woman was considered a good mate because of her ability to bare children and take care of the family. However, currently if someone was overweight or obese some participants considered this to be negative. In reference to Hmong people being overweight, one stated, "when we came to this country I see all my people [sigh] never handsome, never pretty anymore (B-TL², M)." However, the desire for children to be plump still existed for some newly immigrated mothers, as one stated, "I want my daughter to be big and heavy but she doesn't want to be heavy so she decided not to consume a lot of meat, but she does eat a lot of fruits and vegetables and milk (B-TL¹)."

DISCUSSION

For Hmong adults, immigration and acculturation levels have influenced transitions in dietary and activity level in association with environmental change. Place of birth, length of time in the US, and age of migration were also found to influence acculturation to some extent. Further, a history of food insecurity in Laos or Thailand appears to play a major role in post-migration eating behavior and for those growing up in the US. Thus, as Hmong immigrate and acculturate to an obesogenic food environment in the US, they have undergone changes in nutritional and health status.

From focus group discussions major themes were identified as a) cultural values impact eating and lifestyle behaviors, b) a history of food insecurity influences post-migration eating behavior, c) acculturation level impacts BMI through diet and exercise, and d) health status of the Hmong is influenced by changed environments.

Cultural Values Impact Eating and Lifestyle Behaviors

Participants reported the traditional Hmong diet consisted of long-grain rice, vegetables, was supplemented with pork, chicken, duck, and wild game if accessible, and was usually boiled, steamed, or lightly stir fried if they could afford oil. Snacking was rare, specific foods were not associated with meal times, and soups were popular and often consumed with meals. Rice was an important staple for most participants because it was a substantial proportion of the diet and served as a determinant for whether or not food was considered a “meal.” This finding has also been reported in other Asian cultures. The Japanese culture equates rice with food in general and foods are considered staples when they make up the bulk of the diet or are considered an indispensable feature of a meal (Ohnuki-Tierney, 1993). Rice consumption was not only associated with meals, but also with satiation. Many of our participants felt the sensation of fullness was not achieved when consuming food without rice. Ohnuki-Tierney (1993) also found that older Japanese who travel abroad complained of feeling unsatisfied after meals without rice. Using rice as a method of monitoring satiation may be a conditioned response and without it unintentional overconsumption may take place. Many American foods were considered snacks by our participants because rice was not consumed with them. Often, participants reported eating another meal of Hmong food right after consuming “American” food. This potentially doubled their consumption rates and may partially be contributing to overweight and obesity, even among those who consume more Hmong versus American food. Rice was considered important in all three groups, however in focus groups, it appeared that some B-US participants were linking rice consumption to illness and obesity. Some B-US participants reported actively reducing their rice consumption because of these negative associations.

Gender roles in the Hmong culture have traditionally placed women at the helm for cooking, whereas men were involved in cooking only after hunting alternative foods

such as deer, birds, and squirrels. Participants reported that customs for food preparation and consumption were usually determined by the husband's family. Men usually marry outside of their clan and the women join their husband's clan (Sangdad, 2002). While living in extended families the women, specifically daughter-in-laws and eldest daughters, took on the responsibility of cooking for the members of the family. Upon arrival in the US, the tradition of living in extended families has continued for some, but not all. For those living in extended families, results showed the consumption of Hmong food was significantly higher compared to those not living in extended families.

Food Insecurity History Influences Post-migration Behavior

A history of food insecurity among our participants appeared to impact food perceptions in the obesogenic environment in the US. During periods of food shortages B-TL¹ and B-TL² participants survived off little meat, few calories, and little to no fruit. Further, they reported being pleasantly surprised at the amount of readily available food in the US. Periods of food restriction, like our participants experienced in Laos and Thailand, has been reported to alter height, fat deposition, metabolism, and eating behaviors during and after food restriction (Clarkin, 2008; Frisancho, 2003; Polivy, 1996). Clarkin (2008) found that Hmong refugees who experienced malnutrition during the perinatal and infancy periods had stunted height as adults, while being born in a war zone was associated with higher adiposity and centralized body fat distribution as an adult. Frisancho (2003) suggested that chronic undernutrition experienced during pre- and postnatal growth may cause a metabolic shift in individuals, which created a preferential use of carbohydrates over fats and increased fat deposition. Increased fat deposition and decreased energy expenditure associated with urbanization may have contributed to the obesity rates among populations from developing nations (Clarkin, 2008; Frisancho, 2003; Smith, 1998). Exposure to food restriction may also alter food preferences and consumption behaviors. Keys (1950) found that when you remove food restriction, men not only overate but consumed previously disliked foods during food restriction. Polivy (1996) suggested that the inhibition of food intake (starvation and dieting) resulted in eating binges once food was available and psychological

manifestations such as preoccupation with food, increased emotional responsiveness, dysphoria, and distractibility.

Although B-US participants believed they were currently food secure, periods of food insecurity were experienced during their early years in the US when families relied on food assistance programs for food. Exposure to food insecurity during critical growth periods may have significantly impacted their weight and health in adulthood. Researchers have shown that obesity and/or financial insecurity at critical growth periods (birth to seven years and adolescence) increased the risk of individuals being obese in the future (Dietz, 1994; Olson, Bove, & Miller, 2007). Several studies have found a positive yet paradoxical association between food insecure individuals and the likelihood of being overweight/obese, having an elevated BMI, and increased weight gain over time compared to food secure counterparts, in women, men, and children (Bell, Wilbur, & Smith, 1998; Dietz, 1994; Olson, 1999; Richards & Smith, 2007; Tanumihardjo, Anderson, Kaufer-Horwitz, Bode, Emenaker, Haqq, et al. 2007). Although B-US and B-TL² participants have both lived in the US for similar amounts of time and experienced periods of food insecurity during their younger years, the degree of food insecurity experienced by B-TL² participants in Laos and Thailand was described as being more severe than what was experienced in the US. The differences in location and degree of food insecurity between these two groups may be important contributing factors for differences in adult eating behaviors.

Cultural practices came to the US with new immigrants, including the practice of overfeeding children. This practice appeared to be linked to food deprivation exposure during the war and in refugee camps by parents and grandparents and because many children died during the migration period, fat children were culturally preferred (Kasemsup & Reicks, 2006). B-US participants struggled with parents and grandparents wanting to overfeed their children, resulting in dueling cultural norms. Many B-US participants have learned that obesity is not healthy but parents and grandparents continue to exert pressure to overfeed children. Therefore, B-US participants may be at more of a disadvantage compared to B-TL participants in regards to excess weight gain and early onset of chronic diseases associated with it. Popkin and Udry (1998) showed

that second generation adolescents born in the US of Hispanic or Asian descent had more than double the chance of becoming obese compared to first generation residents.

Acculturation Level Impacts BMI through Diet and Exercise

Our participants were at different points along the acculturation curve, with B-US participants exhibiting significantly higher levels of acculturation compared to their B-TL¹ and B-TL² counterparts. Increased levels of acculturation among the B-US generation may be another factor contributing to the current obesity and health problems in this population. Higher levels of acculturation, as measured by generational status and/or years lived in the US, has been strongly associated with overweight/obesity and increased BMI in Puerto Rican women, Latinos, and Cubans (Gordon-Larsen, Harris, Ward, & Popkin, 2003; Himmelgreen, Perez-Escamilla, Martinez, Bretnall, Eells, Peng et al., 2004; Hubert, Snider, & Winkleby, 2005). We found no significant differences for BMI's among the different groups, but found high levels of overweight and obesity within all three groups. These BMI levels are comparable to other research findings on this population (Her & Mundt, 2005; Culhane-Pera et al. 2005; Chang, 2005; Clarkin, 2008). Her and Mundt (2005) found that 51% of their convenience sample of Wisconsin Hmong (n=144) had BMI's >27 kg/m² across male and female participants, with a mean age of 50. Culhane-Pera et al. (2005) also found an average BMI of 27.7 kg/m² (BMI range 16-37) in Hmong adults (n=39) with Type II diabetes, ages ranging between 37 and 91. Chang (2005) found that a sample of 50 Wisconsin Hmong, ages 18 to 45, had an average BMI of 26.8 kg/m² and did not differ by gender. Looking at Hmong refugees, Clarkin (2008) found that mean BMI for adult males (n=166) and females (n=113) was above 25 kg/m². English fluency has also been linked to BMI status. Himmelgreen et al. (2004) found that women who were bilingual and spoke fluent or very good English had significantly higher BMI's than women whose English was good to not so good. Based on comments from our newly immigrated refugees, decreased English fluency provided a protective barrier against consuming a more "Americanized" diet because of difficulty conversing in English at fast food establishments and buying foods in American grocery stores.

Although length of time in the US has been shown to negatively impact dietary

behaviors (Himmelgreen, Bretnall, Perez-Escamilla, Peng, and Bermudez, 2005) and weight and BMI status (Kaplan, Huguet, Newsom, and McFarland, 2004; Goel, McCarthy, Phillips, and Wee, 2004) in immigrant populations, length of time in the US for B-US and B-TL² participants in this study appeared to impact them differently. There was a clear difference in acculturation assessment between the B-US and B-TL¹ groups, but the B-TL² group fell somewhere in between the two groups, not as acculturated as the B-US group but more acculturated than the B-TL¹ group, even though the B-TL² and B-US groups had lived in the US for a similar length of time. Potentially, immigrating to a Western country at an older age somewhat limits an individual's capability to adopt social, linguistic, and dietary behaviors of the host/dominant group. Differences in food insecurity exposure between the B-TL² and B-US groups, foods consumed, and habits developed during formative years may also be contributing factors to acculturation level attainment. This study showed that basing acculturation on length of time spent in a Western country for immigrant populations may not always be the most appropriate aggregate analysis to conduct because overall comparisons by length of time in this case would have missed important intergroup differences.

Degree of dietary acculturation for our participants was influenced by age of exposure to foods in the US, length of time in the US, and food assistance programs. After immigration B-TL¹ and B-TL² participants mentioned the addition of some American foods into their traditional Hmong diets, and for B-US participants the inclusion of American foods seemed to replace more traditional foods, thus reducing their intake. Food assistance programs introduced foods outside of cultural norms for B-US participants, while older generations typically maintained traditional eating behaviors and incorporated some American foods into their diets. Some B-TL¹ and B-TL² participants reported preparing two different meals in the evening, Hmong food for themselves and American food for their children. Story and Harris (1989) also showed that adjustment rate to the "American diet" for Southeast Asian families varied by age. The younger generation was more accepting of dietary change, while the older generation found it difficult to adapt to a more "Americanized" diet and desired to

preserve the Hmong culture and cuisine (Story & Harris, 1989). Alterations in the food environment and the influx of foreign foods have been shown to significantly impact traditional eating behaviors of other Asian cultures not only after immigration but also between generations. Ohnuki-Tierney (1993) found that among Japanese urbanites the influx of foreign food in their country reduced rice consumption from 3 times a day to only once or twice a day. Kudo, Falciglia, and Couch (2000) found that when comparing US born Japanese-American mothers (second generation) and daughters (third generation) the daughters ate fewer meals per day, had higher mean frequencies of takeout foods and eating out, lower consumption of traditional Japanese complement foods, and had an elevated intake of salty snacks, soft drinks, and alcoholic beverages compared to mothers. Researchers have shown that after immigration to Western countries, Asian cultures such as Chinese, Korean, and Japanese typically increased food energy density across food groups, with food variety, and “Western” foods, while the frequency of traditional foods decreased (Kim, Moon, & Popkin, 2000; Kudo et al., 2000; Lv & Cason, 2004).

In our sample, length of time in the US was positively associated with dietary acculturation, indicating that the longer participants have lived in the US the more likely they were to have increased levels of dietary acculturation. Differences between the three sub-groups showed that dietary acculturation was only significantly different between the B-US and B-TL¹ group. B-TL² was not significantly different from the B-TL¹ and B-US groups, though the two groups were significantly different in their overall acculturation score. Although B-TL² and B-US groups have been in the US for similar lengths of time, B-TL² participants have a degree of dietary acculturation that is not as high as the B-US group but not as low as the B-TL¹ group, indicating that place of birth and age of migration may play a larger role in the acculturation process than length of time in the US.

Contributions to increased overweight and obesity are not only the result of increased energy consumption but also alterations in activity levels. Several of our participants felt exercise did not have a significant cultural value or the concept was lacking in the Hmong community. In Laos and Thailand intense physical labor and high

levels of food insecurity helped keep the population lean, but after they transitioned to the US their food consumption increased and occupational activity declined. Many parents felt that competing non-physical activities, such as computers, video games, and television, were partly to blame for their children's physical inactivity. Those participants that desired to lose weight only spoke of weight loss in terms of dietary alterations and not through increased activity. Across all environments in the US (work, leisure, travel, and home) energy expenditures have shifted downward (Popkin, 2006). Kandula and Lauderdale (2005) found that Asian Americans were less likely to meet recommended levels of physical activity and had significantly lower estimated weekly energy expenditure compared to US born non-Asians. Popkin, Duffey, and Gordon-Larsen (2005) found that physical activity levels may be decreased in immigrant populations because of the unequal allocation of activity-related facilities and resources for low educated, minority populations. Low-income Hmong parents and youth were found to perceive physically active lifestyles as essential to good health, but activity was hindered because of limited access to safe spaces and time for adequate physical activity (Pham, Harrison, & Kagawa-Singer, 2007).

Health Status is Influenced by Changed Environments

Although migration of certain populations may introduce new foods with health benefits to the host population, typically the migrant population adopts eating patterns that negatively impact not only their waistline but also their health. Changes in diet and activity behaviors greatly impacted the health of our participants. Many had personally dealt with chronic disease or had parents with it. Some parents even commented that their children (usually mid twenty's) were already experiencing problems with hypertension. Previously, while in Thailand and Laos undernutrition was reported as a major health concern, not chronic disease. Tanumihardjo et al. (2007) estimated that by the year 2015 chronic diseases associated with overnutrition will exceed undernutrition and related diseases as the principal cause of death in low-income communities. Increased consumption of "American" foods and fast food has been associated with increased incidence and prevalence of obesity related chronic diseases in the Hmong population. Her and Mundt (2005) showed that 41% of a Hmong adult sample in

Wisconsin was at high risk for developing type two diabetes. Furthermore, Ross, Xie, Kiffmeyer, Bushhouse, and Robison (2003) found that the Hmong population had increased proportional incidence ratios for nasopharyngeal cancer, gastric cancer, hepatic cancer, and cervical cancer compared with all Minnesotans. The health of this population has been greatly impacted by changes in their environment with respect to food access and physical activity. Many participants discussed how problems with diabetes and blood pressure were never an issue in Laos and Thailand. It is as if immigrant group's trade in a set of complicated problems such as those associated with widespread malnutrition with a whole new set of risks that consist of weight gain, decreased physical activity, and increased accessibility to sugary and fatty foods.

Conclusion

Environmental changes and increased levels of acculturation have negatively impacted the weight and health of Hmong adults by altering their eating and physical activity behaviors. B-US generations may be at a higher risk for early onset obesity and chronic disease development compared to their B-TL counterparts.

Acknowledgements: We would like to thank the Hmong community for their gracious participation in this research project.

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Table 1: Sample Characteristics of Hmong Adults

Characteristics	B-TL^{1*} (n=19)	B-TL^{2**} (n=16)	B-US^{3**} (n=30)
Sex			
Male	8 (42%)	4 (25%)	5 (17%)
Female	11 (58%)	12 (75%)	25 (83%)
Age(years) †			
18 - 29	7 (37%)	2 (12%)	26 (87%)
30 - 49	10 (53%)	10 (63%)	4 (13%)
50 - 64	2 (10%)	4 (25%)	0
Mean ± sd	33.5 ± 9.8 ^a	44.4 ± 11.3 ^a	26.4 ± 4.7 ^b
Education†			
< high school	19 (100%)	3 (20%)	1 (3%)
Some high school	0	1 (7%)	0
Completed high school/GED	0	3 (20%)	2 (7%)
Some undergrad/college/technical/vocation	0	6 (40%)	9 (30%)
Completed undergrad/college/tech/vocation	0	1 (7%)	13 (43%)
Completed graduate/professional school	0	1 (7%)	5 (17%)
Mean ± sd	1.0 ± 0.0 ^a	3.3 ± 1.5 ^{§b}	4.6 ± 1.1 ^c
Income (annual household) †			
< \$10,000	10 (53%)	0	2 (6.5%)
\$10,001-\$19,999	5 (26%)	2 (12.5%)	2 (6.5%)
\$20,000-\$39,999	3 (16%)	8 (50%)	5 (17%)
\$40,000-\$59,999	0	2 (12.5%)	5 (17%)
> \$60,000	0	2 (12.5%)	13 (43%)
Unemployed	1 (5%)	2 (12.5%)	3 (10%)
Mean ± sd	1.8 ± 1.2 ^a	3.6 ± 1.2 ^b	4.1 ± 1.4 ^b
Food Assistance Program Usage (% said yes)			
Food Stamps†	18 (95%)	1 (6%)	4 (13%)
Food Distribution	0	1 (6%)	0
School Lunch†	13 (68%)	2 (13%)	3 (10%)
MN Food Assistance Program	4 (21%)	1 (6%)	0
WIC†	10 (53%)	2 (13%)	7 (23%)
Total people in the household (mean ± sd) †			
	6.6 ± 2.1 ^a	6.3 ± 2.9 ^a	4.2 ± 2.1 ^b
Total children in the household (mean ± sd) †			
	4.4 ± 2.1 ^a	3.1 ± 2.8 ^a	1.3 ± 1.5 ^b
Body Mass Index (BMI)			
< 18.5	0	0	0
18.5 - 24.99	5 (28%)	5 (31%)	8 (30%)

25.0 - 29.99	9 (50%)	8 (50%)	9 (33%)
30.0 - 39.99	4 (22%)	3 (19%)	6 (22%)
> 40.00	0	0	4 (15%)
Mean ± sd	27.1 ± 3.6 [‡]	27.4 ± 4.1	30.1 ± 7.1 [¶]
Male	28.8 ± 2.6	28.9 ± 3.4	32.4 ± 7.4
Female	25.8 ± 3.9	26.9 ± 4.2	29.1 ± 6.8

* Participants born in Thailand/Laos and lived in the US for ≤ 5 years.

** Participants who were born in Thailand or Laos, spent their developmental years there, with the oldest migrating at 38 years of age, could recall food memories (generally >8 years of age) from Thailand or Laos during focus group discussions, and had been in the US for >5 years.

*** Participants born in US or born in Thailand/Laos but could not recall food memories because of the short amount of time spent there (1 month to ≤ 8 years of age).

† ANOVA group means significantly different at $p \leq 0.05$ level; unable to perform Chi-square tests because some cells had counts <5.

§ Missing n=1

‡ Excluded n=1, pregnant

¶ Excluded n=3, pregnant

a, b, & c Post-hoc Tukey HSD multiple comparisons test, means significantly at $p \leq 0.05$ level.

Table 2: Migration, Acculturation, and Health and Dietary Self-Assessment of Hmong Adults

	B-TL^{1*} (n=19)	B-TL^{2**} (n=16)	B-US^{3**} (n=30)
Migration Data			
<i>How many years have you lived in the US?†</i>			
1 to 5	19 (100%)	0	0
5 to 15	0	2 (13%)	0
15 to 25	0	1 (6%)	13 (43%)
25 to 35	0	13 (81%)	17 (57%)
Mean ± sd	2.3 ± 0.7 ^a	25.3 ± 6.6 ^b	24.6 ± 3.9 ^b
<i>Where did you live before coming to the US?</i>			
Thailand	18 (95%)	4 (25%)	12 (40%)
Laos	1 (5%)	8 (50%)	2 (7%)
Born in U.S.	0	0	15 (50%)
Laos and Thailand	0	2 (6%)	1 (3%)
Canada/France	0	2 (13%)	0
Acculturation Data			
<i>What language do you speak at home?†</i>			
Only in Hmong	16 (84%)	3 (19%)	0
More Hmong than English	3 (16%)	3 (19%)	3 (10%)
Both Hmong and English equally	0	7 (44%)	13 (43%)
More English than Hmong	0	3 (19%)	14 (47%)
Only in English	0	0	0
Mean ± sd	1.2 ± 0.4 ^a	2.6 ± 1.0 ^b	3.4 ± 0.7 ^c
<i>What language do you usually think?†</i>			
Only in Hmong	10 (56%)	4 (25%)	0
More Hmong than English	6 (33%)	2 (13%)	0
Both Hmong and English equally	2 (11%)	5 (31%)	8 (27%)
More English than Hmong	0	5 (31%)	20 (67%)
Only English	0	0	2 (6%)
Mean ± sd	1.5 ± 0.7 ^{§a}	2.7 ± 1.2 ^b	3.8 ± 0.5 ^c
<i>Your closest friends are?†</i>			
All Hmong	15 (79%)	4 (25%)	9 (30%)
More Hmong than Americans	2 (11%)	4 (25%)	13 (43%)
About half and half	2 (11%)	8 (50%)	6 (20%)
More Americans than Hmong	0	0	2 (7%)
Only Americans	0	0	0
Mean ± sd	1.3 ± 0.7 ^a	2.2 ± 0.8 ^b	2.0 ± 0.9 ^b
<i>What languages do you speak with friends?†</i>			
Only in Hmong	16 (84%)	1 (6%)	0
More Hmong than English	3 (16%)	5 (31%)	1 (3%)
Both Hmong and English equally	0	6 (38%)	12 (40%)

More English than Hmong	0	4 (25%)	15 (50%)
Only English	0	0	2 (7%)
Mean ± sd	1.2 ± 0.4 ^a	2.8 ± 0.9 ^b	3.6 ± 0.7 ^c
Most of my children's friends' parents' are?†			
All Hmong	9 (47%)	4 (25%)	4 (13%)
More Hmong than Americans	4 (21%)	3 (19%)	11 (37%)
About half and half	6 (32%)	5 (31%)	2 (6.5%)
More Americans than Hmong	0	2 (13%)	2 (6.5%)
All American	0	0	0
Not Applicable	0	2 (13%)	11 (37%)
Mean ± sd	1.8 ± 0.9 ^a	2.8 ± 1.6 ^{a,b}	3.5 ± 2.0 ^b
I eat†			
Only Hmong foods	5 (26%)	0	0
Mostly Hmong foods	4 (21%)	7 (44%)	9 (30%)
Equal amounts of Hmong and American foods	10 (53%)	6 (38%)	17 (57%)
Mostly American foods	0	3 (19%)	4 (13%)
Only American foods	0	0	0
Mean ± sd	2.2 ± 0.8 ^a	2.7 ± 0.7 ^{a,b}	2.8 ± 0.6 ^b
Total Acculturation Score (Mean ± sd) †	9.4 ± 2.3 ^a	15.9 ± 3.9 ^b	19.2 ± 3.1 ^c
Health and Dietary Self-Assessment Data			
What would you say your health is?			
Poor	0	0	0
Fair	4 (21%)	5 (33%)	13 (43%)
Good	12 (63%)	7 (47%)	12 (40%)
Very Good	3 (16%)	2 (13%)	2 (7%)
Excellent	0	1 (7%)	3 (10%)
Mean ± sd	2.9 ± 0.6	2.9 ± 0.9 [§]	2.8 ± 0.9
What would you say your diet is? †			
Poor	0	1 (7%)	1 (3%)
Fair	3 (16%)	3 (20%)	16 (53%)
Good	9 (47%)	6 (40%)	10 (35%)
Very Good	7 (37%)	4 (27%)	3 (10%)
Excellent	0	1 (7%)	0
Mean ± sd	3.2 ± 0.7 ^a	3.1 ± 1.0 ^{§,ab}	2.5 ± 0.7 ^b

* Participants born in Thailand/Laos and lived in the US for ≤ 5 years.

** Participants born in Thailand or Laos, spent their developmental years there, with the oldest migrating at 38 years of age, could recall food memories (>8 years of age) during discussions, and in the US for >5 years.

*** Participants born in US or born in Thailand/Laos but could not recall food memories because of the short amount of time spent there (1 month to ≤ 8 years of age).

† ANOVA group means significantly different at p≤0.05 level

§ Missing n=1

^{a, b, & c} Post-hoc Tukey HSD multiple comparisons test, means between sub-groups significantly different at p≤0.05 level.

Chapter 3:

**Differences in Stature, BMI, and Dietary Practices between US born and Newly
Immigrated Hmong Children**

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Social Science and Medicine. 2009;69(3):442-450

INTRODUCTION

Throughout history the Hmong have undergone hardships and relocations, exposing them to environmental and lifestyle changes. Their series of resettlements began around 1810 when many left southern China for the highlands of Laos because of clashes with the Han Chinese (Culas, 2004). In the 20th century, many supported Americans during the Vietnamese War and by the late 1970's, as the war came to a close, some resettled in refugee camps in Thailand and others sought refuge in the United States (US) (Goldfarb, 1982; St. Paul Foundation, 1994). From 1990 to 2000, the Hmong population in Minnesota increased by 135% with between 42,000 and 70,000 Hmong living there (US Census Bureau, 2003; Leslie, 2001). In Hmong infants and children, a high incidence of stunting and overweight has been observed (Himes, Story, Czaplinski, & Dahlberg-Luby, 1992; Gjerdingen, Ireland, & Chaloner, 1996; Hyslop, Deinard, Dahlberg-Luby, & Himes, 1996). However, the majority of the literature regarding dietary acculturation and body composition changes for immigrants has been done with adults (Kim, Moon, & Popkin, 2000; Lv & Cason, 2004; Himmelgreen, Bretnall, Perez-Escamilla, Peng, & Bermudez, 2005; Culhane-Pera, Peterson, Crain, Center, Lee, & Her, 2005; Her & Mundt, 2005; Clarkin, 2008; Franzen & Smith 2009). Research with Asian immigrant children has typically focused on changes in anthropometric measurements, and in regard to dietary intake only calcium intake has been examined (Auld, Boushey, Bock, Bruhn, Gabel, Gustafson, et al. 2002; Vue & Reicks, 2007). Therefore, the purpose of this study was to investigate how acculturation influences diet, cultural practices related to cooking and food preparation knowledge, and stature and body mass index (BMI) of Hmong children.

METHODS

Design and Sample

Focus groups (n=12) were conducted during the spring of 2008 in St. Paul/Minneapolis, MN with Hmong children who were born in the US and 9-13 years old (B-US¹, n=22), who were born in the US and 14-18 years old (B-US², n=25), and who were born in Thailand or Laos, had lived in the US \leq 5 years, and 14-18 years old (B-TL, n=21). Five years was used as a marker because that period represented the

latest wave of migration for newly immigrated Hmong. Participant recruitment took place through local community groups and leaders. Children with diverse backgrounds were intentionally sampled for this study. The number of children in each focus group ranged from 6 to 8, with 9-13 year olds and 14-18 year olds in separate groups.

Focus group questions were developed using the social cognitive theory (SCT) as the theoretical framework, along with a review of the literature. The SCT, grounded in psychological and sociological principles, evaluates the triadic and dynamic interactions between personal, behavioral, and environmental factors (Bandura, 1977). The application of behavioral theories has been useful when examining dietary behavior (Bandura, 1977; Rinderknecht & Smith, 2004; Fila & Smith, 2006; Lautenschlager & Smith, 2007). Open-ended questions with prompts generated discussions on traditional and current dietary habits, food insecurity, food assistance program use, cultural traditions, and health issues. Children were able to discuss mealtime patterns and cooking methods used in the home. When necessary, terms were clarified, such as diabetes and hypertension. Demographic, height, weight, and acculturation assessment data were collected. Acculturation typically describes the process of a minority group taking on the host/dominant groups' cultural patterns (Satia-Abouta, 2003). Bidirectional acculturation models take into consideration that the host/dominant culture may also be altered by the influx of the minority group (LaFromboise, Coleman, & Gerton, 1993). This model illustrates how true connection still resides with their original minority group, even though integration into the dominant culture may occur (LaFromboise et al. 1993). To address acculturation level in Hmong children we investigated length of time in the US, stature and BMI status, and administered an acculturation assessment tool. The University of Minnesota's Institutional Review Board (IRB) approved this study.

Measures and Analysis

Sessions were conducted by two researchers trained in focus group methods, facilitation, and evaluation (Morgan & Krueger, 1998). Groups were conducted until no new information was introduced and had become redundant (Krueger & Casey, 2000). Nine groups were conducted in English only and three were a mix of Hmong and

English, with translators provided. All groups were audiotaped and transcribed verbatim. Transcriptions were coded by researchers independently to categorize themes and subthemes, with intensity of opinions also given consideration, and any discrepancies resolved prior to further analysis (Morgan & Krueger, 1998). Coded transcripts were assessed with NUD*IST Vivo (Nvivo, Thousand Oaks, CA)®, a qualitative data analysis software.

Acculturation level was evaluated by children completing a modified instrument previously created by Marin, Sabogal, Marin, Otero-Sabogal, and Perez-Stable (1987) called “A Short Acculturation Scale for Hispanics.” This scale had comparable reliability and validity coefficients to other published scales and allows rapid and consistent categorization of acculturation levels. The scale has also been used with Hmong adults (Franzen & Smith, 2009), but has not been used with Hmong children. Questions regarding language (language use at home, with friends, and think in), social connections (friends), and overall eating patterns (I eat) with possible responses are located in Table 2 under the heading “Acculturation Assessment Tool Questions.” All questions were reviewed by Hmong informants and tested prior to administration. To test the reliability of the instrument a small group of children (n=22) completed the forms at two different times. A paired samples t-test was used to compare repeated measure responses and no significant differences were found, leading us to believe this instrument is reliable to use with Hmong children. Overall acculturation level was determined by the summation of responses to the questions, with lower levels of acculturation being equivalent to a lower sum score and higher levels of acculturation being equivalent to a higher sum score. Questions and their possible responses to attain child’s perceptions of health status and dietary quality are listed in Table 2 under the heading “Perceptions of Health and Diet.” To obtain additional information regarding eating patterns, children were asked if breakfast, lunch, and dinner were mostly Hmong or American food and this is located under the heading “Breakfast, Lunch, and Dinner Patterns” in Table 2.

Children were measured with a portable stadiometer and weighed without shoes and heavy outer clothing. Epi Info™ v. 3.3.2 (Centers for Disease Control and

Prevention [CDC], 2005), was used to compute Stature-for-Age and BMI-for-Age percentiles, which were both age and gender specific. Child obesity was defined as $\geq 95^{\text{th}}$ percentile, overweight as $\geq 85^{\text{th}}$ to $< 95^{\text{th}}$ percentile, healthy weight as $\geq 5^{\text{th}}$ to $< 85^{\text{th}}$ percentile, and underweight as $< 5^{\text{th}}$ percentile (CDC, 2006).

Statistical Analysis

Data were analyzed using the Statistical Packages for the Social Sciences (SPSS, v. 14, 2005) software. Demographic information, eating patterns, acculturation assessment, and height and weight data sub-group means were compared using one-way analysis of variance (ANOVA) and post-hoc Tukey Honestly Significant Differences (HSD) multiple comparisons test to determine significant differences.

RESULTS

Sample Characteristics

Sixty-eight Hmong children (36 Males [M] and 32 Females [F]) participated in focus groups (Table 1). Average age was 11.4 ± 1.3 , 15.9 ± 1.2 , and 15.7 ± 1.3 years old for B-US¹, B-US², and B-TL respectively.

BMI, Stature, and Acculturation

Major differences were noted in stature with 0%, 28%, and 43% of children having short stature ($< 5^{\text{th}}$ percentile) and in BMI with 63%, 60%, and 19% of children being at risk or overweight ($> 85^{\text{th}}$ percentile) for B-US¹, B-US², and B-TL respectively (Table 1). B-US¹ were significantly taller than B-TL and B-US². B-TL had significantly lower BMI-for-age percentiles compared to both B-US¹ and B-US².

Acculturation Assessment

No significant differences for acculturation levels were found between genders within the B-TL and B-US group (Table 2). Looking specifically between age groups and genders within B-US, 14-18 year old girls rated their overall health significantly lower than boys, and no other differences were found. Perceptions of diet and health were significantly different among all groups, with B-TL rating their diet and health the highest and B-US² rating theirs the lowest. B-TL scored significantly lower on acculturation questions regarding language use compared to B-US¹ and B-US². B-TL scored significantly lower than B-US¹ for social connections. There were no significant

differences among the groups for the overall dietary acculturation question, indicating similar cultural eating patterns. When looking specifically at meal times, regardless of group, children reported breakfast was a mix of Hmong and American food with no significant differences found. However, significant differences were reported between B-TL and B-US¹ for lunch and dinner. B-US² was not significantly different from B-TL or B-US¹. Hmong food was consumed at dinner by most children, but all B-TL children ate only Hmong food at dinner (Table 2). Based on the overall acculturation score B-TL was significantly less acculturated (10.2 ± 2.4) compared to both B-US¹ (16.4 ± 3.2) and B-US² (16.2 ± 2.4).

Focus Group Data

Dominant themes identified through evaluation of the focus groups were: 1) meal time patterns; 2) determinants of food health; 3) future health concerns; and 4) changing cultural traditions.

Theme 1: Meal Time Patterns

The majority of B-TL lived in refugee camps prior to the US and food insecurity was common. One stated, “we weren’t starving to death or anything, but there were times when we were short on money and didn’t get all the food we wanted, but we still got enough food to survive (B-TL, F).” Typically, limited monetary resources would result in food shortages one to two times per month. Food insecurity was combated with food sharing among friends and family, income from sewing, US relatives sending money, or fathers working temporary jobs or doing manual labor. Rice, vegetables, eggs/omelets, and different types of soups were eaten daily. Food preparation was typically boiled or steamed. Fruits were often consumed at lunch, such as watermelon, grapes, and mangoes, but not eaten daily because of expense. Snacking between meals and desserts were absent while living in refugee camps.

Dietary acculturation was evident in B-US and B-TL children for meal times. In the US, for all groups, breakfast was Hmong or American foods or sometimes absent altogether. One commented, “sometime I eat rice with chicken and eggs and sometime I eat cereal with milk (B-TL, F).” If cereal was eaten, the majority reported eating name brand, sweetened cereals. Not eating breakfast at home was attributed to lack of time,

not being hungry, or because they ate school breakfast. Examples of school breakfast were breakfast pizzas, sausage, biscuit sandwiches, cinnamon rolls, and cereal, which were labeled as American foods. Most reported consuming school lunch. Many B-US had negative comments about school lunch regarding texture, freshness, and taste. One stated, "...like the chicken nuggets or mini corndogs, sometimes if you're clumsy you drop the food and it bounces. What kind of food bounces? So it just feels like the food is rubbery (B-US², F)." Few brought packed lunches to school, with most expressing barriers to bringing a packed lunch. One stated, "I'm in middle school...so that's kinda awkward... 'cause most kids don't bring their lunch to school...it's uncomfortable too 'cause we don't have the right space to put our food (B-US¹, F)." Some B-US² stated that because of expense they skipped lunch. Across groups, the evening meal usually contained rice and a mix between boiled soups and stir fried dishes, with 2-3 dishes to choose from. Some reported that parents opted for convenience food during the week and made traditional dishes on the weekends. Some snacked after school and some did not. Desserts were generally limited to special occasions such as birthdays, parties, or picnics. A change for B-TL was the incorporation of snacking after school and the occasional dessert after meals.

For the majority, rice was considered an important part of their daily diet. Rice was depicted as completing a meal, a neutralizer, satiating, traditional, readily available at home, and eaten with a variety of foods. One stated, "we use rice daily. We always have rice cooked 'cause rice goes with anything (B-US¹, M)." However, rice was identified as not being complimentary with such foods as pizza, tacos, and fast food items, with the exception of Kentucky fried chicken. Some reported when another carbohydrate source was present they did not consume rice. One said, "...if I'm eating American food like hot dogs or something with a bun I probably not eat it with rice, but if it's more like stir fry, chicken, pork, beef, most likely I would eat it with rice (B-US², M)." Rice was reported as usually being absent from the school lunch menu so the majority of rice consumption took place at home.

Theme 2: Determinants of Food Health

Children across groups had distinct definitions and characteristics associated

with American and Hmong food. American foods were labeled as hamburgers, pizza, cheese, hot dogs, lasagna, casseroles, desserts, cakes, fast food, steak, fries, nachos, macaroni and cheese, spaghetti, tacos, junk food (soda, candy, chips), salad, granola bars, sausage, bacon, and sandwiches. Some examples of Hmong foods were rice, dishes with lots of vegetables, egg rolls, Vietnamese noodle soup, noodles, stir fry, tapioca, hot pepper, papaya salad, and curry noodle soup.

For some the label “healthy” was related to whether a food was considered Hmong or American. Some reported that over consuming American foods would have negative consequences. One stated, “It [American food] tastes good, but it’s bad for your body...if you eat a lot of them, you will be bigger (B-TL, M).” Some B-TL stated American food was healthier because it was cleaner compared to foods eaten prior to the US, thus relating foods prior to the US as lacking in safety and sanitation. Some made cases for why Hmong food was healthier by stating it was simpler and had fewer ingredients. One stated, “American food has lots of ingredients put into the food, which adds fats and calories. But Hmong food, there’s less things put in there, like types of soups so there’s less calories (B-US², M).” Others stated Hmong food was high in oil and salt and therefore not healthy.

Several children reported the health of a food depended on what type of food/dish was being consumed because both Hmong and American foods had healthy and unhealthy items. One stated, “I think it’s the way they’re cooked, ‘cause some Hmong food can be really bad for you, like egg rolls, I know those are bad ‘cause it’s like fried oil and the oil is still in the egg roll when you eat it (B-US², M).” In general, foods that were high in oil, salt, calories and fat, were deep fried, and produced negative digestive effects were considered unhealthy.

Theme 3: Future Health Concerns

Several expressed concern about their future health in relation to diabetes, hypertension, and obesity. These concerns originated from children observing ill grandparents/relatives as well as parent’s concern over their eating and exercise habits. One commented, “he [dad] encourages us to eat healthy foods [because] my grandpa and grandma have high blood sugar...so they [parents] want us to be healthy when we

get older (B-US¹, F, BMI=17.7).” Rice consumption was associated with diabetes and the Hmong having a history of diabetes. One stated “...many times my mom told me to slim down on the rice...she keeps telling me rice is full of sugars and that’s why Hmong people have a tradition of getting diabetes (B-US¹, M, BMI=34.0).” Many B-US¹ and B-US² reported their grandparents and/or parents also had problems with high blood pressure. Obesity was discussed as a precursor to chronic disease and also as a consequence of consistently overeating. Children commonly recognized that being too heavy as well as too thin could have negative consequences. One stated, “when you’re too big then you get lazy and if you’re too skinny, that means you’re not getting enough food in your system (B-US¹, M, BMI=26.7).”

Strategies to reduce overweight/obesity or maintain their weight were altering physical activity and/or eating habits. Parents were referenced as a source of motivation and encouragement to be physically active. One stated, “...when I come home from school he’ll [dad] make me and my little brother work out with him...it has to be at least 30 minutes...’cause my older brother he’s really big and my dad is scared for us (B-US², F, BMI=35.3).” Exercise was described as running, jogging, playing sports, dancing, and riding bikes. Barriers to physical activity were temperature/season, busy schedules, and just not wanting to exercise. Some B-US² girls reported exercising was not common in their age group, and they preferred diet modification.

Children spoke frankly about dietary methods they and their friends used to prevent excess weight gain or maintain a healthy weight. Some monitored their food intake by taking into consideration ingredients, portion sizes, or preparation style. Some B-US² girls and boys reported skipping a meal to maintain or lose weight. Some reported they knew of siblings, friends, or peers that were practicing unhealthy weight management behaviors. One commented, “you know how these girls want to be skinny...but they don’t know if you’re really skinny you might ‘cause a sickness ‘cause of your body wanting more food. Some girls don’t eat...because they don’t wanna become a fat girl (B-US¹, F, BMI=18.8).” One boy expressed concern about his sister’s lack of eating by saying, “...she doesn’t eat enough meat or anything...she’s really skinny...she just says she doesn’t wanna eat meat or else it’ll get her fat (B-US¹, M,

BMI=26.3).”

Theme 4: Changing Cultural Traditions

Many stated their traditions and culture were in the process of changing, with the potential for contraction and loss in areas. Factors contributing to these changes were gradual shifts in gender roles and traditional cooking methods/knowledge. Both genders identified females as traditionally taking on the primary cooking and cleaning responsibilities, with males having limited participation. Many girls reported learning to cook between 7 and 10 years old, with their first foods being rice, eggs, or noodles. Girls reported cooking was important for their current and future family. One stated, “the traditional thing for Hmong girls are they’re supposed to learn to cook, and then when they get married they know what to do...so for me I should know how to cook because I have a little brother and...sometimes if he gets hungry, I could just start cooking (B-US¹, F).” Several girls stated mothers and grandmothers grounded their rationale on the importance of learning how to cook in marriage. One commented, “my grandma and mom lecture all the time about cooking. Especially my grandma...she’s like...you have to learn how to cook...you can’t get married unless you learn to cook (B-US², F).” Several girls reported learning to cook through observing mothers/grandmothers and gradually entered into the cooking process by taking on simple tasks and moving their way up to making dishes.

Males were identified as needing to know how to make specialty dishes and their household responsibilities were linked to butchering, yard work, and manual labor. Specialty dishes were usually tied to hunted foods, as one stated, “...the main thing guys need to know how to cook is squirrel, fish, and Laab [beef salad], that’s basically what guys are supposed to do (B-US², M).” Some boys stated cooking was girls’ work and then cleaning up (clearing the table, washing dishes, sweeping) was boys’ work. Another male-oriented task related to meal preparation was learning to butcher animals for events. One reported, “we go to our farms and kill our cows and then they bring it for funerals or big parties, ‘cause the men from Laos know how to do it [butcher] and it’s part of them becoming men that their dad would teach them (B-US², M).”

Although females were often recognized as the primary cooks, some reported cooking could be done by both genders. Many reported that a father's role in the kitchen varied from helping out when mom was tired or busy to evenly splitting the cooking load with moms. Some boys reported that mothers and older sisters were requesting their assistance in the kitchen and encouraging them to learn how to cook through observation. One stated, "my sisters are teaching me, she's telling me to observe her...watch how she's stirring it... 'cause if you're out in the wild or something's wrong, then you know how to survive (B-US¹, M)." Some mothers requested their sons be in the kitchen because the daughters were at college and/or married and living in another household. One commented, "my mom sort of treats me like a daughter... she expects girl things out of me...responsibilities around the house, like cleaning, helping cook, helping prep food, and on top of that do all the guy stuff (B-US², M)." Some boys reported that times were changing and either gender could cook, clean, or do chores around the house. Some inferred that busy schedules with school and work left the responsibility to whoever was home or free to cook and clean. Some boys reported it would be good for them to know how to cook in the future so they could share the responsibility with their future mate.

Most of the children believed traditional foods were an important part of their culture and something they did not want to lose. One stated, "I think it's good for me to keep the tradition going 'cause what I learn to cook is traditional food and we don't really cook American food...so I want to keep the tradition going so it's not lost (B-US², F)." However, what was considered traditional food or preparation methods was not always consistent across families. One stated, "I think we say tradition but within each family there's a level of tradition, for example we stir fry and eat that normally...but for my boyfriend's family...they do boiled cooking and I'm not used to that and that's even more traditional than my family (B-US², F)." A few mentioned their families cooked a mix of Hmong and American foods and were learning to cook American foods because their parents had been exposed to it. Also, several B-US boys, who were not skilled in cooking, often opted for convenient, microwavable foods when they were hungry for a snack after school, did not care for what was offered at dinner,

or for a snack between meals.

DISCUSSION

The results of this study showed differences among children for stature and BMI, but similarities in dietary acculturation existed depending on their birth and migration information, history of food insecurity, and experiences during formative years. Compared to B-US children, B-TL were significantly shorter and leaner, which indicates that years lived in the US and age of migration play a major role in current body composition. B-US also showed elevated acculturation levels in language use, social connections, and accelerated changes in their social structure related to gender-oriented tasks compared to B-TL. Using our data we have developed a model depicting the acculturation process taking into account acculturation questions, anthropometric measures, and focus group discussions (Figure 1.). It incorporates individual and environmental (home, school, community, and overall environment) components that have the potential to interact and influence subsequent dietary intake, body composition, and body image perception. Additionally, the types and intensity of factors individuals were exposed to within each environmental level varied, which in turn resulted in different interactions for B-US and B-TL. Having the different environments (community, school, home, and individual) layered on top of each other represents how these levels are connected and have the potential to infiltrate across their borders, thus all having the potential to influence diet and body composition. Also, the overall environment (US versus Overseas) one was exposed to during formative years can significantly impact dietary patterns and acculturation level attainment. Those born in the US may have a different perspective on what Hmong traditions are and what will be Hmong culture in the future. The dietary acculturation model proposed by Satia-Abouta, Patterson, Neuhouser, and Elder (2002) also considered similar contributing factors to the acculturation process, however, their model did not depict how different levels and factors are interconnected and therefore related to dietary intake and body composition. In addition to important findings regarding dietary acculturation and anthropometric outcomes, major themes from focus group discussions were meal time

patterns, determinants of food health, future health concerns, and changing cultural traditions.

BMI, Stature, and Acculturation

Our data showed that B-US had similar growth patterns and were on average significantly taller and heavier than B-TL, indicative of how different environments, experiences, and years lived in them can have positive and negative body composition effects. These findings suggested the US environment exposed them to nutrition more conducive to growth during their developmental years. Increased access to adequate calories and protein may have helped them achieve a taller stature than those who grew up in refugee camps. However, the increased access to food and calories also appears to have influenced their BMI status. Graham (2005) found that in general children born in the US were more likely to be taller and heavier than their foreign-born counterparts. Anthropometric assessments in adults, such as BMI, length, and stature, have been associated with nativity and years lived in the US (Lauderdale & Rathouz, 2000). Popkin and Udry (1998) found in a nationally representative sample of adolescents that 20.6% of the Asian-Americans were overweight and those born in the US were twice as likely to be obese compared to first generation residents. Research shows that childhood obesity increases the risk of obesity and obesity related chronic diseases later in life (Lawlor & Chaturvedi, 2006). If this holds true, our sample of B-US children will be at increased risk for future obesity and obesity related diseases compared to their B-TL counterparts.

Acculturation Assessment

Our study not only demonstrated significant differences in growth patterns between B-US and B-TL, but also how aspects of acculturation, such as language use, social connections, overall dietary patterns, and perceptions of diet and health differed. Although overall acculturation score was lower for B-TL, language use and social connections decreased their scores, which was also found with newly immigrated adult Hmong by Franzen & Smith (2009), indicating those areas do not acculturate as quickly and may not reach the same level as children who were born and/or raised in the US. With respect to overall diet, there were no significant differences among the groups,

which indicated all groups were consuming a mix of Hmong and American foods. However, significant differences in perceptions of diet and health were detected between the groups, with B-TL rating their diets and health higher than B-US children. B-TL children may have perceived their diet and health as better because of their previous experiences with lack of food and safety and sanitation in Laos/Thailand and their increased financial and food security status in the US.

Meal Time Patterns

Our study showed factors that influenced dietary patterns were food assistance programs, foods available at school and home, and peers. Food assistance programs and foods at school have added American foods into Hmong diets regardless of where children were born. B-TL were primarily exposed to American foods at lunch because they had free or reduced lunch and adapted quickly to the foods served at school, whereas most B-US were not on food assistance programs. This trend in food assistance program use was also noted in Hmong adults with almost all B-TL adults being on food stamps or had children who received free or reduced lunch, whereas well established Hmong were moving away from assistance programs (Franzen & Smith 2009). Researchers have shown that after immigration to Western countries, Asian cultures such as Chinese, Japanese, and Hmong usually have increased food consumption in variety, food groups, and “Western” foods, while traditional food consumption decreases (Story & Harris, 1989; Kudo, Falciglia, & Couch, 2000; Lv & Cason, 2004). Both B-TL and B-US were most likely consuming more American foods than their parents or grandparents, with younger generations substituting American foods for Hmong foods at certain meals, whereas older generations have been shown to eat American foods in addition to their traditional diets (Franzen & Smith, 2009). The importance of rice as a part of the traditional Hmong diet has been demonstrated linguistically in the invitation to eat, which roughly means come, eat rice. While children thought rice was important, most only consumed it at dinner. Ohnuki-Tierney (1993) showed that foreign food introduction in Japan resulted in decreased rice consumption per day in urban dwellers. Younger generations may have reduced rice

consumption patterns in childhood in conjunction with lack of rice availability at school and because it does not go with some American foods.

Determinants of Food Health

Children in our sample defined food as being healthy depending on their components, safety and sanitation, and whether or not they were labeled Hmong versus American foods/dishes. Many demonstrated knowledge that consuming foods high in fat and oil on a regular basis was associated with a larger body size and could negatively impact future health, however, they reported this knowledge did not always stop them from consuming those foods. Croll, Neumark-Sztainer, and Story (2001) found that adolescents in an ethnically diverse school were knowledgeable about healthy foods, but found it challenging to follow healthy eating recommendations. Looking at low-income Hmong adolescents, Pham, Harrison, and Kagawa-Singer (2007) found that diets stressing fresh fruits and vegetables were valued and viewed as important for health, but barriers included access to land and time for food preparation at home. In contrast, most of the children from our study placed more value on vegetables than fruits with regards to daily consumption. Franzen and Smith (2009) reported a similar trend with Hmong adults, where fruits were not a daily part of their diet like vegetables because fruits were labeled as appetizers, desserts, coffee table items, or only present at special occasions.

Future Health Concerns

Several children in our sample reported that concerns regarding eating and physical activity patterns stemmed from parents' concerns for their future health. Many reported that parents and/or grandparents suffered from chronic diseases associated with overweight/obesity, indicating that parents recognized the connection between overweight/obesity during childhood and future chronic disease development. Research has shown a strong connection between childhood overweight and subsequent adult obesity (Freedman, Ogden, Berenson, & Horlick, 2005) and also that hyperlipidemia, hypertension, and abnormal glucose tolerance occur with increased frequency in obese children and adolescents (Dietz, 1998). Although newly immigrated refugees displayed lower BMI levels, research has shown that environmental change by migration within

the first two decades of life can negatively impact chronic disease development (Bogin, Smith, Orden, Varela Silva, & Loucky, 2002). However, according to our results B-US children who were already in the “at risk for overweight” or “overweight” category may be more prone to early onset chronic disease compared to their B-TL counterparts.

Strategies to maintain or reduce weight status in our sample involved diet and physical activity. However, some inferred that dietary over activity modifications were preferred and that some unhealthy weight practices may be occurring. Recent research showed that Hmong adolescents may be at a higher risk for dissatisfaction with their body and therefore practicing unhealthy weight management behaviors (Stang, Kong, Story, Eisenberg, & Neumark-Sztainer, 2007). Pham et al. (2007) also found that low-income Hmong youth were not very physically active because of limited access to safe spaces and time. In contrast, Hmong girls in our study preferred not to be active and modified their dietary practices instead. Children in our study often identified females as practicing potentially unhealthy dietary practices as a means for weight control. With the growing prevalence of chronic disease associated with obesity in this population it will be important to emphasize healthful practices regarding weight maintenance and reduction for children.

Changing Cultural Traditions

Hmong children in our study reported that traditional gender roles were well defined with females being responsible for domestic duties such as meal preparation and cleaning, whereas males were responsible for heavy duty or manual labor with limited participation in meal preparation. Although many perceived these gender roles to hold true currently, some reported changes in gendered household activities, not only by observing their fathers in the kitchen, but also because some males reported their mothers and older female siblings were requesting their help in the kitchen. With adaptation to life in the US, the Hmong have faced many lifestyle changes, including gender roles with women becoming more active outside of the home (Sperstad & Werner, 2005). With increasingly busy lifestyles and elder daughters marrying into another family and/or attaining higher education, mothers may be challenging

traditional gender roles by utilizing who is home to help with household duties, regardless of their child's gender.

Not only were changes reported in who was helping and learning to prepare meals but also what and how food was being prepared. Although many reported learning and preparing traditional Hmong foods, the question arose as to what traditional meant by different families standards. In the past boiling, steaming, and roasting were considered traditional food preparation styles, but now for some stir frying was considered traditional. Also, some children reported learning to cook American foods in addition to Hmong foods was associated with their parents' level of American food exposure. With B-US children being exposed to American foods at school breakfast and lunch, as well as potentially being taught how to cook American foods at home, more of their diets are including American foods, thus expediting the acculturation process.

LIMITATIONS

Although results may not be generalizable to all Hmong children living in the US, the data provide researchers with baseline information regarding potential trends in diet, health, weight, and stature. While the sample size may be considered small for quantitative studies, our sample is considered to be of good size for qualitative research. Previous qualitative research has included sample sizes ranging from 15 to 50 (Macario, Emmons, Sorenson, Hunt, & Rudd, 1998; George, Freedman, Norfleet, Feldman, & Apter, 2003). Focus group data is descriptive, provides in-depth information, is appropriate for small samples, and is very rigorous when properly done (Morgan & Krueger, 1998). Our sample size was deemed adequate because we had achieved the "point of saturation," when no new information was being introduced (Morgan & Krueger, 1998). Although some topics may have been difficult to verbalize, such as food insecurity, food assistance, cultural traditions, and health, children did not seem to have problems discussing these issues. Children were grouped with other children of similar backgrounds, providing them with an environment to have frank discussions about the topics mentioned. Additionally, we used language appropriate for each group.

CONCLUSIONS

The findings of this research show how acculturation, length of time in the US, and birth place may play an important role in stature and BMI status, food and physical activity habits, and cultural practices regarding cooking and food preparation knowledge of Hmong children. The results are significant given the large-scale migration patterns of immigrants into obesogenic environments as well as the expense of health care costs involved with obesity-related diseases. Additionally, there is a lack of information regarding how migrant children of Asian subgroups, well established and newly immigrated, perceive what is considered healthy and why. Understanding Hmong child's perception of food and health could be used to develop future interventions to prevent continued increases in BMI.

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Table 1: Sample Characteristics of Hmong Children

Characteristics	B-US¹ (n=22)	B-US² (n=25)	B-TL (n=21)
Sex			
Male	12 (55%)	16 (64%)	8 (38%)
Female	10 (45%)	9 (36%)	13 (62%)
Age (years)			
Mean ± sd	11.4 ± 1.3	15.9 ± 1.2	15.7 ± 1.3
Grade Level			
Elementary School	8 (36%)	0	0
Middle School	14 (64%)	2 (8%)	0
High School	0	23 (92%)	21 (100%)
Height for Age percentiles			
<5th percentile	0	7 (28%)	9 (43%)
≥5th to <50th percentile	16 (73%)	15 (60%)	12 (57%)
≥50th percentile	6 (27%)	3 (12%)	0
Mean ± sd ^d	2.3 ± 0.5 ^a	1.8 ± 0.6 ^b	1.6 ± 0.5 ^b
Body Mass Index (BMI) for Age percentiles			
< 5th percentile	0	0	0
≥5th to <85th percentile	9 (41%)	10 (40%)	17 (81%)
≥85th to <95th percentile	8 (36%)	5 (20%)	4 (19%)
≥95th percentile	5 (23%)	10 (40%)	0
Mean ± sd ^d	79.6 ± 19.2 ^a	84.0 ± 18.9 ^a	62.0 ± 21.1 ^b
BMI (mean ± sd) ^d			
Male	22.2 ± 3.9 ^a	27.7 ± 4.7 ^b	20.7 ± 1.6 ^a
Female	20.9 ± 3.3 ^a	25.5 ± 4.9 ^b	22.4 ± 2.9 ^{ab}
B-US ¹ = Born in the US and 9-13 years old B-US ² = Born in the US and 14-18 years old B-TL = Born in Thailand or Laos, lived in the US ≤5 years, and 14-18 years old a, b, & c Post-hoc Tukey HSD multiple comparisons test, means significantly different at p≤0.05 level. ^d ANOVA group means significantly different at p≤0.05 level			

Table 2. Acculturation Data of Hmong Children			
	B-US¹ (n=22)	B-US² (n=25)	B-TL (n=21)
Perceptions of Health and Diet			
<i>What would you say your health is?</i>			
Poor	0	1 (4%)	0
Fair	3 (14%)	11 (44%)	0
Good	12 (55%)	10 (40%)	8 (38%)
Very Good	6 (27%)	2 (8%)	9 (43%)
Excellent	1 (5%)	1 (4%)	4 (19%)
Mean ± sd ^d	3.2 ± 0.8 ^a	2.6 ± 0.8 ^b	3.8 ± 0.8 ^c
<i>What would you say your diet is?</i>			
Poor	1 (5%)	2 (8%)	0
Fair	4 (18%)	15 (60%)	0
Good	15 (68%)	8 (32%)	15 (71%)
Very Good	2 (9%)	0	6 (29%)
Excellent	0	0	0
Mean ± sd ^d	2.8 ± 0.7 ^a	2.2 ± 0.6 ^b	3.3 ± 0.5 ^c
Breakfast, Lunch, and Dinner Patterns			
<i>Which of the following is mostly true?</i>			
<i>Breakfast is mostly:</i>			
Hmong food	4 (18%)	5 (22%)	10 (47.5%)
American food	17 (77%)	14 (61%)	10 (47.5%)
Both	1 (5%)	1 (4%)	1(5%)
Not Applicable	0	3 (13%)	0
Mean ± sd	1.8 ± 0.5 ^a	1.6 ± 0.8 ^{a e}	1.6 ± 0.6 ^a
<i>Lunch is mostly:</i>			
Hmong food	6 (27%)	4 (17%)	0
American food	16 (73%)	19 (83%)	21 (100%)
Mean ± sd ^d	1.7 ± 0.5 ^a	1.8 ± 0.4 ^{ab e}	2.0 ± 0.0 ^b
<i>Dinner is mostly:</i>			
Hmong food	17 (77%)	21 (91%)	21 (100%)
American food	5 (23%)	2 (9%)	0
Mean ± sd ^d	1.2 ± 0.4 ^a	1.1 ± 0.3 ^{ab e}	1.0 ± 0.0 ^b
Acculturation Assessment Tool Questions			
<i>What language do you speak at home?</i>			
Only in Hmong	0	0	7 (33%)
More Hmong than English	3 (14%)	1 (4%)	13 (62%)
Both Hmong and English equally	3 (14%)	11 (44%)	1 (5%)
More English than Hmong	13 (59%)	12 (48%)	0
Only in English	3 (14%)	1 (4%)	0
Mean ± sd ^d	3.7 ± 0.9 ^a	3.5 ± 0.7 ^a	1.7 ± 0.6 ^b
<i>What language do you usually think?</i>			

Only in Hmong	1 (5%)	0	4 (19%)
More Hmong than English	2 (9%)	1 (4%)	12 (57%)
Both Hmong and English equally	9 (41%)	7 (28%)	5 (24%)
More English than Hmong	6 (27%)	12 (48%)	0
Only English	4 (18%)	5 (20%)	0
Mean \pm sd ^d	3.5 \pm 1.0 ^a	3.8 \pm 0.8 ^a	2.1 \pm 0.7 ^b
<i>Your closest friends are?</i>			
All Hmong	2 (9%)	4 (16%)	10 (48%)
More Hmong than Americans	9 (41%)	15 (60%)	9 (43%)
About half and half	9 (41%)	3 (12%)	2 (10%)
More Americans than Hmong	0	3 (12%)	0
Only Americans	2 (9%)	0	0
Mean \pm sd ^d	2.6 \pm 1.0 ^a	2.2 \pm 0.9 ^{ab}	1.6 \pm 0.7 ^b
<i>What languages do you speak with friends?</i>			
Only in Hmong	0	0	3 (14%)
More Hmong than English	2 (9%)	1 (4%)	9 (43%)
Both Hmong and English equally	9 (41%)	7 (28%)	9 (43%)
More English than Hmong	5 (23%)	11 (44%)	0
Only English	6 (27%)	6 (24%)	0
Mean \pm sd ^d	3.7 \pm 0.9 ^a	3.9 \pm 0.8 ^a	2.3 \pm 0.7 ^b
<i>I eat</i>			
Only Hmong foods	1 (5%)	0	2 (10%)
Mostly Hmong foods	4 (18%)	9 (36%)	5 (24%)
Equal amounts of Hmong and American foods	12 (55%)	13 (52%)	14 (67%)
Mostly American foods	5 (23%)	3 (12%)	0
Only American foods	0	0	0
Mean \pm sd	2.9 \pm 0.8 ^a	2.8 \pm 0.7 ^a	2.6 \pm 0.7 ^a
<i>Acculturation Score (mean\pm sd) ^d</i>	16.4 \pm 3.2 ^a	16.2 \pm 2.4 ^a	10.2 \pm 2.4 ^b

B-US¹ = Born in the US and 9-13 years old

B-US² = Born in the US and 14-18 years old

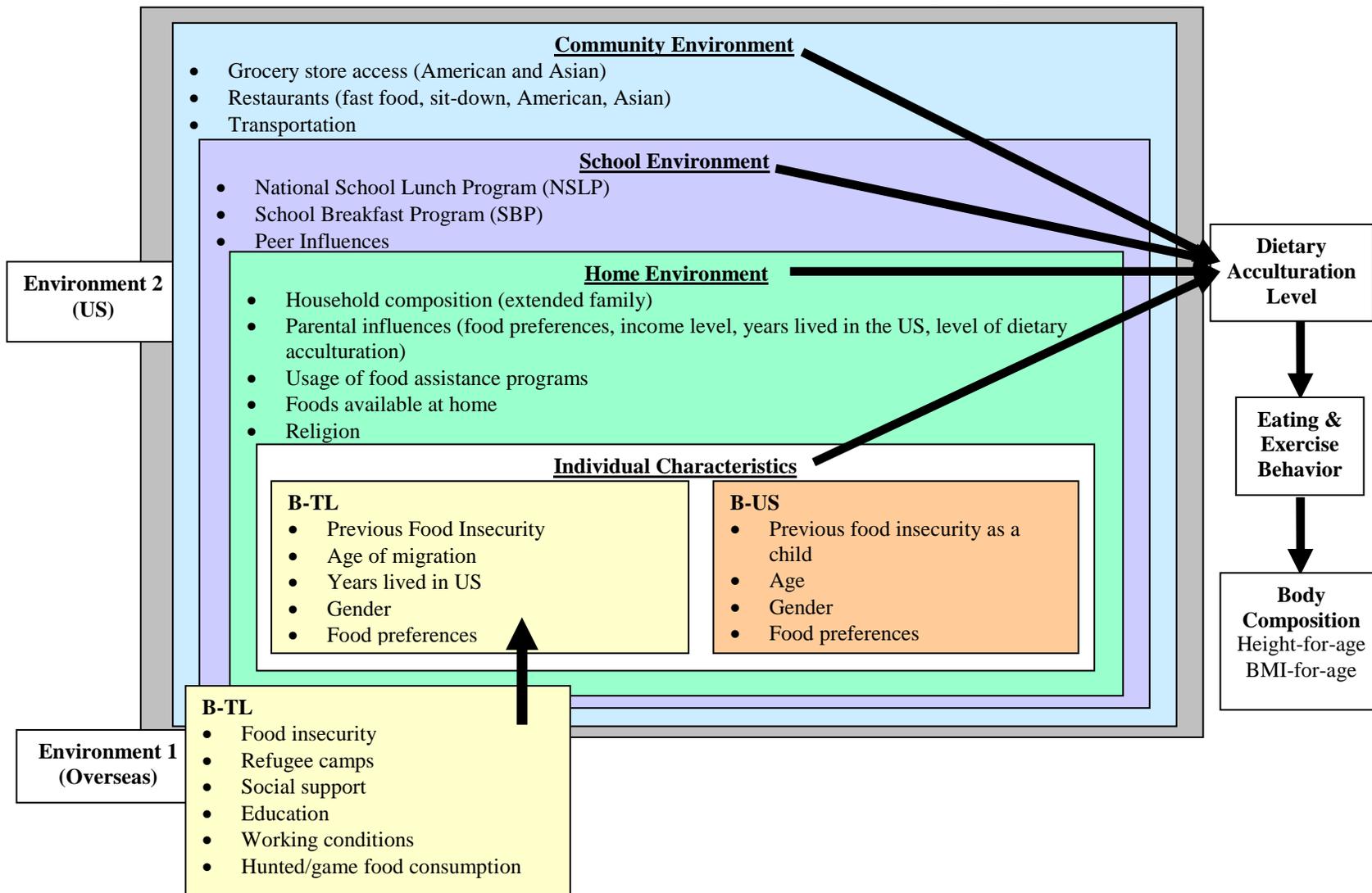
B-TL = Born in Thailand or Laos, lived in the US \leq 5 years, and 14-18 years old

^{a, b, & c} Post-hoc Tukey HSD multiple comparisons test, means between sub-groups significantly different at $p \leq 0.05$ level.

^d ANOVA group means significantly different at $p \leq 0.05$ level; unable to perform Chi-square tests because some cells had counts <5.

^e Missing n=2

Figure 1. Proposed model of individual and environmental interactions that influence body composition of Hmong children.



Chapter 4:

Intergenerational Dietary Differences among Hmong Adults and Children

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Submitted to: *Public Health Nutrition*

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INTRODUCTION

The Hmong, originating in Southern China, have undergone several relocations and experienced subsequent adversity. Many left Southern China around 1810 for Laos because of domination by and conflict with the Han Chinese¹. In the 20th century, the Hmong were recruited by the Central Intelligence Agency (CIA) to aide in the Vietnamese conflict, which made them a target of further oppression and retribution^{2,1}. As the war ended in the late 1970's, some relocated to Thailand into refugee camps while others migrated to Western countries, such as France, Australia, and the United States (US)^{2,3}. According to the US Census Bureau almost 170,000 Hmong live in the US⁴. Refugee resettlement services placed Hmong into American cities irrespective of family clan associations and through secondary migration groups were reunited largely in California and Minnesota⁵. It is estimated that between 42,000 and 70,000 Hmong live in Minnesota^{4,6}.

In the US, as with other immigrant families, the Hmong have experienced changes in their cultural structure related to everyday life⁷. Lifestyle changes have included decreased physical activity⁸, increased chronic disease occurrence such as cancer, hypertension, and diabetes⁹⁻¹¹, and a decreased consumption of traditional foods with an increase in “Western” foods¹²⁻¹⁴. Harrison et al.¹² hypothesized that dietary acculturation may happen quickly in their new environment because consumption of traditionally healthy foods is not supported (lacking availability and/or preparation style changes) whereas unhealthy foods are heavily marketed and available. Dietary acculturation transpires when migrating groups adopt eating behaviors similar to the host group^{15,16}. Traditional foods may be preserved or altered, while others are eliminated, or dietary assimilation of the host group may occur¹⁷⁻²¹.

While acculturation happens at different rates, second generation immigrants typically display increased patterns of risk factors and disease that reflect individuals in their new environment. Story and Harris²² reported that the level Southeast Asian families adjusted to the “American diet” varied by age. Additionally, the younger generation was more accepting of dietary alterations, while the older generation found it difficult to adjust to an “Americanized” diet²². Although researchers have investigated

dietary changes and health issues, such as obesity and chronic disease, between generations of Hispanic, Mexican and African immigrants²³⁻²⁶, and some Asian sub-populations^{21, 27, 28, 29, 30}, there is a lack of research regarding intergenerational dietary differences within the Hmong population. Therefore, the purpose of this paper was to investigate how acculturation level influences dietary differences between Hmong children and their parents and how these differences may negatively impact the health of future generations.

METHODS

Design and Sample

Focus groups (n=12) were conducted in St. Paul/Minneapolis, MN with Hmong children $\geq 9 \leq 18$ years old. Recruitment of newly immigrated and US born children took place through local youth groups, organizations, and churches. Children were given cash incentives. B-TL were 14-18 years old and in the US ≤ 5 years (n=21), B-US¹ were 9-13 years old and US born (n=22), and B-US² were 14-18 years old and US born (n=25). Five years was chosen as a cutoff point because it corresponded to the latest wave of migration for Hmong in the Twin Cities. Open-ended questions were used in focus groups to generate discussions with children regarding eating habits, food assistance, food insecurity, media, and cultural traditions. Demographic and acculturation data was collected for children and one of their parents/guardians, and child's height and weight were taken.

B-TL¹ were parents born in Thailand/Laos and in the US for ≤ 5 years (n=21), B-TL² were parents born in Thailand/Laos and in the US for >5 years (n=43), and B-US were guardians born in the US (n=4) (youth lived with family other than their parents, thus the small "n"). Acculturation usually describes the progression of a minority group implementing the host groups' cultural patterns¹⁶. Individuals are attaining, preserving, and/or abandoning values of the original and host culture³¹⁻³³. Acculturation level was investigated by looking at social connections, language use, dietary habits, years in the US, and height and weight. Before the focus groups, study participants signed assent forms and parents signed informed consent forms. This study was approved by the University of Minnesota's Institutional Review Board (IRB).

Measures and Analysis

Two researchers, trained in focus group methodology, facilitation, and assessment³⁴, conducted the sessions. All sessions were audiotaped and transcribed verbatim. Three groups were conducted in Hmong/English, with translators provided, and nine were conducted in English only. Researchers separately coded all focus group transcripts to catalog common themes and subthemes, and then discrepancies among coded transcripts were resolved prior to further analysis. Coded transcripts were organized according to themes and subthemes with NUD*IST Vivo (Nvivo, Thousand Oaks, CA)[®], a qualitative data organization software. Given focus group data is descriptive and the process of collecting data is appropriate for small sample sizes and is quite rigorous, the sample size was judged to be adequate for this study³⁴.

Child and parent acculturation level was assessed by implementing a modified instrument, which was generated previously by Marin et al.³⁵. Compared to other published scales, this instrument had comparable reliability and validity coefficients. Although it has been used with Mexican Americans³⁶, Puerto Ricans³⁷, Cambodian refugees³⁸, Filipino Americans³⁹, and Hmong adults¹⁴, it has not been administered to Hmong children. The instrument was modified by substituting in the appropriate language (i.e. Hmong replaced Spanish) and was evaluated for reliability. A small group of children completed the assessment at two different times. A paired samples t-test compared repeated measure responses with no significant differences detected, which indicated the modified instrument was reliable. Questions regarding language (at home, with friends, and think in), social connections (friends), and overall dietary acculturation (I eat) with potential responses is under the heading “Acculturation Assessment Tool Questions” in Table 2. A summation of the responses to these questions was used to calculate the overall acculturation level. Hmong informants reviewed the questions regarding the acculturation assessment before implementation to ensure participants would understand the questions. Sufficient time was spent during focus groups discussing how participants defined Hmong versus American food, with participants consistently defining them as different from one another. Questions regarding perceptions of health and diet quality and their responses are listed in Table 2

under “Perceptions of Health and Diet.” To attain additional information concerning eating patterns, children and parents were asked if breakfast, lunch, and dinner were mostly Hmong or American food and is located in Table 2 under “Breakfast, Lunch, and Dinner Patterns.”

Child height and weight were measured using a portable stadiometer and calibrated scale without shoes and outer clothing. Epi Info™ Version 3.3.2 was used to calculate BMI-for-Age percentiles from height and weight data⁴⁰. Child obesity was defined as $\geq 95^{\text{th}}$ percentile, overweight as $\geq 85^{\text{th}}$ to $< 95^{\text{th}}$ percentile, healthy weight as $\geq 5^{\text{th}}$ to $< 85^{\text{th}}$ percentile, and underweight as $< 5^{\text{th}}$ percentile⁴¹.

Statistical Analysis

The Statistical Packages for Social Sciences (SPSS) software, v 17 (2008), was used to analyze child and parent data. Sub-group means (demographic, acculturation, and height and weight data) were compared using one-way analysis of variance (ANOVA) and post-hoc Tukey Honestly Significant Differences (HSD) multiple comparisons test to establish significance. Paired samples t-test was used to compare acculturation assessment, overall health and diet, and supplementary eating patterns between parent and child pairs.

RESULTS

Sample Characteristics: Children

Thirty-six males [M] and 32 females [F] participated in the focus groups (Table 1). The average age for B-US¹, B-US², and B-TL was 11.4 ± 1.3 , 15.9 ± 1.2 , and 15.7 ± 1.3 years old. Significant differences were observed in height with 0%, 28%, and 43% of children having short stature ($< 5^{\text{th}}$ percentile for height-for-age and gender) for B-US¹, B-US², and B-TL respectively. Significant differences were also found in BMI with 63%, 60%, and 19% of children being overweight/obese ($> 85^{\text{th}}$ percentile for BMI-for-age and gender) for B-US¹, B-US², and B-TL respectively. B-TL and B-US² were significantly shorter than B-US¹. B-US¹ and B-US² had significantly higher BMI-for-age percentiles compared to B-TL. Children with higher BMIs were more likely to rate their diets less favorably. Children who ranked their diet quality higher also ranked their health higher. Those who ranked their diets and health lower had elevated language

acculturation and had higher overall acculturation scores, whereas children with higher BMIs and scores for the dietary acculturation question had increased language acculturation and overall acculturation scores.

Sample Characteristics: Parents

Sixty-nine percent of parents were female and 31% were male (Table 1). B-TL¹ parents were 43.0 ± 15.5 years old, approximately 80% had some high school education and reported using food stamps, and average total household size was 7.7 ± 2.7 people, with 5.5 ± 2.9 children. B-TL² parents were 40.5 ± 6.9 years old, 46% had schooling beyond high school, only 7% reported using food stamps, and average total household size was 6.7 ± 2.0 people, with 4.2 ± 1.9 children. B-US parents/guardians were 27.3 ± 11.9 years old, 75% completed high school, and average total household size was 9.8 ± 4.2 people, with 6.3 ± 5.1 children. Parents who lived in the US longer were more likely to have higher income and education levels, higher language acculturation and overall acculturation scores, decreased food stamp usage, and lower perceptions of health and diet quality. Those with higher income levels were more likely to be more educated, speak more English at home, have higher overall acculturation scores, perceive their diets and health as lower, and have less children in the household. Parents with higher education and language acculturation scores, ate more American food, had higher overall acculturation scores, and had fewer children in the household.

Acculturation Assessment and Health Perceptions: Children vs. Parents

Out of all the paired samples, only three questions were not significantly different from each other and were regarding perceptions of health, meal patterns at dinner, and social connections (closest friends) (Table 2). Both children and parents viewed their health as being good to very good, dinner was viewed as mostly consisting of Hmong food, and their closest friends were more Hmong than non-Hmong. Perceptions of diet were significantly different between paired samples, with parents rating their diets significantly higher (good to very good) compared to children (fair to good). Meal patterns at breakfast and lunch showed parents reported eating more Hmong foods, whereas children reported eating more American foods. Children also scored higher on the overall dietary acculturation question than parents. Children scored

higher on all of the acculturation questions pertaining to language (use at home, think in, and use with friends) compared to their parents. Overall acculturation scores were significantly lower for parents compared to children. In addition, there was a relatively high positive association between child and parent language use at home and overall acculturation score ($r=.60$).

Focus Group Data: Intergenerational Dietary Differences

Differing degrees of dietary acculturation were reported between children, parents, and grandparents. Most children perceived their eating patterns as being very different from their parents and grandparents in regards to preparation style. One commented, “cause the older folks, your grandparents and parents, they like more of the boiled things...but then we’re young...we like stir fry (B-US², F).” Children also reported consuming more American foods compared to their parents and grandparents. For B-US¹ and B-US² especially, if the evening meal did not contain a desired dish some reported finding alternatives, whereas others said their parents would make additional dishes adjusting to the their wants. One stated, “I’m picky so I mostly would eat American food, like if my mom would cook...certain Hmong food that I don’t like or if I just look at and say eww that looks nasty then I’ll go and look for something else to eat even if it’s junk food like chips or something (B-US², M).”

Food assistance programs, peer influences, and media played a contributing role in exposing children to different foods and preparation styles outside cultural norms, which widened the dietary acculturation gap between children and adults. Most of the children reported learning about American food through the school system. One stated, “I think it’s mostly school because you go to school and you have lunch and breakfast there every day...I think it’s just there and everybody just have the same thing (B-US², F).” All B-TL children reported being more food secure in the US and were on the Food Stamp Program (FSP) and either received free or reduced lunch. One commented, “the food in Thailand that we get I think is not healthy than in here, ‘cause sometime it too expensive to buy...and then here you can use food stamp to buy any kind of food you want (B-TL, F).” In the beginning, B-TL stated they did not like school lunches because of unappealing tastes and smells as well as being unfamiliar with foods. As one stated,

“we don’t know [how] to eat the hamburger...it’s very different... we don’t know what thing we can put on it (B-TL, F).” Most said it took two to four weeks to adjust to school lunch and for the most part have adapted to and have come to like it. Fewer B-US children received free or reduced lunch or were on the FSP.

Peers influenced eating patterns not only at school but also on the weekends. At school, children were exposed to a variety of ethnicities and their associated foods and eating patterns. Fast food consumption increased on the weekends because it was a place where they could spend time with friends. One stated, “mine’s mostly on the weekends ‘cause on the weekends is when I’m more with my friends and we’re not really at someone’s house eating a home cooked meal...it’s just a place for you to hang out, you have nothing else to do (B-US², F).” Fast food establishments were also identified as an affordable place to purchase food on a limited budget.

Media also played a contributing factor when it came to differences in generational eating patterns. Cooking shows and commercials were most often mentioned as a vehicle for introducing non-Hmong foods into homes. Several stated commercials did not influence them to try foods, but felt they appealed more to their younger siblings (cereals, snacks, and drinks). Cooking shows introduced not only new foods but also preparation methods/styles. Some perceived certain cooking shows as representative of American food and cooking. One stated, “...their flavorings and stuff...they use a lot of thyme and different things that I don’t know of and then a lot of people, they use a lot of similar things so then I kind of get that in mind like how American people cook (B-US², F).”

DISCUSSION

The results of this study showed that Hmong children have substantially different eating patterns compared to their parents as well as attitudes regarding what is acceptable to consume for younger generations. Potential contributions to these intergenerational dietary differences included higher acculturation levels (language and overall scores), earlier age of entry into the US or being born in the US, and increased exposure to American foods through food assistance programs, peer influences, and the media. Differences in eating patterns and acculturation level may also have a negative

effect on body composition for children. Approximately 60% of B-US¹ and B-US² children were in the overweight or obese category. Although B-TL were on average shorter and leaner compared to B-US, their dietary patterns were similar to B-US, with breakfast and lunch consisting of more American foods, while dinner was more likely to be Hmong foods.

In our study, parents and children not only reported eating differently for two out of three meals (breakfast and lunch), but also in general (dietary acculturation question), with children consuming more American and less Hmong food than their parents. Research has demonstrated that Asian cultures are likely to increase their consumption of food groups, variety, and “Western” foods with subsequent declines in traditional food consumption post migration to Western countries^{22, 21, 42, 28, 43, 13}. Westernization of the diet is typically more strongly pronounced in younger generations because they usually modify their values and attitudes toward the country of residence, while older generations find it more difficult and lack the desire to adapt^{22, 28, 7}. Traditionally, the Hmong have eaten a staple diet of long-grain rice, vegetables, and supplemented it with chicken, duck, pork, fish and wild game, with food typically boiled, roasted, or steamed^{5, 14}. However, in our study, what was considered traditional and acceptable for consumption varied and children seemed to be moving away from healthier preparation styles, such as boiling and steaming, toward stir fry and fried foods.

For our group, differences in dietary practices and acculturation level of younger generations may be putting them at higher risk for obesity and chronic disease development in adulthood. In our sample, 60% of B-US¹ and B-US² were in the overweight/obese category and were significantly heavier compared to B-TL. Research has shown that children born in the US are not only more likely to be taller compared to their foreign-born counterparts, but also heavier⁴⁴. A positive correlation has been found between childhood overweight/obesity and consequent adult obesity⁴⁵⁻⁴⁷ and disease development such as hyperlipidemia, hypertension, and abnormal glucose tolerance⁴⁸. Increased acculturation level in immigrant populations, whether it be by length of time in the US and/or generational status, has been hypothesized as increasing

one's likelihood to engage in health risk behaviors, such as smoking, drinking, decreased fruit and vegetable intake, increased dietary acculturation, and higher levels of obesity^{23, 24, 26, 49-54}. Although newly immigrated refugees displayed lower BMI levels, approximately 20% were in the overweight/obese category and environmental change because of migration during the first two decades of life can have a negative effect on chronic disease development⁵⁵. Because some are at the end of their growth period stature may continue to stay low, but their weight has the potential to increase.

Overall, children in our sample had higher acculturation levels than their parents with regards to dietary patterns. Within our sample, breakfast and lunch patterns were significantly different, whereas dinner patterns were reported as similar. Dietary patterns at home are more likely to be altered at breakfast as opposed to dinner, with American foods being adopted the most at breakfast and the least at dinner²¹. A vehicle cited for introducing foods exterior to cultural norms by our participants was food assistance programs. Franzen and Smith¹⁴ found that younger generation adults recognized the Special Supplemental Program for Women, Infants, and Children (WIC) and FSP as accelerating their dietary acculturation during formative years because their parents were more reliant on programs when they were newly immigrated. Another reason breakfast and lunch patterns were different was because of the foods children were exposed to and offered at school through the National School Breakfast and Lunch Program. Franzen and Smith⁵⁶ found that children rarely brought lunch to school because of inconvenience and social awkwardness and most children consistently consumed the lunch and in some cases the breakfast at school. In our study, B-TL in particular cited that school introduced them to foods outside cultural norms and increased their palatability towards them.

Additional influences on dietary pattern differences with our sample were other outside forces such as peers and media. Children were more likely to interact with and be exposed to other cultures and viewpoints in an academic setting and its associated extracurricular activities than parents. Asian parents who migrated to the US as adults have an increased likelihood of preserving traditions, values, and customs of their country of origin and inconsistently implement traditions, values, and customs of

American culture^{57, 14}. However, children acculturate more uniformly across cultural domains because they are not only influenced by family but also by their experiences at school, interactions with peers, and by what they view in the media⁵⁷. Research has shown that individuals who were more likely to use English and American mass media were more likely to consume American food, have American friends, and alter their dietary habits after migrating to the US³⁰. In our sample, children turned to media for information pertaining to dietary patterns of American society such as preparation style, seasonings, and recipes. Children viewed media messages as representative of American cooking and preferences.

CONCLUSIONS

Results of this study suggest that acculturation of Hmong children to the US is associated with increased levels of overweight/obesity and dietary acculturation, which is a leading public health problem. Differences in acculturation and orientation to the host society have resulted in increased dietary acculturation between generations. Over half of the B-US and approximately 20% of the B-TL sample were in the overweight/obese category and because childhood obesity has significant physical, public and financial outcomes, health promotion programs are needed to encourage physical activity and healthy diets among children in acculturating families. This research supports the need to investigate obesity patterns of Hmong and the importance of identifying how dietary patterns change as acculturation takes place.

ACKNOWLEDGEMENTS

We would like to thank the many people in the Hmong community for their support and willingness to participate in this research project, including the parents and their willingness to participate and have children participate, and the children for sharing their thoughts and experiences with us. This study was funded by the Minnesota Agricultural Experiment Station at the University of Minnesota.

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Table 1. Sample Characteristics	Hmong Children			Hmong Parents		
	B-US ¹ (n=22)	B-US ² (n=25)	B-TL (n=21)	B-TL ¹ (n=21)	B-TL ² (n=43)	B-US (n=4)
Sex				€	†	
Male	12 (55%)	16 (64%)	8 (38%)	5 (42%)	10 (28%)	3 (75%)
Female	10 (45%)	9 (36%)	13 (62%)	7 (58%)	26 (72%)	1 (25%)
Age (years; mean ± sd)	11.4 ± 1.3	15.9 ± 1.2	15.7 ± 1.3	43.0 ± 15.5 θ	40.5 ± 6.9 ζ	27.3 ± 11.9
Years lived in the US? (mean ± sd)	11.4 ± 1.3	15.9 ± 1.2	3.0 ± 0.60	3.0 ± 0.60	24.8 ± 6.2	23.5 ± 2.4
Grade Level						
Elementary School	8 (36%)	0	0			
Middle School	14 (64%)	2 (8%)	0			
High School	0	23 (92%)	21 (100%)			
Height for Age percentiles						
<5th percentile	0	7 (28%)	9 (43%)			
≥5th to <50th percentile	16 (73%)	15 (60%)	12 (57%)			
≥50th percentile	6 (27%)	3 (12%)	0			
Mean ± sd	2.3 ± 0.5 ^a	1.8 ± 0.6 ^b	1.6 ± 0.5 ^b			
Body Mass Index (BMI) for Age percentiles						
< 5th percentile	0	0	0			
≥5th to <85th percentile	9 (41%)	10 (40%)	17 (81%)			
≥85th to <95th percentile	8 (36%)	5 (20%)	4 (19%)			
≥95th percentile	5 (23%)	10 (40%)	0			
Mean ± sd	79.6 ± 19.2 ^a	84.0 ± 18.9 ^a	62.0 ± 21.1 ^b			
BMI (mean ± sd)	21.6 ± 3.6 ^a	26.9 ± 4.8 ^b	21.7 ± 2.6 ^a			

Male	22.2 ± 3.9 ^a	27.7 ± 4.7 ^b	20.7 ± 1.6 ^a	
Female	20.9 ± 3.3 ^a	25.5 ± 4.9 ^b	22.4 ± 2.9 ^{ab}	
Educational Attainment				
< high school			4 (19.0%)	8 (20%)
Some high school			17 (81.0%)	6 (14%)
Completed high school/GED			0	8 (20%)
Some				1 (25%)
undergrad/college/technical/vocational			0	5 (12%)
Completed				2 (50%)
undergrad/college/tech/vocational			0	8 (20%)
Completed graduate/professional school			0	6 (14%)
Mean ± sd			1.81 ± 0.4	3.4 ± 1.7 [‡]
				3.0 ± 1.4
Income (annual household)				
< \$10,000			8 (44.0%)	1 (2.5%)
\$10,000-\$19,999			5 (28.0%)	4 (10%)
\$20,000-\$39,999			1 (6.0%)	6 (15%)
\$40,000-\$59,999			0	13 (32.5%)
> \$60,000			0	14 (35%)
Unemployed			4 (22.0%)	2 (5%)
Mean ± sd			2.5 ± 2.0 [§]	4.0 ± 1.2 [§]
				3.5 ± 1.7
Food Assistance (participants that said yes)				
Food Stamps			17 (81.0%)	3 (7%)
Food Distribution			2 (9.5%)	0
School Lunch			8 (38%)	15 (35%)
MN Food Assistance Program			0	0
WIC			2 (9.5%)	2 (5%)
				2 (50%)
Total people in the household (mean ± sd)			7.7 ± 2.7	6.7 ± 2.0
				9.75 ± 4.2

Total children in the household (mean ± sd)		5.5 ± 2.9	4.2 ± 1.9	6.25 ± 5.1
<p>B-US¹ = Children born in the US and 9-13 years old B-US² = Children born in the US and 14-18 years old B-TL = Children born in Thailand or Laos, lived in the US ≤5 years, and 14-18 years old B-TL¹ = Parents born in Thailand/Laos and lived in the US for ≤ 5 years. B-TL² = Parents born in Thailand/Laos and lived in the US for > 5 years. B-US= Parents/Guardians born in the US.</p> <p>^{a, b, & c} Post-hoc Tukey HSD multiple comparisons test, means between sub-groups significantly different at p≤0.05 level. [‡] Missing n=2; [§] Missing n=3; [£] Missing n=5; [†] Missing n=7; [€] Missing n=9; ^δ Missing n=10; ^ζ Missing n=13; ^θ Missing n=19 *Some data missing from parent forms because most parents were not present, children brought filled out forms with them to the focus groups.</p>				

Table 2. Acculturation, Health, and Diet Data	Hmong Children			Hmong Parents		
Perceptions of Health and Diet	B-US¹ (n=22)	B-US² (n=25)	B-TL (n=21)	B-TL1 (n=21)	B-TL2 (n=43)	B-US (n=4)
<i>What would you say your health is?</i>						
Poor	0	1 (4%)	0	0	0	0
Fair	3 (14%)	11 (44%)	0	2 (9.5%)	10 (23%)	0
Good	12 (55%)	10 (40%)	8 (38%)	3 (14%)	22 (51%)	4 (100%)
Very Good	6 (27%)	2 (8%)	9 (43%)	5 (24%)	8 (19%)	0
Excellent	1 (5%)	1 (4%)	4 (19%)	11 (52%)	3 (7%)	0
Mean ± sd	3.2 ± 0.8 ^a	2.6 ± 0.8 ^b	3.8 ± 0.8 ^c	4.2 ± 1.0	3.1 ± 0.84	3.0 ± 0.0
<i>What would you say your diet is?^d</i>						
Poor	1 (5%)	2 (8%)	0	0	1 (2%)	0
Fair	4 (18%)	15 (60%)	0	0	11 (26%)	1 (25%)
Good	15 (68%)	8 (32%)	15 (71%)	11 (52%)	24 (56%)	2 (50%)
Very Good	2 (9%)	0	6 (29%)	6 (29%)	6 (14%)	0
Excellent	0	0	0	4 (19%)	1 (2%)	1 (25%)
Mean ± sd	2.8 ± 0.7 ^a	2.2 ± 0.6 ^b	3.3 ± 0.5 ^c	3.7 ± 0.8	2.9 ± 0.76	3.25 ± 1.3
Breakfast, Lunch, and Dinner Patterns						
<i>Which of the following is mostly true?</i>						
<i>Breakfast is mostly:^d</i>						
Hmong food	4 (18%)	5 (22%)	10 (47.5%)	10 (71%)	12 (44%)	2 (50%)
American food	17 (77%)	14 (61%)	10 (47.5%)	4 (29%)	12 (44%)	0
Both	1 (5%)	1 (4%)	1(5%)	0	2 (7.0%)	
No Breakfast	0	3 (13%)	0	0	1 (4.0%)	
Mean ± sd	1.8 ± 0.5 ^a	1.6 ± 0.8 ^{a†}	1.6 ± 0.6 ^a	1.30 ± 0.5†	1.56 ± 0.7 [‡]	1.0 ± 0.0 [‡]
<i>Lunch is mostly:^d</i>						
Hmong food	6 (27%)	4 (17%)	0	2 (15%)	18 (64%)	2 (50%)
American food	16 (73%)	19 (83%)	21 (100%)	11 (85%)	9 (32%)	0
Both	0	0	0	0	1 (4%)	0

Mean ± sd	1.7 ± 0.5 ^a	1.8 ± 0.4 ^{ab‡}	2.0 ± 0.0 ^b	1.9 ± 0.4 ^ξ	1.4 ± 0.57 ^φ	1.0 ± 0.0 [‡]
<i>Dinner is mostly:</i>						
Hmong food	17 (77%)	21 (91%)	21 (100%)	14 (100%)	25 (92%)	2 (50%)
American food	5 (23%)	2 (9%)	0	0	1 (4%)	0
Both	0	0	0	0	1 (4%)	0
Mean ± sd	1.2 ± 0.4 ^a	1.1 ± 0.3 ^{ab‡}	1.0 ± 0.0 ^b	1.0 ± 0.0 [†]	1.1 ± 0.42 [∅]	1.0 ± 0.0 [‡]
Acculturation Assessment Tool Questions						
<i>What language do you speak at home?</i>^d						
Only in Hmong	0	0	7 (33%)	8 (38%)	1 (2%)	0
More Hmong than English	3 (14%)	1 (4%)	13 (62%)	10 (48%)	12 (28%)	1 (33.3%)
Both Hmong and English equally	3 (14%)	11 (44%)	1 (5%)	3 (14%)	23 (54%)	1 (33.3%)
More English than Hmong	13 (59%)	12 (48%)	0	0	7 (16%)	1 (33.3%)
Only in English	3 (14%)	1 (4%)	0	0	0	0
Mean ± sd	3.7 ± 0.9 ^a	3.5 ± 0.7 ^a	1.7 ± 0.6 ^b	1.76 ± 0.7	2.8 ± 0.72	3.0 ± 1.0 [‡]
<i>What language do you usually think in?</i>^d						
Only in Hmong	1 (5%)	0	4 (19%)	7 (33%)	9 (21%)	1 (25%)
More Hmong than English	2 (9%)	1 (4%)	12 (57%)	9 (43%)	10 (24%)	1 (25%)
Both Hmong and English equally	9 (41%)	7 (28%)	5 (24%)	4 (19%)	15 (36%)	1 (25%)
More English than Hmong	6 (27%)	12 (48%)	0	1 (5%)	7 (17%)	1 (25%)
Only English	4 (18%)	5 (20%)	0	0	1 (2%)	0
Mean ± sd	3.5 ± 1.0 ^a	3.8 ± 0.8 ^a	2.1 ± 0.7 ^b	1.9 ± 0.87	2.6 ± 1.1 [‡]	2.5 ± 1.3
<i>Your closest friends are?</i>						
All Hmong	2 (9%)	4 (16%)	10 (48%)	7 (33%)	12 (29%)	2 (50%)
More Hmong than Americans	9 (41%)	15 (60%)	9 (43%)	7 (33%)	20 (48%)	2 (50%)
About half and half	9 (41%)	3 (12%)	2 (10%)	6 (29%)	8 (19%)	0
More Americans than Hmong	0	3 (12%)	0	0	2 (5%)	0
Only Americans	2 (9%)	0	0	0	0	0

Mean ± sd	2.6 ± 1.0 ^a	2.2 ± 0.9 ^{ab}	1.6 ± 0.7 ^b	1.9 ± 0.83 [¥]	2.0 ± 0.83 [¥]	1.5 ± 0.58
What languages do you speak with friends?^d						
Only in Hmong	0	0	3 (14%)	14 (70%)	8 (19%)	0
More Hmong than English	2 (9%)	1 (4%)	9 (43%)	5 (25%)	8 (19%)	2 (50%)
Both Hmong and English equally	9 (41%)	7 (28%)	9 (43%)	1 (5%)	20 (46%)	0
More English than Hmong	5 (23%)	11 (44%)	0	0	6 (14%)	2 (50%)
Only English	6 (27%)	6 (24%)	0	0	1 (2%)	0
Mean ± sd	3.7 ± 0.9 ^a	3.9 ± 0.8 ^a	2.3 ± 0.7 ^b	1.35 ± 0.59 [¥]	2.6 ± 1.0	3.0 ± 1.2
I eat^d						
Only Hmong foods	1 (5%)	0	2 (10%)	3 (15%)	1 (2%)	0
Mostly Hmong foods	4 (18%)	9 (36%)	5 (24%)	8 (40%)	20 (47%)	1 (25%)
Equal amounts of Hmong and American foods	12 (55%)	13 (52%)	14 (67%)	8 (40%)	22 (51%)	3 (75%)
Mostly American foods	5 (23%)	3 (12%)	0	1 (5%)	0	0
Only American foods	0	0	0	0	0	0
Mean ± sd	2.9 ± 0.8 ^a	2.8 ± 0.7 ^a	2.6 ± 0.7 ^a	2.3 ± 0.81 [¥]	2.5 ± 0.50	2.75 ± 0.50
Acculturation Score						
	16.4 ± 3.2 ^a	16.2 ± 2.4 ^a	10.2 ± 2.4 ^b	10.3 ± 3.0	14.5 ± 3.6	14.3 ± 5.0
<p>B-US¹ = Children born in the US and 9-13 years old B-US² = Children born in the US and 14-18 years old B-TL = Children born in Thailand or Laos, lived in the US ≤5 years, and 14-18 years old B-TL¹ = Parents born in Thailand/Laos and lived in the US for ≤ 5 years. B-TL² = Parents born in Thailand/Laos and lived in the US for > 5 years. B-US= Parents/Guardians born in US.</p> <p>^{a, b, & c} Post-hoc Tukey HSD multiple comparisons test, means between sub-groups significantly different at p≤0.05 level. ^d Statistically significant differences in paired sample t-test between parent and child pairs at the p≤0.05 level. [¥] Missing n=1; [‡] Missing n=2; [†] Missing n=7; ^ξ Missing n=8; ^φ Missing n=15; [∂] Missing n=16 *Some data missing from parent forms because most parents were not present, children brought filled out parent forms with them to the focus groups.</p>						

Chapter 5:

Productions of Silence: Identity Shift in Hmong Culture

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Submitted to: *Current Anthropology*

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Silence, although traditionally thought of as empty and void of reference, has been a subject of study in the anthropological literature. The concept of silence, often misunderstood, misconstrued, or undervalued, has been discussed as a method of forgetting, erasure, and trivialization of past events. Berdahl (1994) discussed how silences that revolved around the Vietnam Veterans Memorial were not viewed as a forced suppression of knowledge about the past, but instead as an American public's want to forget the controversial war. Trouillot (1995) showed how the Haitian revolution was subject to formulas of erasure (erase the fact of a revolution) and formulas of banalization (removal of particular revolutionary content in order to trivialize the event). Silence has also been used to illustrate how meaning can emerge out of a context in which a conversational partner is silent and that verbal discretion can be demonstrative of the serious nature placed on social relationships in a Western Apache community (Basso 1970). In addition, Hymes (2001:53-73) discussed how children acquire, "competence as to when to speak, when not to, and as to what to talk about with whom, when, where, and in what manner" and that competence is used in conducting and interpreting social life.

For the Hmong community, the concept of silence used will not be directed at knowing when to or not to speak and in what situation, but rather how being competent in a language (Hmong vs. English) may determine who you are able to converse with and how you are able to fit into the dominant culture. Silences may be produced, in this sense, in the form of language contraction and loss and the subsequent breakdown of communication between younger and older generations. History, stories, and details related to cultural traditions (rituals, ceremonies, and medicinal and religious practices) have the potential to be silenced. Through this potential loss in language, there is also potential for silence to develop in action, meaning the discontinuation or partial awareness of cultural practices. Furthermore, shifts in language and action may also be associated with shifts in identity, moving away from a perceived traditional identity for a more modern one, in which spaces for traditional practices may be silenced so seemingly more modern practices that are more in line with accepted social norms can have a voice. Throughout anthropological literature a common theme has emerged,

often what is not uttered, recorded, or done speaks volumes more than what is actually uttered, recorded, or done. Silence not only exists in opposition to speech acts, but also in the form of language contraction and physical action not taken. These silences have the potential to create intergenerational distances that could ultimately restructure the future of Hmong culture in the United States (US).

Throughout history the Hmong population has endured a series of resettlements and hardships, which has exposed them to new environments and subsequent lifestyle changes as they have adapted and borrowed from their surroundings. Many of the Hmong left southern China between 1810 and 1820 for the highlands of Laos because of conflicts with, and oppression by, the Han Chinese (Ovesen 2004:457-76.). In the 1960's and 70's, while in Laos, many assisted the US military during the Vietnamese conflict and became targets of oppression and retaliation (Goldfarb 1982; Johns 1995; Pfaff 1995). Subsequently, many left Laos and resettled in Thailand into refugee camps where the conditions of living were not optimal and many suffered adversities including psychosocial distress and food insecurity (Goldfarb 1982; Pfaff 1995; Franzen and Smith 2009). As the war in Indochina came to a close in the late 1970s, many sought refuge in Western countries such as France, Australia, and the US (Pfaff 1995). Secondary migration within the US has reunited clan groups primarily in Minnesota and California (Kittler and Sucher 2004). It is estimated that between 42,000 and 70,000 Hmong live in Minnesota (US Census Bureau 2003; Leslie 2001).

By tradition, the Hmong have had a tribal or clan social organization that is of patrilineal descent and strictly exogamous, with clan elders and Shamans being the most important functionaries in the community (Ovesen 2004:457-76.). To remedy and heal sickness Hmong have traditionally depended on shamans, community healers, and medicine women (Chang 2005). Religion was traditionally based in the belief of animism in which spiritual and physical worlds coexist and that there can be spiritual as well as non-spiritual causes for illness (Sperstad and Werner 2005). A Shaman is considered a healer and someone who has the capacity to go between the physical and spiritual world and can communicate with spirits as well as catch and liberate them so they can return home (Mottin 1984; Fadiman 1997). Shamanism is considered to be a

special field of medicine that is founded on beliefs and the Shaman is the challenger of evil forces to ensure the community he serves is secure (Mottin 1984).

Since settling in the US, the Hmong have encountered many lifestyle changes. Xiong et al. (2005) described immigrant families as shifting from one cultural framework to another, which, in the Hmong community, has been associated with decreased physical activity (Kandula and Lauderdale 2005), increased consumption of “Western” foods and decline in traditional foods (Harrison et al. 2005; Kasemsup and Reicks 2006; Franzen and Smith 2009; Franzen and Smith, in press), and a subsequent rise in obesity and obesity related chronic diseases (Her and Mundt 2005; Helsel, Mochel, and Bauer 2005; Clarkin 2008; Franzen and Smith 2009). Other lifestyle changes included alterations in their social structure, such as no longer holding elders in high esteem, language barriers, job discrimination, and changes in gender roles as women became more active outside the household (Sperstad and Werner 2005).

Cultural shifts have been linked with individual and group values such as dietary habits, economics, education, religion, and language (Kulick 1992; Kuter 1989:75-89; Schieffelin and Doucet 1998:285-315; Hoffman 2008). Ideas people have about language, children, self, and their placement in the interpretation of the social world may be crucial to comprehending why shifts in cultural practices occur (Kulick 1992). Shifts in language use in particular have been studied as a marker for alterations in individual and group perceptions (Kulick 1992). Warning signs of language loss or contraction have been shown to increase when middle-aged and elder segments of the population discontinue passing their native language onto offspring (Kuter 1989:75-89; Cavanaugh 2006:194-210; Hoffman 2008), which may be occurring with the Hmong.

According to 2000 Census data, a trend is emerging with a large proportion of young Hmong (5-17 year olds) speaking English very well or well compared to those of the same age in the general US population (US Census Bureau 2008). Compared to the US population overall, Hmong 18 to 64 years old, were underrepresented in the speak English very well category and over represented for the not speaking English well category (US Census Bureau 2008). Lastly, Hmong ≥ 65 years old were mainly categorized as not speaking English at all compared to the general US population of the

same age, indicative of linguistic isolation in elderly Hmong-Americans (US Census Bureau 2008). Studies looking at native language (L1) and majority language (L2) have found that L1 may be susceptible to quick reversion when L2 is systematically launched at the preschool level (Wong-Fillmore 1991; Leseman 1995; Schaerlaekens, Zink, and Verheyden 1995). Results of a survey with 1,100 US families proposed that negative modifications in L1, related to speaking and comprehension, were associated with early L2 exposure (Wong-Fillmore 1991). Specifically looking at Hmong preschoolers, Kan and Kohnert (2005) found that older participants surpassed younger participants in English related lexical-semantic skills, but not Hmong, signifying a comparative stabilization of L1 skills, in conjunction with more vigorous growth in L2.

Shifts in language use and cultural practices with each successive generation have been showing signs of increased acculturation (Story and Harris 1989; Capps 2004; Xiong et al. 2005; Kasemsup and Reicks 2006). There are various models and theories related to the acculturation process. The term acculturation often describes a minority group's progression of adopting the host/dominant groups' cultural patterns (language, cultural practices, and religion) (Satia-Abouta 2003). Park and Burgess (1924:734-83) first described it as specific stages that were irreversible once completed, but this theory was based on a European immigrant model and did not directly transfer to other migrant groups (African or Asian), which typically did not go through irreversible stages or become completely assimilated to the dominant group. Gordon (1964) proposed a different model of acculturation that involved seven stages of assimilation, ranging from civic to cultural, and harbored the potential for bidirectional movement. A bidirectional model, however, accounts for the possibility of not only the minority group changing their behaviors, but also the host group being influenced by the influx of a minority group (LaFromboise, Coleman, and Gerton 1991). This type of model also demonstrates that although one may become a part of the dominant culture, true membership still resides with their original minority group (LaFromboise, Coleman, and Gerton 1991). Regardless of the theory used, acculturation is thought to occur at the individual as well as the group level (Satia-Abouta 2003). As individuals wade through the acculturation process they may be retaining, accruing, and/or rejecting

values and patterns of their own as well as the dominant culture (Gordon 1964; Szapocznik and Kurtines 1980:130-59; Marger 2000).

Along with other shifts and changes happening with the Hmong, there may be a modern/non-modern dichotomy forming in relation to identity, with those who have aligned themselves with a perceived more “modern”, American identity (nontraditional, Christian, use biomedicine, and speak English fluently) versus those who have aligned themselves with a more “non-modern”, Hmong identity (traditional, Shaman, use traditional medicine, and speak Hmong fluently). However, what is perhaps just as interesting are those that fall somewhere in between the two ends of the dichotomy and are attempting to form an identity that houses desired aspects of both Hmong and American culture (Hmong-American). This would also show how the Hmong are not only in the process of describing their identity but are also contributing to its construction, whether it be in the form of an absent other or about themselves. Thus, this paper will investigate what factors contribute to shifts in identity and what characteristics are assumed by associating or not associating with these intercultural identity categories. In addition, identity shift will also be discussed in terms of how it affects participation in the culture of origin as well as the culture lived and worked in, and how the acculturation process may deny or silence spaces for certain aspects of culture.

Research conducted among the Hmong community in the Twin Cities took place from the fall of 2006 through the spring of 2009. Research methods for this project involved ethnographic fieldwork including participant observation by visiting and mapping areas where Hmong live and work in the Twin Cities as well as areas lived in Thailand and Laos, attending community events, visiting Hmong cultural centers, organizations and grocery stores, a video analysis, an in-depth interview with a key community informant, informal discussions with community members and leaders, and focus group discussions with newly immigrated and well established Hmong adults and children living in St. Paul/Minneapolis, MN. Specifically, the discussion for this paper will focus on a particular community event, video analysis, interview, and results from focus group discussions with adults and children. The community event was the 7th

Annual Hmong Resource Fair, which took place in a suburb of St. Paul. In 2001 a small group of concerned professionals and community members created the Hmong Resource Fair with the purpose and mission of bringing the community and surrounding businesses together, despite any language barriers. The Hmong Resource Fair has become a centralized clearinghouse for the Hmong community to have ready and available access to the services of their community. The video, *Hmonglish* (<http://www.youtube.com/watch?v=AN6-lUjkJ9o&feature=related>), was also reviewed for this paper. The video is a documentary about Hmong language loss and contraction and is shown through the eyes of a young Hmong woman and the life of her friends, family, and those she interviewed. A key community informant was also interviewed to gain further insight into issues regarding language, religion, and bicultural living. She is a young Hmong professional who works specifically with Hmong girls from 9 to 18 years old in the St. Paul area. She interacts and holds meetings with approximately 100 to 150 girls throughout the year. She has been given a pseudonym and will be referred to as Houa.

Focus group discussions were conducted with unrelated Hmong adults (n=69) and children (n=68) and took place in Hmong community centers, organizations, congregations, and schools. Participants were asked open-ended questions with prompts regarding dietary habits, food insecurity, food assistance use, media, cultural loss, health, religion, and medicinal practices. Focus groups were conducted in English only for seven adult and nine child groups, while four adult and three child groups were conducted in Hmong and English, with translators provided by the organizations with which we were working. Groups were audiotaped, transcribed verbatim, and evaluated independently to categorize themes (Morgan and Krueger 1998), with discrepancies resolved. Adults born in Thailand or Laos and lived in the US for ≤ 5 years (most recent wave of migration) were labeled B-TL¹ (n=19). Adults born in Thailand or Laos, spent their formative years there, with the maximum migration age being 38 years, were able to evoke food memories (>8 years of age) from Thailand/Laos during discussions, and lived in the US >5 years were labeled B-TL² (n=20). Adults born in the US or Thailand/Laos but were unable to evoke food memories during discussions, due to

limited time spent there (1 month to ≤ 8 years of age), were labeled B-US (n=30). Children born in Laos or Thailand, lived in the US for ≤ 5 years, and 14-18 years old were labeled B-TL³ (n=21). Children born in the US and 14-18 years old were labeled B-US[†] (n=25). Children born in the US and 9-13 years old were labeled B-US[‡] (n=22). Demographic information for adults is in Table 1 and for children is in Table 2.

In focus group discussions with adults and children, a trend emerged that younger generations were speaking less Hmong and more English. Many adolescents expected that in future generations Hmong language use would be greatly reduced, if not lost completely. One boy stated, “I think this generation to the next we are gonna lose most of our culture...right now we’re mostly speaking English and not Hmong...we’re gonna lose the language and we’re gonna lose the traditions if we don’t learn it and then this generation and the next we’ll probably be more Americanized and no more Hmong culture (B-US[†], M).” Many adolescents expressed that “Americanization” was associated with decreased Hmong language fluency and consequently predicted that cultural traditions tied to language would be diminished if not discontinued.

This trend was also noted in the video *Hmonglish*, where a young woman created a documentary because of her growing concern about language loss in her own life. She states that she is bilingual and Hmong is her native language, but that she cannot read or write in Hmong, and when she does speak Hmong she speaks half English. She posed the question if she would still “know Hmong” later in her life. Ultimately her central quest was to discover, “do younger generations of Hmong born here in America speak Hmong anymore?” To answer this question, she interviewed a variety of people from professors to Hmong youth. When talking to some Hmong boys and girls who were members of the Hmong Student Association at the University of Wisconsin she found a language trend similar to her own. One of the boys stated, “No, we don’t speak Hmong to each other, because it’s kind of broken...We don’t know how to translate some English words to Hmong...That’s what I mean by broken...We speak Hmonglish.” Hmonglish was described as a mixture of Hmong and English all chopped together. In another instance a girl described how she has to speak some Hmong to

communicate with her parents. She stated, “I speak Hmonglish to my parents too and I think that’s the only way they understand me. ‘Cause I can’t really speak Hmong to them.” The students she spoke with also felt that as the language faded, the culture tied to it also had the potential to fade.

In households with extended families, language use was described by many adults in our focus groups as mainly conversing in Hmong with their parents or elders, whereas they conversed principally in English with their children. One girl stated, “I told her [mom] that she should speak Hmong to me at home and she never does, she just speaks English...I’m like, ‘this week you haven’t spoken one word to me in Hmong’ (B-US[‡], F).” Children that lived in extended families had more exposure to the Hmong language and were more likely to comprehend and speak it, but changes in household dynamics and the breakdown of the family units have disrupted this transmission pattern. With respect to alterations in living arrangements one man stated that not living in the same house as his father was different because, “...in the old tradition you would have lived there [home] until either the household doesn’t fit anymore or your younger brother gets married and then you move out...but I mean traditions have changed or I guess our traditions have changed (B-US, M).” Adolescents not living in extended families often stated they were unable to converse with their grandparents who only spoke Hmong. As one stated, “I can’t speak Hmong...I can’t understand my grandma...I mean she only speaks Hmong...so whenever I stay at her house, it’s like we can’t talk to each other (B-US[‡], F)”.

With growing silences in communication between generations, as demonstrated in our focus groups, the impending question regarding language leads one to ponder about its survival. Similar social structure with respect to language shift has also been found in other societies and research has illustrated the possibility of language death. Kulick (1992) discussed how shifts in personal as well as group values/goals may lead to revisionment of individual and world perceptions. His main argument revolved around the idea that conceptions people have about language, children, self, and their place in people’s interpretations of the social world is central to understanding why language abandonment occurs (Kulick 1992). Although macrosociological processes play a role

in language shift, these may not be the sole predictors, but rather cosmological shifts, a combination of social, economic, political, history, and religion, should be considered the culprit (Kulick 1992). Kuter (1989:75-89) found that language death was more likely when the elderly population was only speaking a specific language (Breton) in everyday talk and that middle-aged or elder people in the community were not passing the language onto their offspring. In Kuter's example, Breton was not actively being transmitted to spare offspring the humiliation and powerlessness older populations felt because of their inability to participate in the modern identity housed within the French language, which would have granted them access to educational advancement and greater social mobility (Kuter 1989:75-89). In our focus groups we also noted a similar trend of emphasizing educational advancement in younger generations. Educational advancement was linked with success and overall advancement in society.

The educational system has played an important role in the maintenance of dominant languages as well as contributed to shifts in cultural practices and identity. Adolescent Hmong typically stated they spoke fluent Hmong when they were younger but once introduced to the school system their ability to maintain this fluency diminished. As one child stated, "my mom would always tell me that I spoke a lot of Hmong before preschool...but then I didn't talk that much Hmong 'cause everybody started talking in English (B-US[‡], F)." Some requested their parent's converse with them in Hmong on a more regular basis to help maintain the language but requests were usually unfulfilled.

The emphasis placed on education was also evident at the community event attended, the Hmong Resource Fair. This event provided information on what was considered a "resource" for Hmong in the Twin Cities and how that might be reflective of transitions in the community related to values on language and education. The fair included several main sections such as employment, education, language, and health and wellness. Several of the booths had their information printed in Hmong and English. As exhibited by youth in the *Hmonglish* video and focus group discussions, it is necessary to have both languages on materials because otherwise someone would be left out, with older groups English may be a problem and with younger groups Hmong

may be a problem. Additionally, focus group data on adults showed that length of time in the US and being born in the US was associated with increased educational attainment (Table 1). Looking at the number of booths present at the fair, almost 40% of the booths were devoted to education in one form or another (elementary, high school, and college level). Buzz words on posters, presentations, and handout materials frequently used were multicultural diversity, English as a second language, dual language programs, opportunity, and advancement. However, many of the pamphlets emphasized the importance of not only learning about Hmong culture, but also appreciating it. The Hmong have changed because of their exposure to the US environment (Franzen and Smith 2009), but the host/dominant group is also changing in response to the Hmong presence. For example, schools are adapting, creating, and adding curriculum specifically aimed at Hmong culture and language.

Education was also discussed as a priority and highly valued for children and young adults in focus groups, mainly because their parents wanted them to be educated and successful. Adult focus group data showed that years lived in the US was associated with increased income level in participants (Table 1). One young adult stated, “I’m thinking right now they want our generation...to be successful, to be professionals (B-US, F).” Education was often seen as a vehicle to increase one’s access to social and economic mobility. Increasing one’s education also impacts other aspects of culture, such as marriage. Several girls, across groups, reported they wanted to delay marriage until their early to mid-twenties because they, as well as their parents, placed a positive emphasis on completing their education. One echoed a common theme, “...pursuing education is really important for my parents so that I can go into a family and have that as my background that I’m not just a young Hmong girl who just came out of my family and has nothing out of high school or sometimes even that, but I can have something to offer him and his family to where I have an education and its not just about him taking care of me (B-US[†], F).”

The subject of marriage also brought up how some parents wanted to traditionally arrange marriages for them, however, most preferred the final decision for a future mate be their own. As one stated, “I am totally against it [arranged

marriages]... for us it's weird, but for them it's tradition...they like to know that person will treat you well...but our way of seeing it is it's weird, cause we grew up in American society and do things differently than them (B-US[†], M).” Desired characteristics of future partners for most participants were that they be Hmong, practice the same religion, have a positive attitude and personality, and ultimately had their parent's approval. Also, in the adolescent groups, participants commented that educated girls were more valuable because they brought in a higher bride price, which also contributed to the idea of finishing their education prior to marriage.

For many Hmong youth in our focus groups, education was linked to a decline in their ability to speak and comprehend Hmong, which was in stark contrast to their parents and other elders in their community. The issue of the educational system teaching in the dominant/host language and the subsequent decline in the importance and use of native languages has also been addressed in other groups. As with Kuter (1989:75-89), Cavanaugh (2006) also found that younger speakers, especially with higher education, spoke the minority language (Bergamasco) less and the majority language (Italian) more than elders. As with Breton, Bergamasco was seen as hindering children's socioeconomic futures because Italian like French was the language taught in schools (Cavanaugh 2006). This trend of wanting to avoid social differentiation and humiliation by the older generation guided attempts to raise offspring who were monolingual Italian speakers. When Hoffman (2008) investigated villages in Berber Morocco she found a similar trend regarding the language children spoke who attended school (monolingual Moroccan Arabic) versus the language their parents spoke (local vernacular). Hoffman (2008) found that vernacular language was typically excluded from homes with the hopes of contributing to their children's upward social mobility. As Kulick (1992) showed, children are consistently sent the message that there is no reason for them to learn or speak their vernacular, with reinforcement taking place both at home and school. Children in our groups followed their parent's example when it came to language use in the home. As one girl said, “usually they [parents] speak to me in American so I reply to them in American. And if they speak to me in Hmong, usually I reply in Hmong. I kinda just follow whatever they say (B-US[†], F).”

When interviewing our key informant, Houa, a similar trend was noted with respect to a negative reinforcement of the native language. The only time she requests that girls in her group speak Hmong is at the beginning during “check-in” time and even that can be upsetting. Embarrassment and not having a good grasp on the language causes some to be uncomfortable about speaking Hmong in front of their peers, almost to the point of tears. However, she said there were others who wanted to use group as a time to develop their Hmong language skills and speak in Hmong for the entire time, however, even Houa felt they would literally not be able to communicate with each other, so the majority of the group has remained in English. She commented that the girls were exposed to English at school all day, while they view television after school or in the evenings, and when they come to group. In many cases, she reported that the girls understood Hmong when spoken to them, but they could not read, write, or respond fully in Hmong. And, vice versa with parents, they usually understood English when it was spoken to them, but they could not read, write, or respond back in English. In conjunction with the backlash received at check-in, this represented not a complete loss of the language, but a definite contraction with potential negative foreshadowing for the future. While Houa has been working with girls, she has noticed a decline in her own Hmong language skills.

The issue of identity also reared up throughout the conversation with Houa and how important it was for girls to have not only a sense of who they were but also why. There was one activity in particular that stood out for Houa related to identity. She stressed the activity was for self-exploration and also confidence building, given they had to present their identity to the other members of the group. She brought up how on pre-assessments, some of the girls said they did not like being Hmong, almost as if they were ashamed to be listed under that category. It seemed that Houa stressed this activity as a vehicle to help the girls feel more comfortable with whom they were as a Hmong person. Through this exercise, Houa tried to alter their perceptions about what it means to be a Hmong person and highlight positive aspects of their culture. Houa was worried that this negative perception of “being Hmong” may contribute to cultural losses in the community related to language, beliefs, values, rituals, and traditions.

Language ideologies intertwined with identity have been a powerful source of dichotomization in societies. Many youth in our focus groups established dichotomies between themselves and older generations by defining how their actions, beliefs, and desires were more in line with modern, American cultural and societal norms. Kuter (1989:75-89) showed that symbolic opposition was found between Breton and French, where French was associated with a national language, being civilized, progressive, international, and urban areas whereas Breton was associated with being regional, a past language, backward, and an unattractive marker of a local, rural, identity. To shed the backward ways of the past and gain modern ways, one had to reject the Breton language to escape the negative socioeconomic future that awaited (Kuter 1989: 75-89). Kulick (1992) also showed how boundary lines had been drawn between villagers in Papua New Guinea with civilized villagers using the majority language (Tok Pisin), being Christian, and operating cash-generating schemes, whereas backward villagers had not yet acquired Tok Pisin, the word of God, and lived in villages without cash crops. Differences in language use and, as the research above showed, changes in religious practices, may be contributing to the widening silent space between modern and non-modern subjects in the Hmong community.

Another driving force behind structural changes and identity shifts for some of our participants was choosing to value Christianity over Shamanism. Newly immigrated adults and children, however, typically still valued Shamanism and traditional methods of religion and medicine. A part of being modern and American for some meant shedding the “old” ways of Shamanism and adopting the “new” ways of Christianity. With this replacement, silent spaces have been produced in the form of marginalization of Shamanism, medicine women, traditional medicine use and knowledge, and herb gardening. When asking adult Hmong focus group participants from a local Christian based church about traditional aspects of the Hmong culture, Shamanism always entered the verbal landscape, and inevitably was talked about in contrast to Christianity with a negative tone.

Shamanism was considered by many as an old tradition that older generations (parents and grandparents) still practiced and in many cases for younger generations

Christianity was favored, which has resulted in a loss of common ground and subsequently widens the silent space between generations. For example, one young adult stated, "...older folks still believe and still have the superstitions...they still believe in some of that stuff [Shamanism] but they have to learn how to let go and put their faith in something else (B-US, F)." This statement not only actively produced an invisible absent "other" (Gaudio 2001; Jones and Shweder 2003), which entailed being older, superstitious, and had an inappropriate placement of faith, but simultaneously projected a desired image of the speaker as a contrastive opposite, which was young, non-superstitious, and had an appropriately placed faith in Christianity. Participants that were born in the US blatantly stated they were more "Americanized" and "modernized" and this usually occurred in conjunction with discussions regarding being Christian. In essence, practicing Christianity was viewed as modern, American, and a rational way of conducting oneself whereas practicing Shamanism was viewed as a non-modern, un-American, and an irrational way of conducting oneself.

In discussions, Christian Hmong actively tried to devalue the practice of Shamanism. They have essentially located the Shaman religion as external to their group and in the absent body of others who invoke these contrasts (Cameron and Kulick 2003:106-32). This act could be considered the relabeling of traditional shamanism as superstitious with the simultaneous achievement of validating their more American identity. Sahlins (1985) referred to this act as the "structure of conjuncture," in which a pair of historical relationships replicate traditional cultural groupings and provide them with new values. Sahlins (1981; 1985) explained that by utilizing previously accepted cultural categories to construe and take action under new circumstances, people may alter the cultural categories through which they understand and act.

Young adults and adolescents expressed a willingness to rebel against their cultural traditions to maintain their American, Christian, and modern identity. For example, traditionally when a woman marries she would follow her husband's clan-related beliefs and practices. However, one woman discussed how she and her husband opposed this tradition by saying, "[my] in-laws follow the old tradition but my husband doesn't, so we've both decided that our child will get baptized and raised in the church.

It will be a struggle to fight with our in-laws [be]cause they don't know that about my husband (B-US, F)." Another way of silencing religious practices involved the conversion of Shaman women upon marriage into a Christian family. As one boy stated, "my parents didn't really want one of my brothers to marry my sister-in-law right now... 'cause like she doesn't believe in God, so they're having problems...she's trying to learn [to be Christian] right now, but it's frustrating for her (B-US[‡], M)." Adolescents also had a negative view of some Hmong traditions, especially arranged marriages and practices related to calling the spirit. One commented, "I think some of the Hmong cultures are just ridiculous, and they are like so funny it makes no sense whatsoever and I think this generation, we'll probably keep the ones we think are reasonable (B-US[†], M)." Again, there is a dichotomizing mechanism that places some subsets of Hmong tradition and culture into a box labeled unreasonable, something easily contained, and should be eliminated in the future.

Religion was a topic in Houa's group which easily became contested, and although requested from the girls, she tried to steer away from discussing it at group. She felt the topic of religion could become unintentionally stereotypical about the different sides (Christian versus Shaman or Christian versus non-Christian) and made her best efforts to remain neutral. Although she often pitted Christianity and Shamanism as being in separate corners, she also expressed that some dabble in both depending on the situation. She identified herself as Christian and did not view her religious beliefs/practices as negatively contributing to her cultural heritage, but she noted that it brought about conflict between her immediate family (practicing Christians and her dad being a pastor) and her extended family (non-Christian). Some children in our focus groups were confronted with conflicting cultural beliefs and traditions because one side of the family practiced Shamanism whereas the other side was Christian. As one girl stated, "I try to keep the Hmong culture with me...so I know about the Hmong people and my grandma tries to teach me what they do because we're Christians, we don't do that much with culture as the other Hmong people. I still learn 'cause my mom's side aren't Christians, but my dad's side is...I get half and half of the Hmong culture (B-US[‡], F)." With this transition to the dominant religion, many cultural practices,

including use of traditional medicine, are in the process of being modified and/or discontinued.

Traditionally, Shamans were considered the most important functionaries in the community (Ovesen 2004:457-76.), but for those segments of the community that are Christian, Shamans, as well as medicine women, have been marginalized with respect to their healing capabilities. Children often viewed traditional medicine used in Laos and Thailand as something practiced out of necessity because modern medicinal forms were unavailable. A boy stated, “back then they didn’t have medicines like in America, so they had to use like leaves, rocks, and roots (B-US[‡], M).” Participants typically stated Shamans were appropriate to use in times of psychological or spiritual distress. As one woman stated, “if it’s a visible, physical thing then we call the doctor, but if it’s just psychological than it’s more a Shaman (B-US, F).” Also, many of the medical problems currently experienced by Hmong adults are chronic diseases related to lifestyle changes, in which Shamans would not be considered the expert. Before coming to the US, the Hmong rarely experienced chronic diseases, such as hypertension and diabetes (Helsel, Mochel, and Bauer 2005).

Where Shamans were considered most useful for psychological or spiritual issues, medicine women were reported to have physical treatments in the form of herbs, bark, or a mixture of natural ingredients. There appeared to be generational differences in preference and perception of medicinal practices related to medicine women. Several younger adults expressed wariness towards the treatments provided by medicine women. As one woman stated, “it gets a little nervous because now we literally don’t have one medicine woman or no one knows if she’s educated. She could just be the lady next door who wants to make a buck or two. All of the roots look the same...but she can say it will cure diabetes or cancer, I mean they go to extremes (B-US, F).” This distrust in the “old ways” leads to non-use and expedites silent spaces within medical traditions. Older, adult participants described the process of becoming a medicine woman. One woman specifically reminisced about how her mother-in-law became a medicine woman and stated, “she kind of listen, open her ears and listen to people, when they go to the neighbors and they say oh this is good and she kept that in her mind

and she collected things and then she just become one because she observe how people use it and then her two daughters were the same as her and the mother passed to daughter (B-TL², F).” It appeared younger participants felt a major barrier to placing trust in these medicinal practices was the mysterious factor (unknown ingredients and quantities) herbal treatments held. Essentially, the herbal treatments, which typically either came from a medicine woman or their parent’s backyard was missing a label and credentials. Western medicines have labels, are prescribed by an accredited doctor, and scientific research has been conducted on them. Younger adults preferred Western doctors and the biomedical model over traditional medicines because there is a supposed reference point, a standardization, something they can visibly see, read, and has verification of truth printed on the outside of the bottle.

Younger adolescents also expressed disapproval of traditional medicine with their reasoning typically grounded in religion. Ortner (1978), who studied Sherpas, showed it was quite common for medicinal practices and religion to co-exist in the same space. In our groups, Hmong who practiced Shamanism viewed their religious practices as coinciding with traditional healing and medicine, whereas Christian Hmong saw their religion as synonymous with Western medicine use. In regards to traditional medicine one boy commented, “I wouldn’t do any of that [Shamanism] because...things just go on my faith and if your faith is strong you wouldn’t turn to it but if your faith is weak you’re gonna get tempted and you’re gonna do it because you think God isn’t going to help you. You’re gonna turn to what is next and what’s next is Shamanism (B-US[†], M).” Some adolescents and young adults were not able to place their trust in traditional medicines/practices because there was no representation of their Christian, modern, and American identity. Not only did young adults not trust the knowledge of the medicine woman but they also did not trust the judgment and traditional medical knowledge of their family members.

Participants discussed disapproval of their parent’s mixture of Hmong and Western medicines because of unknown potential interactions and ingredients and amounts in herbal mixtures. One commented that her father, “he’ll always do the Hmong medicine. I always tell him about mixing medicines and not knowing how much

is in what and he's like don't worry everything is herbal it's safe. Because it's herbal and natural it's safe (B-US, F)." Although, blindly putting trust in medication because it is considered "herbal" may not always be safe, it was interesting that younger generations typically put blind faith in Western biomedicine just as their parents did with traditional medicine. What makes biomedicine seem so much safer to younger generations? Just because something has a label, is prescribed by a doctor, and has been tested does not necessarily mean it is without fault either. Exposure to US culture has had a powerful effect on younger generations via acculturation to Western attitudes, practices, and beliefs. Older generations do in addition to traditional ways whereas in some cases younger may replace or substitute wholly.

The decline in traditional medicine use in younger generations has led to decreased herb gardening for medicinal purposes. Many young women said their mothers or grandmothers had medicinal herb gardens, but they did not. In reference to growing herbs one stated, "sometimes my mother-in-law would tell me about it, she wants me to learn so if anything happens to her I can continue with it but I have too many other things to do that I'm like yeah, yeah, but after that I forget...maybe when she is gone I will put the effort in to learn and keep continuing the practice but not now (B-US, F)." Barriers to participating in and continuing this practice included lack of standardization and referenced documentation of herbs used by their mothers and grandmothers. As one woman stated, "because we don't have that formal structure documenting the herbs and how to you use them its kind of difficult. Sometimes even for my mom or my grandmother, when she was alive, they don't know some of the names. They come up with little nicknames for their herbs so they can tell you this but then maybe you talk to another person they say its this, and until you actually see it you say oh it's the same thing (B-US, F)." Young women desired a written text, which contained referential information about herbs, not an oral transmission of passing information. They did not want to rely on memory and practice, but instead yearned for tangible texts they could refer back to on their own time table. By not accepting oral forms of transmission for traditional knowledge and practices young women were contributing to the growing silence in medicinal herb gardening.

As younger generations of Hmong remodel their cultural patterns, deciphering who or what they identify with becomes a contested space. Many focus group participants struggled to define themselves, as one boy said, “I do think that I’m American...I mean I am Hmong, yet I am an American. I’m here (B-US[†], M).” In our interview, Houa echoed a similar feeling by stating, “what is expected between Hmong and American culture, how much do I identify with each? It was a struggle growing up.” Her parents wanted her to pursue an education but at the same time learn the traditional female roles at home. She was surprised to discover that the girls she worked with had parents who still expected them to uphold the traditional female responsibilities, such as cooking and cleaning, go to school, and in some cases hold down a job. She noted that several of her juniors and seniors were having difficulties finding a balance between work, school, and responsibilities at home. She questions herself often, “why are they working so much?” She was worried some did not view education as an investment like their job. They work to help out with household bills, it provides some independence, or supplies groceries for the family.

Based on discussions from youth and young adults in our study, there appears to be a struggle as to where they see themselves not only fitting into American culture but also their culture of origin, and how to strike a balance between the two. Maybe, according to Hoffman’s (2008) model, aspects of the Hmong and American identity are not located on separate ends of the continuum but are two sides of the same coin. Individuals may choose to silence some aspects while voicing others depending on the situation and what identity they wish to present. Many young adults and adolescents may be choosing to silence some Hmong parts of self and give voice to the desired American parts of self. Boshier (1997) looked at Hmong students at the postsecondary level and found they showed a bicultural adaptation to US life, preserving some aspects of Hmong culture while at the same time adopting aspects of American culture. Xiong et al. (2005) showed how Southeast Asian immigrant adolescence may modify their values and attitudes toward the country of residence, while parents may resist these shifts. Specifically, Hmong parents discussed providing clothes, cultural education, and food as qualities of good parents, whereas none of the adolescents discussed these

qualities (Xiong et al. 2005). Expectations and ideas concerning relationships and social conventions may be very different between Hmong parents and adolescents when faced with dueling cultural norms.

Having one foot on both sides of the identity coin may also be mapped out in a linear fashion. Moving back and forth between the less acculturated Hmong identity and the more acculturated American identity may be viewed as an embracing of old ways rather than stepping forward into their American identity. In some cases traditional practices were neutralized or grandfathered in when properly justified and viewed as non-threatening to their acculturated American identity. Some expressed levels of acceptability when it came to Shaman practices. As one adult Christian stated, “we don’t go to extreme cases for Shamanism, just small. Like just ask the ancestors for some blessings so we don’t do big practices (B-US, F).” In this case, her family would dabble in both Christian and Shaman practices depending on the situation. B-US children expressed that updating or modernizing traditions may be a potential preservation method for their culture. One girl stated, “I think it’s important to keep the traditions...you can Americanize it, but still keep those traditions (B-US[†], F).” For those that would experiment with both traditional medicine and biomedicine, it was whatever type of medicine would provide positive results. Medical pluralism has been available to US citizens (Kaptchuk and Eisenberg 2001) dating prior to the early 19th century (Warner 1987). Capps (1994) found that Hmong in Kansas City had responded to rapid cultural changes by creating a medical culture that incorporated traditional ideas and therapies in conjunction with US biomedicine. B-TL participants particularly stated they would try Hmong medicine first and if desired results were not achieved they would try Western medicine and vice versa.

Newly immigrated Hmong (B-TL¹ and B-TL³) were in a tremendous stage of transition. Adults and adolescents were especially caught between two worlds, rooted in their culture of origin but expected to flourish in their new surroundings in the US. Newly immigrated adolescents, however, have already started incorporating more dominant cultural traits because they are being educated in the American school system, exposed to American foods at school and through food assistance programs, and more

likely to interact with non-Hmong peers. Already the B-TL³ groups expressed marriage would be delayed until after their education was finished. They also expressed that keeping Hmong foods as well as adding different foods into their diets was a positive thing. As one stated, “I think it’s important...because it’s my own culture. It’s good to learn all the kinds of foods, but it’s not good to lose (B-TL³, F).” Interestingly, they also discussed how Hmong born in the US were better able to go between the two cultures, as if to slide back and forth with ease, whereas for them it was more difficult. Although they could speak some English, were able to understand most of our questions, had adjusted to and embraced foods offered at school, and were influenced by clothing and hair styles in the US, religion had been left untouched. Shamanism was talked about in a positive manner and without restraint or hesitation. Many commented they had male family members who were Shamans and were used to determine illness.

The future of the Hmong language and cultural practices may be remodeled according to what is considered “reasonable” by modern subjects’ standards and determine what aspects get maintained versus let go. Schieffelin and Doucet (1998:285-315) found a parallel negotiation process for Haitians where religion (vodou and western religion) and language (French and kreyol) were both prime battleground arenas for individuals to attempt to integrate their dual African/European heritage. As Hoffman (2008: 77) pointed out, “more than language is lost with language shift.” Hartman, a linguist at Northern Illinois University, was interviewed in the video *Hmonglish*, and stated that the advent of language contraction is, “a terrible, terrible loss to our store of knowledge because languages are the reservoir of a culture, of knowledge, especially of indigenous knowledge, ways of doing, ways of thinking, or even the nomenclature of plants and animals...So when we lose this it’s a tremendous loss to the intellectual treasure of the world, so that’s what’s happening.” The question remains as to whether the Hmong language will be added to the growing list of endangered language species. Characteristics associated with a language, such as class, shared identity, history, and cultural value greatly affect whether or not a language survives, dies, is celebrated, or revitalized (Cavanaugh 2006).

Loss of language and tradition in the Hmong community have shown that

silences are productive and have resulted in silences between individuals (younger and older generation), the creation and widening of silent spaces through devaluing Shamanism and its associated medicinal practices/rituals. This paper has shown how modernity is conveyed through linguistic discourses, by constructing contrastive opposites, and how silences can be destructive but also extremely informative about the evolution of a culture in transition. Throughout this piece language ideology has been a place where images of self versus other and us versus them have been determined and worked out. The Hmong language as well as the traditional practices tied to it is deeply connected to a representation of identity that younger generations may be attempting to silence not only in word and thought but also in deed. As the Hmong population increases and successive generations are born in the US, it will be important to examine how acculturation levels and environmental change expedite as well as mediate silences in language and action of current and future generations. The information in this study may be useful to educators, community leaders, and health care professionals in better understanding the desires as well as pressures generations born in the US are facing with regards to cultural values and practices in transition.

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Table 1: Sample Characteristics of Hmong Adults

	B-TL ^{1*} (n=19)	B-TL ^{2**} (n=20)	B-US ^{3**} (n=30)
Sex			
Male	8 (42%)	8 (40%)	5 (17%)
Female	11 (58%)	12 (60%)	25 (83%)
Age (years) †			
18 - 29	7 (37%)	2 (10%)	26 (87%)
30 - 49	10 (53%)	13 (65%)	4 (13%)
50 - 64	2 (10%)	5 (25%)	0
Mean ± sd	33.5 ± 9.8 ^a	44.1 ± 10.3 ^b	26.4 ± 4.7 ^c
Years lived in the US†			
1 to 5	19 (100%)	0	0
5 to 15	0	2 (10%)	0
15 to 25	0	1 (5%)	13 (43%)
25 to 35	0	17 (85%)	17 (57%)
Mean ± sd	2.3 ± 0.7 ^a	26.2 ± 6.2 ^b	24.6 ± 3.9 ^b
Education†			
< high school	19 (100%)	3 (16%)	1 (3%)
Some high school	0	1 (5%)	0
Completed high school/GED	0	4 (21%)	2 (7%)
Some undergrad/college/technical/vocational	0	8 (42%)	9 (30%)
Completed undergrad/college/tech/vocational	0	2 (11%)	13 (43%)
Completed graduate/professional school	0	1 (5%)	5 (17%)
Mean ± sd	1.0 ± 0.0 ^a	3.4 ± 1.4 ^{b§}	4.6 ± 1.1 ^c
Income (annual household) †			
< \$10,000	10 (53%)	0	2 (6.5%)
\$10,001-\$19,999	5 (26%)	2 (10%)	2 (6.5%)
\$20,000-\$39,999	3 (16%)	8 (40%)	5 (17%)
\$40,000-\$59,999	0	6 (30%)	5 (17%)
> \$60,000	0	2 (10%)	13 (43%)
Unemployed	1 (5%)	2 (10%)	3 (10%)
Mean ± sd	1.8 ± 1.2 ^a	3.7 ± 1.1 ^b	4.1 ± 1.4 ^b

Food Assistance (% that said yes)			
Food Stamps [†]	18 (95%)	1 (5%)	4 (13%)
Food Distribution	0	1 (5%)	0
School Lunch [†]	13 (68%)	4 (20%)	3 (10%)
MN Food Assistance Program	4 (21%)	1 (5%)	0
WIC [†]	10 (53%)	2 (10%)	7 (23%)
Total people in household (mean ± sd)[†]	6.6 ± 2.1^a	6.6 ± 2.7^a	4.2 ± 2.1^b
Total children in household (mean ± sd)[†]	4.4 ± 2.1^a	3.4 ± 2.5^a	1.3 ± 1.5^b

* Those born in Thailand or Laos and lived in the US ≤ 5 years (latest wave of migration).

** Those born in Thailand or Laos, spent their developmental years there, with 38 years being the oldest age of migration, could recall food memories (>8 years of age) from Thailand/Laos during discussions, and lived in the US >5 years.

*** Those born in the US or in Thailand/Laos but could not recall food memories during discussions, because of the short amount of time spent there (1 month to ≤ 8 years of age).

† ANOVA group means significantly different at p≤0.05 level; unable to perform Chi-square tests because some cells had counts <5.

§ Missing n=1

a, b, & c Post-hoc Tukey HSD multiple comparisons test, means significantly different at p≤0.05 level.

Table 2: Sample Characteristics of Hmong Children

	B-US (n=47)		
	B-TL³ (n=21)	B-US[†] (n=25)	B-US[‡] (n=22)
Sex			
Male	8 (38%)	16 (64%)	12 (55%)
Female	13 (62%)	9 (36%)	10 (45%)
Age (years)			
Mean ± sd	15.7 ± 1.3	15.9 ± 1.2	11.4 ± 1.3
Grade Level			
Elementary School	0	0	8 (36%)
Middle School	0	2 (8%)	14 (64%)
High School	21 (100%)	23 (92%)	0

B-TL³ = Born in Laos or Thailand, are 14-18 years old, and have been in the US for ≤5 years

B-US[†] = Born in the US and 14-18 years old

B-US[‡] = Born in the US and 9-13 years old

Chapter 6:

**Environmental, personal, and behavioral influences on BMI and acculturation of
second generation Hmong children**

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Submitting to: *Journal of Nutrition*

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INTRODUCTION

Research suggests that second generation immigrants have a higher prevalence of obesity than their foreign born counterparts¹⁻³. Part of the rising obesity problems for second generation immigrants has been placed on differences in acculturation level⁴⁻⁶. Acculturation, typically defined as the progression of a minority group adopting cultural patterns of a dominant/host group⁷, in association with obesity has been linked with nativity, years lived in the US, English language fluency, and negative dietary modifications^{5, 8-11}.

The Hmong are an immigrant group that first came to the United States (US) in the late 1970's as the Indochinese war was ending^{12, 13}. Many were allies to the United States (US) during the Vietnam War as they were recruited by the Central Intelligence Agency (CIA) to participate in what would later be called the Secret Wars of Laos¹⁴. After the war, some sought refuge in Western countries and in the US they are mainly concentrated in California, Wisconsin, and Minnesota^{15, 16}. It is estimated that up to 70,000 Hmong live in Minnesota^{15, 17}.

A high incidence of overweight has been observed in Hmong infants and children¹⁸⁻²¹. Research has shown that second generation Hmong children are not only twice as likely to become obese compared to first generation residents¹, but also are more likely to adapt to US culture and adopt potentially risky health behaviors^{21- 25}. Being overweight/obese as a child greatly increases the chances of adult overweight/obesity and the risk of chronic disease development, such as type 2 diabetes, hypertension, and heart disease²⁶⁻³¹. Given the large-scale migration patterns of immigrants into the American obesogenic environment and the expense of health care costs involved with obesity-related diseases, it is important to conduct research on migrant groups such as Hmong children and examine what factors most influence acculturation and BMI so that appropriate educational materials and intervention programs can be developed. Therefore, the purpose of this project was to determine influences (environmental, personal, and behavioral) on body mass index (BMI) and acculturation status among second generation Hmong children using the Social Cognitive Theory (SCT) as the theoretical framework.

METHODS

Design and Sample

A quantitative survey was developed for Hmong children in St. Paul/Minneapolis, MN using formative information collected from 12 child focus groups (n=68) with children aged $\geq 9 \leq 18$ years old^{42, 59} and a review of the literature, and questions were developed using the SCT constructs. Founded in sociological and psychological principles, the SCT assesses the dynamic and triadic relationship among environmental, behavioral, and personal factors^{32, 33}. Using behavioral theories to better understand health related behaviors has provided valuable information with previous studies³³⁻³⁵, and the SCT in particular has been used to examine health behaviors in nutrition research³⁶⁻³⁹.

Survey, heights and weights, and acculturation information were collected on Hmong children (n=300) $\geq 9 \leq 18$ years of age. Children were recruited through local youth organizations, schools, and churches and they received cash incentives. B-US¹ were raised in the US and 9-13 years old (n=144) and B-US² were raised in the US and 14-18 years old (n=156). This study was approved by the University of Minnesota's Institutional Review Board (IRB) and appropriate informed assent/consent forms were signed.

Measures and Analysis

Hmong Child Survey

The survey was pilot tested with a group of Hmong children (n=35), and was evaluated for content, breadth of coverage, and readability (Flesch Reading ease was 84.3 and Flesch-Kincaid readability was grade level 4.1). Responses to the SCT questions were on a 5-point Likert scale, entered as -2 through 2, analogous to strongly disagree through strongly agree. The cronbach alpha coefficient, an index of inter-item homogeneity or internal consistency, found excellent reliability levels for the environmental (0.87), behavioral (0.83), and personal (0.92) scale. These scores indicate an almost perfect (0.81–1.0) range of reliability⁴⁰. Pearson correlations showed that all of the construct means were positively and significantly ($p < 0.01$) associated with each other.

The surveys were self-administered, and assistance was given to children whenever needed. Children were asked to read each question carefully and select only one response and that there were no right or wrong answers. Children averaged 45 minutes to complete the survey. All surveys were checked for multiple and/or blank responses and children completed problematic responses.

Acculturation Assessment

Acculturation level was evaluated using a modified instrument (substituting Hmong for Spanish), previously generated by Marin et al.⁴¹. This instrument had comparable validity and reliability coefficients to other published scales. The scale has been used with Hmong adults²⁵ and children⁴². The reliability of the scale was tested with adults and children, small groups completed the instrument at two different points in time. A paired samples t-test detected no significant differences, indicating the modified instrument was reliable to use^{25,42}. The instrument asked questions regarding language (at home, with friends, and think in), social connections (friends), and overall dietary acculturation (I eat). To attain additional information concerning eating patterns, questions were asked regarding what children ate for breakfast, lunch, dinner, and snacks. Also, a question pertaining to identity perception was added (I see myself as). Questions and possible responses are located in Table 10. A summation of the responses to these questions was used to calculate the overall acculturation level. Further, Hmong informants reviewed all of the questions regarding the acculturation assessment before implementation to ensure participants would understand the questions properly.

Anthropometric Measurements

Child height and weight were measured using a portable stadiometer and calibrated scale without shoes and heavy outer clothing. Epi Info™ Version 3.3.2 was used to calculate BMI-for-Age percentiles from height, weight, age, and gender data⁴³. Child obesity was defined as $\geq 95^{\text{th}}$ percentile, overweight as $\geq 85^{\text{th}}$ to $< 95^{\text{th}}$ percentile, healthy weight as $\geq 5^{\text{th}}$ to $< 85^{\text{th}}$ percentile, and underweight as $< 5^{\text{th}}$ percentile⁴⁴.

Statistical Analysis

The Statistical Packages for Social Sciences (SPSS) software, v 17 (2008), was used to analyze the data. Descriptive statistics were used to determine means and

standard deviations of all constructs as well as age, gender, BMI, and acculturation level. Mean values for the constructs were compared using independent t-tests to identify any gender or age differences. Age and gender differences were noted in responses for SCT survey questions; however, only age differences were noted for responses to the acculturation assessment questions.

Data for BMI-for-Age percentiles were not normally distributed, however sum acculturation scores were. Thus, Spearman Rho and Pearson correlations were used as a data reduction method respectively to determine which questions within each construct (environment, behavior, and personal) were significantly correlated to BMI-for-Age percentiles and sum acculturation scores for each of the four sub-groups (B-US¹ and female, B-US¹ and male, B-US² and female, B-US² and male). To examine SCT constructs most predictive of BMI percentiles and sum acculturation score, multiple linear regression analyses using the enter method were performed respectively with only the significantly correlated questions. The enter method, or simultaneous multiple regression, assumes that all of the predictor variables entered are important and that you want to know the multiple correlation of all these variables with the outcome variable of interest. Questions that were highly correlated with each other ($R^2 > 0.50$) were tested as a group because high intercorrelation among independent/predictor variables (collinearity) can cause problems in the interpretation of the multiple regression. For instance, the questions “*I use Hmong medicine because my parents use them*” and “*I use Hmong medicine because my grandparents use them*” had a correlation value of $R^2 = 0.80$. When we compared the regression runs with and without these questions the change in the p-value for R^2 was significant, indicating that the combination of these questions added significantly to the prediction of the variance, whereas when they were run with the group they appeared non-significant because of collinearity. Pearson correlations were also conducted on the acculturation assessment questions and the sum acculturation score for the two age groups (B-US¹ and B-US²). The level of significance was set at $p < 0.05$ for all statistical tests.

RESULTS

Participants included 56% females and 44% were males (Table 1) with average ages of 11.4 ± 1.3 (B-US¹) and 15.8 ± 1.3 (B-US²) years old. Approximately 50% of children were classified as overweight/obese.

BMI-for-Age Percentiles and SCT Survey Questions

B-US¹ and Female

Spearman correlations found 11 environmental questions significantly correlated with BMI percentiles (Table 2). Multiple linear regression then identified significantly correlated environmental questions (independent variables) most predictive of BMI percentiles (dependent variable). Approximately 60% ($R^2=0.601$) of the variance was explained by these questions, with four questions making a significant addition to the prediction of the variance. The negatively correlated questions included, *“I started eating American foods because my family was on WIC”* and *“My parents take me to an American doctor when I am sick”*. The positively correlated questions were, *“My parents tell me I should lose weight”* and *“I eat chips, candy, and pop because the people I care about do”*. Because of collinearity, questions #10 and 11 (*Even when I am full my parents/grandparents want me to eat more*) were tested as a group and changed the R^2 for the model significantly ($p=0.003$) by 9%. Spearman correlations for behavioral questions and BMI percentiles found four questions were significantly correlated and multiple linear regression analysis showed they explained 14% of the variance ($R^2=0.135$) (Table 2). Three questions from the personal construct were significantly correlated to BMI percentiles and multiple linear regression analysis found they explained 20% of the variance ($R^2=0.195$) (Table 2). Two questions made a significant addition to the prediction of the variance and were, *“I choose to eat American foods over Hmong foods at school”* (negatively correlated) and *“If I eat less rice, I will lose weight”* (positively correlated).

B-US¹ and Male

Spearman correlations for environmental questions and BMI percentiles showed 13 questions as being significantly correlated (Table 3). Multiple linear regression then identified significantly correlated environmental questions (independent variables) most

predictive of BMI percentiles (dependent variable). Approximately 55% ($R^2=0.545$) of the variance was explained by these questions, with two questions making a significant addition to the prediction of the variance. The questions included, *“In the home boys/men do the cleaning and go hunting”* (negatively correlated) and *“My parents tell me I should lose weight”* (positively correlated). Because of collinearity, questions #7-9 on partents/grandparents encouraging eating and grandparents suggesting weight gain were tested as a group and there was a significant change ($p=0.018$) in the R^2 value for the model by 11%. Ten questions measuring behavior were significantly correlated to BMI percentiles (Table 3). BMI percentiles were run as the dependent variable with the significantly correlated behavioral questions as independent variables through multiple linear regression to establish questions most predictive of BMI percentiles.

Approximately 33% ($R^2=0.328$) of the variance was explained by these questions, with two making a significant addition to the prediction of the variance. These negatively correlated questions included, *“Eating American food is good for my body”* and *“The men in my family teach me to fish”*. Seventeen questions measuring the personal construct were significantly correlated to BMI percentiles (Table 3). BMI percentiles were run as the dependent variable with the significantly correlated personal questions as independent variables through multiple linear regression to establish which questions were most predictive of BMI percentiles. Approximately 40% ($R^2=0.401$) of the variance was explained by these questions.

B-US² and Female

Spearman correlations for environmental questions and BMI percentiles found 9 questions as being significantly correlated (Table 4). Multiple linear regression then identified significantly correlated environmental questions (independent variables) most predictive of BMI percentiles (dependent variable). Approximately 51% ($R^2=0.51$) of the variance was explained by these questions and four questions made a significant addition to the prediction of the variance. Negatively correlated questions included, *“I eat snack foods like chips, candy, and pop when I watch TV”* and *“My grandparents tell me I should gain weight”*. The positively correlated questions were, *“My parents tell me I should lose weight”* and *“I cannot lose weight because there is too much food to*

eat". Three questions measuring the behavioral construct were significantly correlated with BMI percentiles (Table 4). BMI percentiles were run as the dependent variable with the significantly correlated behavioral questions as independent variables through multiple linear regression to determine questions most predictive of BMI percentiles. Approximately 16% ($R^2=0.155$) of the variance was explained by these questions, with two questions making a significant addition to the prediction of the variance, which were, "*I have made it a habit to overeat at mealtimes*" (positively correlated) and "*Eating American food is good for my body*" (negatively associated). Spearman correlations for personal questions and percentiles showed 10 questions as being significantly correlated (Table 4). BMI percentiles were run as the dependent variable with the significantly correlated personal questions as independent variables through multiple linear regression to establish questions most predictive of BMI percentiles. Approximately 33% ($R^2=0.333$) of the variance was explained by these questions, with two questions making a significant addition to the prediction of the variance. These questions were, "*If I eat less rice I will lose weight*" (positively correlated) and "*I eat chips, candy, and pop to make me feel better*" (negatively correlated). Because of collinearity, questions #6-8 on rice consumption were entered as a grouped and did significantly change the R^2 value between models ($p=0.002$) by 13%.

B-US² and Male

Spearman correlations for environmental questions and percentiles showed 8 questions as being significantly correlated (Table 5). Multiple linear regression then identified significantly correlated environmental questions (independent variables) most predictive of BMI percentiles (dependent variable). Approximately 52% ($R^2=0.522$) of the variance was explained by these questions, with two questions making a significant addition to the prediction of the variance. These questions included, "*My parents tell me I should lose weight*" (positively correlated) and "*I eat snack foods like chips, candy, and pop when I watch TV*" (negatively correlated). Three questions measuring the behavioral construct were significantly correlated with BMI percentiles (Table 5). BMI percentiles were run as the dependent variable with the significantly correlated behavioral questions as independent variables through multiple linear regression to

determine questions most predictive of BMI percentiles. Approximately 15% ($R^2=0.148$) of the variance was explained by these questions, with one making a significant addition to the prediction of the variance, which was “*I have made it a habit to overeat at mealtimes*” (positively correlated). Spearman correlations for personal questions and BMI percentiles showed 8 questions as being significantly correlated (Table 5). BMI percentiles were run as the dependent variable with the significantly correlated personal questions as independent variables through multiple linear regression to establish questions most predictive of BMI percentiles. Approximately 36% ($R^2=0.356$) of the variance was explained by these questions, with three questions making a significant addition to the prediction of the variance. Positively correlated questions included, “*If I eat chips, candy, and pop I gain weight*” and “*I can clean game (squirrel, deer)*”. Because of collinearity, questions #5 and 6 on desserts were tested as a group and there was a significant change ($p=0.01$) in the R^2 value for the model by 12%.

Sum Acculturation Scores and SCT Survey Questions

B-US¹ and Female

Pearson correlations for environmental questions and acculturation score found 11 questions as being significantly correlated (Table 6). Acculturation scores were run as the dependent variable with the significantly correlated environmental questions as independent variables through multiple linear regression to determine questions most predictive of score. Approximately 41% ($R^2=0.408$) of the variance was explained by these questions, with one question making a significant addition to the prediction of the variance. This question was, “*I eat snack foods like chips, candy, and pop when I watch TV*” (positively correlated). Because of collinearity, questions #9-11 on Hmong medicine use were tested as a group and changed the R^2 model significantly ($p=0.036$) by 9%. Ten questions measuring behavior were significantly correlated to acculturation score (Table 6). Acculturation scores were run as the dependent variable with the significantly correlated behavioral questions as independent variables through multiple linear regression to determine questions most predictive of scores. Approximately 36% ($R^2=0.355$) of the variance was explained by these questions, with two questions

making a significant addition to the prediction of the variance. These questions included, “*I am able to use Hmong medicine when I am sick*” (negatively correlated) and “*I am able to use American medicine when I am sick*” (positively correlated). Pearson correlations for personal questions and acculturation score showed 15 questions as being significantly correlated (Table 6). Acculturation scores were run as the dependent variable with the significantly correlated personal questions as independent variables through multiple linear regression to determine questions most predictive of the score. Approximately 42% ($R^2=0.421$) of the variance was explained by these questions, with one question making a significant addition to the prediction of the variance. This question was, “*I like American food because it tastes good*” (positively correlated). Due to collinearity, questions #7-10 on Hmong medicine use were tested as a group and changed the R^2 value for the model significantly ($p=0.036$) by 11%.

B-US¹ and Male

Pearson correlations for environmental questions and acculturation score found 13 questions as being significantly correlated (Table 7). Acculturation scores were run as the dependent variable with the significantly correlated environmental questions as independent variables through multiple linear regression to determine questions most predictive of score. Approximately 58% ($R^2=0.581$) of the variance was explained by these questions and four questions made a significant addition to the prediction of the variance. Positively correlated questions included, “*I like American foods*”, “*My parents take me to an American doctor when I am sick*”, and “*I eat more American foods than my parents do*”. The negatively correlated question was, “*I like Hmong foods*”. Due to collinearity, questions #11-13 on Hmong medicine use were tested as a group and changed the R^2 for the model significantly ($p=0.025$) by 7%. Six questions measuring the behavioral construct were significantly correlated to acculturation score (Table 7). Acculturation scores were run as the dependent variable with the significantly correlated behavioral questions as independent variables through multiple linear regression to determine questions most predictive of score. Approximately 33% ($R^2=0.330$) of the variance was explained by these questions and three made a significant addition to the prediction of the variance. The positively correlated question

was, *“I know how to cook American food”*. The negatively correlated questions were, *“I choose to use Hmong medicine over American medicine”* and *“My mother/grandmother teaches me how to cook food for the family”*. Because of collinearity, questions #3 and 4 on Hmong medicine use and questions #5 and 6 on American medicine use were tested as a group and changed the R^2 for the model significantly by 10% ($p=0.015$) and 8% ($p=0.028$) respectively. Pearson correlations for personal questions and acculturation score showed 7 questions as being significant (Table 7). Acculturation scores were run as the dependent variable with the significantly correlated personal questions as independent variables through multiple linear regression to determine questions most predictive of score. Approximately 42% ($R^2=0.423$) of the variance was explained by these questions, with two questions making a significant addition to the prediction of the variance. The questions included, *“I eat Hmong foods because they make me feel good”* (negatively correlated) and *“I like American food because it tastes good”* (positively correlated).

B-US² and Female

Pearson correlations for environmental questions and acculturation score found 7 questions as being significantly correlated (Table 8). Acculturation scores were run as the dependent variable with the significantly correlated environmental questions as independent variables through multiple linear regression to determine questions most predictive of score. Approximately 34% ($R^2=0.339$) of the variance was explained by these questions, with four questions making a significant addition to the prediction of the variance. Negatively correlated questions were, *“My parents take me to a Shaman or a medicine woman when I am sick”*, *“I eat rice everyday”*, and *“I gain weight because there is always food to eat”*. The positively correlated question was, *“My parents take me to an American doctor when I am sick”*. Nine questions measuring the behavioral construct were significantly correlated with acculturation score (Table 8). Acculturation scores were run as the dependent variable with the significantly correlated behavioral questions as independent variables through multiple linear regression to determine questions most predictive of score. Approximately 41% ($R^2=0.414$) of the variance was explained by these questions and five questions made a

significant addition to the prediction of the variance. Negatively correlated questions included, *“My mother/grandmother teaches me how to cook food for the family”*, *“If I do not eat Hmong food everyday, I feel like I have not eaten”*, *“If I went to a Shaman, it would be good for my health,”* and *“If I cannot cook, I will not be able to find a good husband”*. The positively correlated question was, *“Foods eaten at school are making my diet more American”*. Pearson correlations for personal questions and acculturation score showed 15 questions as being significantly correlated (Table 8). Acculturation scores were run as the dependent variable with the significantly correlated personal questions as independent variables through multiple linear regression to determine questions most predictive of score. Approximately 48% ($R^2=0.479$) of the variance was explained by these questions, with three questions making a significant addition to the prediction of the variance. The negatively correlated questions included, *“I eat while I watch TV”*, *“I like to eat Hmong foods because I am used to eating them”*, and *“When I am sick, using Hmong medicine makes me feel better”*.

B-US² and Male

Pearson correlations for environmental questions and acculturation score showed 10 questions as being significantly correlated (Table 9). Acculturation scores were run as the dependent variable with the significantly correlated environmental questions as independent variables through multiple linear regression to determine questions most predictive of score. Approximately 64% ($R^2=0.643$) of the variance was explained by these questions, with four questions making a significant addition to the prediction of the variance. Negatively correlated questions included, *“In the home boys/men go fishing and girls/women cook and clean the fish”*, *“My parents give me Hmong medicine when I am sick”*, and *“Hmong medicine is for sale near my house”*. The positively correlated question was, *“Milk is always in my home”*. Because of collinearity, questions #7 and 8 on eating different foods than parents/grandparents were tested as a group and changed the R^2 for the model significantly by 5% ($p=0.04$). Six questions measuring the behavioral construct were significantly correlated with acculturation score (Table 9). Acculturation scores were run as the dependent variable with the significantly correlated behavioral questions as independent variables through

multiple linear regression to establish questions most predictive of score. Approximately 50% ($R^2=0.495$) of the variance was explained by these questions, with three questions making a significant addition to the prediction of the variance. Positively correlated questions were, “*I know how to cook food for myself*” and “*I am able to use American medicine when I am sick*”. The negatively correlated question was, “*I choose to use Hmong medicine over American medicine*”. Pearson correlations for personal questions and acculturation score showed 7 questions as being significantly correlated (Table 9). Acculturation scores were run as the dependent variable with the significantly correlated personal questions as independent variables through multiple linear regression to determine questions most predictive of score. Approximately 60% ($R^2=0.597$) of the variance was explained by these questions, with two questions making a significant addition to the prediction of the variance. The positively correlated questions included, “*I choose to eat American foods over Hmong foods at school*” and “*I eat desserts when it is available*”. Because of collinearity, questions #5-7 regarding hunting were tested as a group and changed the R^2 for the model significantly by 16% ($p=0.001$).

Acculturation Assessment Data

B-US² reported speaking more English at home and thinking in English more compared to B-US¹ (Table 10). Both groups had similar scores for social connections (closest friends) with approximately 60% reporting they were more Hmong than Americans to about half and half. About 80% of both groups reported speaking equal amounts of Hmong and English or more English than Hmong with friends. Looking at eating patterns, the overall dietary acculturation question (I eat) and lunch scores were significantly different between groups, with B-US² reporting a higher consumption of American type foods than B-US¹. Breakfast, dinner, and foods eaten for snacks were not significantly different. For breakfast, children reported eating about equal amounts of Hmong and American foods. Dinner was reported as being mostly Hmong foods to equal amounts of Hmong and American food. Snacks were reported as being equal amounts of Hmong and American foods to mostly American foods. Self-perception was not significantly different, with almost all children perceiving themselves as Hmong-

American. Overall acculturation score was significantly higher for B-US² (30.3 ± 4.1) compared to B-US¹ (28.3 ± 4.9).

For B-US¹ BMI-for-Age percentiles were significantly and positively associated with language spoken at home and language thought in at the $p < 0.05$ level. Overall acculturation scores were positively and significantly associated with all of the acculturation questions at the $p < 0.01$ level. The most highly correlated questions ($R^2 > 0.60$) were language spoken at home, language thought in, language spoken with friends, overall dietary acculturation, and what was eaten for lunch and snacks. For B-US², BMI-for-Age percentiles were only positively and significantly associated with the question regarding language spoken with friends at the $p < 0.05$ level. Acculturation score was positively and significantly associated with all of the acculturation questions at the $p < 0.01$ level. The most highly correlated questions ($R^2 > 0.60$) were language spoken at home, language thought in, and language spoken with friends.

DISCUSSION

In this investigation of BMI and acculturation status of Hmong children born in the US, the constructs of the SCT were found to be predictive of factors influencing the outcome variables of interest. Across age and gender sub-groups, significantly correlated questions measuring the environmental construct appeared to be the most predictive of variances in BMI percentiles (50-60%). In contrast, acculturation scores were more approximately equally predicted by environmental, behavioral, and personal constructs. When looking at the acculturation assessment responses, significant differences were found between age groups with B-US¹ being less acculturated than B-US² in regards to language and diet. In addition, language questions were positively associated with BMI percentiles.

BMI-for-Age Percentiles and SCT Survey Questions

B-US¹ Females and Males

For our 9-13 year old female sample, questions within the environmental construct were more predictive of the variance in BMI percentiles, whereas for the 9-13 year old males the environmental and behavioral constructs were more predictive of BMI percentiles. Males and females with higher BMI percentiles were more likely to

have their parents be vocally concerned and worried about their child's weight status and less likely to have their parents/grandparents encouraging them to overeat. This message was echoed in focus groups, where Hmong children highlighted their parents as being concerned with their weight because of potential future health concerns present in the parents themselves or other elder relatives such as diabetes and hypertension⁴². Traditionally, Hmong adults have reported that the desired body image was plump because of previous food insecurity in Laos/Thailand and that being heavier was a symbol of strength, hardiness, and survival²⁵. However, with an increased incidence of obesity-related chronic diseases such as diabetes⁴⁵, cancer⁴⁶, and hypertension⁴⁷ in this population, Hmong parents and some grandparents experiencing these diseases either directly or indirectly appear to see the connection between obesity and future disease development. Additionally for 9-13 year old females within the environmental construct, higher BMI percentiles were negatively associated with being on WIC, indicative of higher levels of food security when they were younger. Research suggests that previous experience with food security is associated with changed eating behaviors and subsequent weight gain^{39, 48, 49}. Although, these children were not food insecure when they were younger, their parents most likely were, and parental experience with food insecurity and subsequent alterations in dietary habits with readily available food may have negatively impacted the weight status of their children²⁵.

Within the behavioral construct, younger males with higher BMI percentiles perceived American foods as being bad for their body. Although the perception that American type foods may not be healthy exists for them, research has shown that knowledge/perception does not always express itself in behaviors. During focus groups with Hmong children, many expressed that regularly consuming calorie dense foods was associated with weight gain and potential health problems, but this knowledge did not always result in a positive behavior change⁴². Other research has also found that children, despite their knowledge and understanding, stated that barriers to maintaining a healthy diet included finding it difficult to follow healthy eating recommendations⁵⁰, lacking the time to prepare healthy foods at home, and limited access to fresh fruits and vegetables⁵¹. Nine to thirteen year old males with higher BMI percentiles were also less

likely to have examples of or being taught how to do traditional outdoor activities such as hunting (environmental) and fishing (behavioral) respectively, thus higher BMI percentiles may be a reflection of changed cultural patterns experienced during the acculturation process.

B-US² Females and Males

In our older group of females and males, environmental and personal factors were more predictive of BMI percentiles compared to behavioral factors. For males and females within the environmental construct, BMI percentiles were positively associated with parents suggesting weight loss and negatively associated with eating snack foods while watching TV. Parents who are concerned about their child's weight status may be restricting or discouraging snack type foods and sedentary behavior, however, previous research has indicated that restriction techniques regarding eating behaviors are associated with weight gain and preferences for high-fat, calorie dense foods⁵²⁻⁵⁴. Within the behavioral construct, habitually overeating at mealtimes was positively associated with BMI percentiles for males and females. Ackard et al.⁵⁵ found that youth who engaged in overeating had a higher incidence of overweight/obesity, had dieted in the last year, were in the process of trying to lose weight, and stated that shape and weight status were central to their general feelings regarding self.

Within the personal construct, different questions were significant for males and females. Within the personal construct for females, rice consumption and the connection between weight loss and disease (diabetes) was positively associated with BMI percentiles. In focus groups with young adults, there was a willingness to reduce or cut back on rice consumption to produce desired weight loss²⁵ and in focus groups with children there was a connection cited between rice consumption and the potential for developing diabetes later in life⁴². It appears that rice consumption, a traditional dietary staple for Asians^{56,57}, may be reduced in future generations because of its negative association with weight gain and chronic disease development. Within the personal construct for males, the ability to clean game (squirrel and deer) and perceiving that chips, candy, and pop result in weight gain was positively associated with BMI percentiles. Although there may be a reduction in the act of hunting and

fishing, there may still be an expectation for males to know how to clean and prepare foods that are brought home by older men in the family for special occasions or family/friend gatherings where food is being shared ⁴², which supports food consumption.

Sum Acculturation Scores and SCT Survey Questions

B-US¹ Females and Males

According to our 9-13 year old female and male sample, the environmental, behavioral, and personal constructs had questions that significantly added to the prediction of the variances in sum acculturation scores. Within the environmental construct for 9-13 year old females, eating snack foods (chips, candy, and pop) while watching TV was positively associated with scores. Dietary acculturation has been hypothesized as happening quickly in a new food environment because of heavily marketed unhealthy foods and a subsequent deficit in the support of traditional healthy foods ⁵⁸. Within the environmental construct for 9-13 year old males, liking American foods, their parents taking them to an American doctor when they were sick, and eating more American foods than their parents do were all positively associated with acculturation scores. Exposure to American culture through food and medicine appear to expedite the acculturation process for children in our younger sample. This was observed within the behavioral construct for 9-13 year old males as well with because knowing how to cook American food, choosing to use American medicine and perceiving it as healthy was associated with elevated acculturation, whereas learning how to cook traditional Hmong food for the family was associated with lower levels. For younger generations, valuing American foods and medicinal practices may be associated with a reduction or loss in traditional ways for seemingly more modern, American ones ⁵⁹. Previous research has also shown a connection between acculturation level and shopping at American grocery stores, purchasing and consuming more pre-made foods, declines in cooking traditional foods from scratch, and knowing how to cook American foods ^{42, 60, 61}.

Among younger males and females, questions regarding Hmong medicine use throughout the three constructs were associated with lower acculturation scores.

Traditionally, to combat sickness the Hmong have utilized shamans, community healers, and medicine women⁶² and the Shaman is considered the protector of the community and a challenger of evil forces⁶³. Although some alternative and complimentary treatments have been adopted in Western society, the primary method of treatment continues to be biomedical⁶⁴. Research has shown that medicinal practices are often closely tied to religion⁶⁵, and younger generations may be moving away from more traditional practices (religion and medicine) in favor of more modern, biomedical ones as a part of their acculturation process⁵⁹. Acculturation, most often cited in terms of years lived in the US and the association with negative dietary modifications and increased BMIs^{45,66-70}, is also associated with shifts in cultural patterns that may occur beyond dietary habits and spill over into areas such as economics, education, and religion⁷¹⁻⁷³. Capps⁷⁴ found that Kansas City Hmong countered rapid cultural alterations by creating an integrated medical culture comprised of traditional ideas and therapies in conjunction with US biomedicine. According to our sample, younger generations may be creating a medical culture that provides little space for traditional therapies and medicinal practices.

B-US² Females and Males

According to our 14-18 year old female and male sample, questions within the environmental, behavioral, and personal constructs significantly added to the prediction of the variance in sum acculturation scores. Across constructs for 14-18 year old females and males, perceiving and using Hmong medicine as positive as well as maintaining more traditional food patterns with regards to consumption were associated with low sum acculturation scores. As with younger children, older children who were more acculturated expressed a willingness to adopt new medical and food systems and these behavioral changes are highly associated with acculturation.

Within the environmental construct for 14-18 year old females, consuming rice daily was associated with low sum acculturation scores. In focus groups with Hmong children, although rice was considered an important part of their diet, consumption was usually limited to dinner⁴². Other reasons cited for a decreased consumption of rice were lack of availability at school and because it was not eaten with some types of

American foods⁴². Decreased rice consumption patterns may be another strong indicator of shifts in cultural practices and higher levels of acculturation. Within the behavioral construct, knowing how to cook and finding a future husband, feeling the need to eat Hmong food daily, and learning to cook food for the family from the mother/grandmother were negatively associated with sum acculturation scores. Focus group data with Hmong females across age groups indicated that traditionally women should know how to cook, with its importance rooted in marriage and providing food for the family^{25,42}, however, more acculturated females in our sample indicated that consuming and knowing how to cook traditional foods may be losing its importance. In addition, perceiving that foods at school are Americanizing their diets was positively associated with scores. This was also a common theme found in focus groups with young adults, with foods provided at school being identified as a catalyst to introducing foods outside of cultural norms and accelerating their dietary acculturation²⁵.

Within the environmental construct for 14-18 year old males, always having milk in the home and perceiving differences in eating patterns with parents was positively associated with sum acculturation scores. Interestingly having milk increases acculturation because milk is not traditionally consumed in the Hmong culture; therefore this is a new food adaptation. Consistently having milk in the home may be correlated to food assistance program use in the past and because of milk consumption at school through the National School Breakfast and Lunch program²⁵. Younger generations of Hmong have been cited as being more likely to adopt eating behaviors of the host society, replacing American foods for Hmong foods at certain meals, while older generations were more likely to consume American foods along with their traditional diets^{22,25,60}. In addition, for males 14-18 years old, questions pertaining to hunting and fishing within the environmental and personal constructs were negatively associated with sum acculturation score. Negative associations with acculturation and outdoor activities, such as hunting and fishing, may be indicative of another area of potential shifts in cultural practices with less of an emphasis on traditional activities for more acculturated, younger males.

Acculturation Assessment Tool

Age was found to be a significant factor in youths' responses to the acculturation assessment questions. When looking at the acculturation assessment data between age groups, B-US² were more acculturated than B-US¹ in the areas of language used, language thought in, overall dietary acculturation, and foods eaten at lunch. Older children appeared to have a more bicultural adaptation in the areas of language and dietary patterns compared to their younger counterparts. Research examining native language (L1) and majority language (L2) has shown that L1 may be vulnerable to rapid deterioration with early and consistent L2 exposure⁷⁵⁻⁷⁷. In a study with Hmong preschoolers, older participants exceeded younger ones with regards to English related lexical-semantic skills, but did not surpass the younger group when they were tested in Hmong language skills⁷⁷. Boshier²³ found that Hmong students at the postsecondary level had developed a bicultural adaptation to life in the US by retaining parts of Hmong culture while taking on some features of American culture. Previous research has shown that US born Hmong children were more acculturated than their foreign-born counterparts⁴², however, our sample showed that there are differences in acculturation level between age groups among US born children as well.

Language used and language thought in were positively correlated to BMI percentiles for B-US¹ and language used with friends was positively correlated to BMI percentiles for B-US². English language fluency has also been associated higher BMIs in Puerto Rican women, with those who were bilingual and spoke fluent to very good English having significantly higher BMI's than those whose English was good to not so good⁵. Language questions were highly correlated with sum acculturation scores for both age groups, however, B-US¹ also had dietary acculturation questions (overall and foods eaten for lunch and snacks), as being significantly correlated to acculturation score whereas B-US² did not. Dietary-related questions may have been a more significant influence on younger children because their ability to select foods may be more limited, with school breakfast, lunch, and snacks at afterschool programs either selected for them or having limited choices that are typically American type foods.

CONCLUSIONS

Findings indicate that the SCT is useful for predicting factors related to BMI status and acculturation level in a sample of Hmong children born in the US. Across gender and age sub-groups, environmental factors appear to affect BMI-for-Age percentiles more significantly than behavioral or personal factors and should be taken into consideration when designing programs aimed to prevent or reduce overweight/obesity in this population. However, when looking at acculturation scores, all three of the SCT constructs were equally predictive for all four of the sub-groups, indicating that acculturation level is more directly influenced by all three constructs. Given acculturation level and BMI status are associated with each other; this indicated that personal and behavioral constructs are indirectly related to BMI status, whereas environmental factors have a more direct influence. This data suggests that working through the family and community is important and that nutrition professionals should work with Hmong community leaders to help supply nutritional knowledge to the entire community. Differences in gender and age may require the need for separate programs or at minimum special considerations for age and gender groupings. Special considerations for younger females with higher BMI percentiles include that they are more likely to copy or emulate people they consider important regarding food choices. In addition, older females with higher BMI percentiles were more likely to report feeling their abundant access to food was detrimental to their weight loss efforts. Because of the high prevalence of obesity in Hmong children, future studies should continue to investigate factors influencing obesity, such as eating and activity behavior, to identify the most effective method to reduce and prevent this problem.

Competing interests

The author(s) declare that they have no competing interests.

Acknowledgements

We would like to thank the Hmong youth for volunteering to participate in this survey and their parents for allowing them to do so. We would also like to express our appreciation for the leaders and organizers at the local youth groups, churches, and schools that aided in recruitment and provided space for us to conduct the survey. We would also like to thank Urvashi Pokhriyal for her assistance in data collection and entry. This project was funded by the Agriculture Experiment Station of the University of Minnesota.

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Table 1. Sample Characteristics Among Children		
Sex	B-US1 (n=144)	B-US2 (n=156)
Male	73 (51%)	60 (38%)
Female	71 (49%)	96 (62%)
Age (Mean ± sd)	11.4 ± 1.3a	15.8 ± 1.3b
Where were you born?		
	‡	†
Thailand	1 (1%)	15 (9%)
Laos	0	1 (1%)
France	0	1 (1%)
Minnesota	99 (70%)	98 (63%)
California	22 (16%)	28 (18%)
Wisconsin	9 (6%)	9 (6%)
Other US State	10 (7%)	3 (2%)
Grade Level		
Elementary School	59 (41%)	0
Middle School	85 (59%)	14 (9%)
High School	0	140 (90%)
Post-Secondary	0	2 (1%)
Body Mass Index (BMI)-for-Age Percentiles		
< 5th percentile	1 (1%)	1 (1%)
≥5th to <85th percentile	73 (50%)	76 (49%)
≥85th to <95th percentile	23 (16%)	26 (16%)
≥95th percentile	47 (33%)	53 (34%)
BMI (mean ± sd)	22.2 ± 5.5a	25.5 ± 5.6b
Male	22.8 ± 5.7a	25.9 ± 5.7b
Female	21.6 ± 5.2a	25.3 ± 5.5b
<p>B-US1 = Born and/or raised in the US and 9-13 years old B-US2 = Born and/or raised in the US and 14-18 years old ^{a & b} Post-hoc Tukey HSD multiple comparisons test, means between groups significantly different at p≤0.05 level. † Missing=1 ‡ Missing=3</p>		

Table 2. Multiple Linear Regression Analysis for BMI-for-Age Percentiles of 9-13 year old females

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Questions Measuring the Environmental Construct					
(Constant)	82.364	4.571		18.018	.000
1. Milk is always in my home	-1.690	2.147	-.070	-.787	.435
2. I started eating American foods because my family was on WIC	-5.602	1.758	-.283	-3.188	.002
3. My parents encourage me to eat so I will be big and strong	-1.662	1.576	-.101	-1.054	.296
4. My grandparents tell me I should gain weight	-.094	1.746	-.006	-.054	.957
5. My parents tell me I should lose weight	4.655	1.426	.302	3.265	.002
6. I eat the school lunch everyday	-.760	1.579	-.042	-.481	.632
7. Hmong medicine is for sale near my house	3.166	1.843	.163	1.718	.091
8. My parents take me to an American doctor when I am sick	-4.102	1.795	-.201	-2.286	.026
9. I eat chips, candy, and pop because people who I care about do	4.838	2.014	.216	2.402	.020
10. Even when I am full, my parents want me to eat more	-3.477	2.065	-.192	-1.684	.098
11. Even when I am full, my grandparents want me to eat more	-3.675	2.148	-.214	-1.711	.092
Questions Measuring the Behavioral Construct					
(Constant)	78.700	3.125		25.181	.000
1. American food is high in oil and salt and bad for my body	3.914	2.365	.190	1.656	.103
2. Eating American food is good for my body	-3.655	2.455	-.192	-1.489	.141
3. If I used American medicine, it would be good for my health	-.388	2.829	-.020	-.137	.891
4. If I used Hmong medicine, it would be good for my health	-3.951	2.617	-.203	-1.510	.136
Questions Measuring the Personal Construct					
(Constant)	76.383	3.171		24.087	.000
1. If I eat less rice, I will lose weight	4.420	2.122	.230	2.083	.041
2. I choose to eat American foods over Hmong foods at school	-6.382	2.130	-.339	-2.995	.004
3. I eat Hmong foods because they make me feel good	-2.802	2.177	-.146	-1.287	.203

a. Dependent Variable = BMI-for-Age Percentile

Table 3. Multiple Linear Regression Analysis for BMI-for-Age Percentiles for 9-13 year old males

Coefficients^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Questions Measuring the Environmental Construct					
(Constant)	77.282	4.934		15.662	.000
1. My parents tell me I should lose weight	7.437	1.828	.454	4.069	.000
2. In the home boys/men do the cleaning and go hunting	-4.300	1.929	-.225	-2.229	.030
3. I have learned to make American foods because I watch TV	-1.980	2.227	-.098	-.889	.378
4. I have learned that boys/men hunt and clean game by watching my parents	.811	2.191	.041	.370	.713
5. I learn to fish by watching the men in my family	-4.165	2.172	-.218	-1.918	.060
6. My parents encourage me to eat so I will be big and strong	.114	2.107	.006	.054	.957
7. Even when I am full, my parents want me to eat more	-3.924	2.926	-.194	-1.341	.185
8. Even when I am full, my grandparents want me to eat more	4.217	2.674	.198	1.577	.120
9. My grandparents tell me I should gain weight	-3.678	2.608	-.196	-1.410	.164
10. I use Hmong medicine because my parents use them	-.117	2.769	-.006	-.042	.966
11. I use Hmong medicine because my grandparents use them	-.146	2.610	-.008	-.056	.956
12. When I see chips, candy, or pop on TV, I ask my mom or dad if we can buy it	-3.004	2.454	-.145	-1.224	.226
13. TV commercials help me decide which foods I want to eat	1.293	2.041	.072	.633	.529
Questions Measuring the Behavioral Construct					
(Constant)	97.583	7.223		13.511	.000
1. My parents talk to me about the importance of learning how to cook	-1.768	2.548	-.098	-.694	.490
2. My mother/grandmother teaches me how to cook food for the family	-1.218	2.643	-.067	-.461	.647
3. I am able to eat lunch everyday because I get free or reduced lunch	-.854	2.277	-.043	-.375	.709
4. I am able to try new foods I have not eaten before	-.899	2.970	-.036	-.302	.763
5. I am able to use American medicine when I am sick	-6.434	4.039	-.188	-1.593	.116
6. I am able to use Hmong medicine when I am sick	-1.567	2.577	-.075	-.608	.545
7. Eating American food is good for my body	-7.650	3.674	-.309	-2.082	.041
8. Eating Hmong food is good for my body	4.375	3.138	.187	1.394	.168
9. If I used American medicine, it would be good for my health	-2.155	3.373	-.088	-.639	.525
10. The men in my family teach me to fish	-5.135	2.514	-.241	-2.042	.045
Questions Measuring the Personal Construct					

(Constant)	79.975	6.034		13.254	.000
1. I like to eat Hmong foods because I am used to eating them	-1.045	2.924	-.046	-.357	.722
2. I eat rice because it is always in my home	.412	3.962	.016	.104	.918
3. I finish my plate of food at mealtimes even when I am full	-2.424	2.472	-.115	-.981	.331
4. I eat chips, candy, and pop to make me feel better	-4.990	2.724	-.259	-1.832	.072
5. I eat Hmong foods because they make me feel good	1.268	3.575	.062	.355	.724
6. I fish because it makes me feel good that I have pleased the men in my family	-4.209	2.490	-.239	-1.690	.097
7. If I am hungry I eat rice or rice with water as a snack	-.156	2.361	-.009	-.066	.948
8. When I am sick, using Hmong medicine makes me feel better	-1.824	3.279	-.074	-.556	.580
9. I like to hunt/clean game because the men in family do	-2.299	2.631	-.118	-.874	.386
10. I like to fish because the men in my family do	-1.319	2.539	-.073	-.519	.606
11. I eat desserts when it is available	-4.469	3.045	-.231	-1.468	.148
12. I eat desserts because I like sweets	1.356	3.304	.070	.411	.683
13. I use Hmong medicine because my grandparents do	-2.668	3.069	-.135	-.869	.389
14. I use Hmong medicine because my parents do	.188	3.327	.009	.056	.955
15. I like American food because it tastes good	-3.409	3.902	-.119	-.874	.386
16. I eat American foods because they make me feel good	-.413	3.613	-.021	-.114	.909
17. I eat American foods at school because I want to fit in	1.182	2.787	.061	.424	.673
a. Dependent Variable = BMI-for-Age Percentile					

Coefficients^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Questions Measuring the Environmental Construct					
(Constant)	83.032	7.654		10.848	.000
1. I like Hmong foods	-2.400	3.402	-.057	-.705	.482
2. I eat rice everyday	-3.307	2.729	-.097	-1.212	.229
3. My parents encourage me to eat so I will be big and strong	-1.196	1.277	-.077	-.937	.351
4. I cannot lose weight because there is too much food to eat	3.494	1.504	.204	2.322	.023
5. My parents tell me I should lose weight	5.070	1.193	.374	4.250	.000
6. My grandparents tell me I should gain weight	-5.058	1.450	-.295	-3.488	.001
7. I eat snack foods like chips, candy, and pop when I watch TV.	-3.969	1.489	-.209	-2.666	.009
8. I eat fruits at school	-.594	2.001	-.024	-.297	.767
9. There is a place available for me to exercise at school and/or after school	1.479	1.549	.077	.955	.342
Questions Measuring the Behavioral Construct					
(Constant)	72.506	5.191		13.968	.000
1. I have made it a habit to overeat at mealtimes	4.731	1.586	.290	2.982	.004
2. I am able to use American medicine when I am sick	4.128	3.084	.131	1.338	.184
3. Eating American food is good for my body	-4.489	2.091	-.208	-2.147	.034
Questions Measuring the Personal Construct					
(Constant)	74.586	5.668		13.158	.000
1. I eat rice because it is always in my home	-1.011	3.136	-.032	-.322	.748
2. I look for ways to learn how to cook American food	.506	1.935	.025	.261	.794
3. I overeat mealtimes so I will not be hungry later on	1.805	1.823	.098	.990	.325
4. I eat chips, candy, and pop to make me feel better	-3.431	1.407	-.230	-2.439	.017
5. Because I like to eat, I eat too much	1.374	1.577	.086	.871	.386
6. If I eat less rice, I will lose weight	5.654	2.204	.352	2.565	.012
7. If I eat too much rice, I increase my chances of getting diabetes when I am older	.473	1.920	.026	.246	.806
8. When I eat less rice, I lose weight	1.083	1.977	.063	.548	.585
9. If my friend likes a food, I will try it	.928	3.277	.040	.283	.778
10. If someone in my family likes a food, I will try it	2.640	2.717	.136	.972	.334
a. Dependent Variable = BMI-for-Age Percentile					

Table 5. Multiple Linear Regression Analysis for BMI-for-Age Percentiles for 14-18 year old males

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Questions Measuring the Environmental Construct					
(Constant)	82.842	4.995		16.585	.000
1. Even when I am full, my parents want me to eat more	-1.107	2.241	-.056	-.494	.624
2. My parents encourage me to eat so I will be big and strong	-3.443	2.254	-.166	-1.528	.133
3. I like squirrel, venison, or other hunted foods	2.129	2.131	.104	.999	.323
4. My parents tell me I should lose weight	7.428	1.912	.431	3.886	.000
5. I eat the school lunch everyday	-1.842	2.218	-.086	-.831	.410
6. I have learned to eat rice with KFC because people I care about do	3.463	2.000	.190	1.732	.089
7. I use American medicine because my grandparents use them	2.081	2.422	.093	.859	.394
8. I eat snack foods like chips, candy, and pop when I watch TV.	-4.457	2.142	-.212	-2.080	.043
Questions Measuring the Behavioral Construct					
(Constant)	81.896	4.416		18.547	.000
1. I have made it a habit to overeat at mealtimes	6.482	2.545	.314	2.548	.014
2. I make it a habit to eat foods that are good for me	-1.120	2.953	-.047	-.379	.706
3. I choose to use Hmong medicine over American medicine	4.879	2.921	.206	1.670	.100
Questions Measuring the Personal Construct					
(Constant)	80.598	4.224		19.079	.000
1. I choose to eat American foods over Hmong foods at school	-4.311	2.416	-.206	-1.785	.080
2. I can clean game (squirrel, deer)	4.537	2.198	.237	2.064	.044
3. If I eat chips, candy, and pop I gain weight	6.280	2.334	.317	2.690	.010
4. If I eat less rice, I will lose weight	1.925	3.062	.074	.629	.532
5. I eat desserts when it is available	-2.089	3.134	-.092	-.666	.508
6. I eat desserts because I like sweets	-6.475	3.010	-.293	-2.151	.036

a. Dependent Variable = BMI-for-Age Percentile

Coefficients^a					
Model	Unstandardized Coefficients		Standardized Coefficients		
Questions Measuring the Environmental Construct	B	Std. Error	Beta	t	Sig.
(Constant)	25.618	1.013		25.279	.000
1. I eat snack foods like chips, candy, and pop when I watch TV.	1.295	.437	.358	2.961	.004
2. I bring Hmong foods for lunch to school	-.417	.528	-.090	-.789	.433
3. My parents tell me I should lose weight	-.252	.365	-.085	-.690	.493
4. American medicine is used in my home	1.007	.529	.213	1.905	.062
5. I do not eat school lunch because it is too expensive	-.556	.533	-.120	-1.043	.301
6. I like American foods	.088	.532	.020	.165	.869
7. Hmong medicine is for sale near my house	-.271	.477	-.073	-.569	.572
8. My parents take me to a Shaman or a medicine woman when I am sick	-.207	.407	-.061	-.509	.613
9. I use Hmong medicine because my parents use them	-.705	.649	-.215	-1.087	.281
10. I use Hmong medicine because my grandparents use them	-.349	.574	-.114	-.609	.545
11. My parents give me Hmong medicine when I am sick	-.101	.458	-.028	-.220	.826
Questions Measuring the Behavioral Construct					
(Constant)	26.722	1.094		24.422	.000
I know how to cook American food	.525	.415	.158	1.263	.212
I make it a habit to eat foods that are good for me	.000	.471	.000	.001	.999
I am able to use Hmong medicine when I am sick	-1.133	.473	-.318	-2.398	.020
I choose to use Hmong medicine over American medicine	-.338	.418	-.104	-.807	.423
My parents teach me that it is important to eat Hmong foods	-.504	.490	-.140	-1.029	.308
I am able to use American medicine when I am sick	1.428	.679	.284	2.104	.040
If I do not eat Hmong food everyday, I feel like I have not eaten	-.855	.449	-.238	-1.906	.061
American food is high in fat and calories and bad for my body	-.247	.434	-.067	-.569	.572
If I used Hmong medicine, it would be good for my health	.840	.526	.225	1.598	.115
If I cannot cook, I will not be able to find a good husband (girls only)	-.197	.433	-.059	-.455	.651
Questions Measuring the Personal Construct					
(Constant)	25.468	1.185		21.487	.000
1. Saving money by skipping school lunch is important to me	-.142	.466	-.038	-.305	.762

2. It is hard to eat fruit everyday	-.391	.411	-.108	-.951	.346
3. I am able to use American medicine	1.428	.776	.214	1.840	.071
4. I eat rice to make me feel better	-.163	.451	-.048	-.361	.720
5. When I eat less rice, I lose weight	-.399	.431	-.110	-.924	.360
6. I like American food because it tastes good	1.570	.562	.328	2.793	.007
7. When I am sick, using Hmong medicine makes me feel better	-.415	.713	-.105	-.582	.563
8. I use Hmong medicine because my parents do	-.881	.679	-.277	-1.296	.200
9. I use Hmong medicine because it helps my body when I am sick	-.468	.611	-.133	-.766	.447
10. I use Hmong medicine because my grandparents do	.350	.534	.110	.656	.515
11. I look for ways to learn how to cook Hmong food	.032	.574	.009	.056	.956
12. I like to cook for my family because my mom/grandma does	-.024	.454	-.007	-.054	.957
13. Eating Hmong food is important because it makes me more Hmong	.218	.552	.063	.394	.695
14. I can cook most traditional Hmong foods	-.176	.456	-.053	-.386	.701
15. I like to eat Hmong foods because my family likes to eat them	-.338	.490	-.103	-.689	.494
a. Dependent Variable = Sum Acculturation Score					

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Questions Measuring the Environmental Construct					
(Constant)	26.881	1.552		17.325	.000
1. I like American foods	1.206	.558	.250	2.160	.035
2. I started eating American foods because of the School Lunch Program	-.153	.396	-.041	-.387	.700
3. My parents take me to an American doctor when I am sick	.883	.394	.204	2.238	.029
4. If I do not eat rice everyday, I feel hungry	-.393	.350	-.103	-1.123	.266
5. American medicine is used in my home	.597	.660	.093	.905	.369
6. If I do not like the school lunch, I throw it away	-.567	.329	-.155	-1.721	.090
7. I eat school lunch so that I can be more like my non-Hmong friends	-.434	.629	-.072	-.690	.493
8. I like Hmong foods	-1.783	.776	-.237	-2.296	.025
9. I eat more American foods than my parents do	.996	.438	.249	2.272	.027
10. I eat more American foods than my grandparents do	-.095	.444	-.022	-.214	.831
11. My parents give me Hmong medicine when I am sick	-.649	.557	-.144	-1.165	.249
12. I use Hmong medicine because my parents use them	-.676	.552	-.175	-1.225	.225
13. I use Hmong medicine because my grandparents use them	-.079	.520	-.022	-.153	.879
Questions Measuring the Behavioral Construct					
(Constant)	26.820	.898		29.864	.000
1. I know how to cook American food	.977	.402	.261	2.433	.018
2. My mother/ grandmother teaches me how to cook food for the family	-.989	.431	-.268	-2.296	.025
3. I am able to use Hmong medicine when I am sick	-.163	.533	-.039	-.305	.761
4. I choose to use Hmong medicine over American medicine	-1.157	.509	-.269	-2.272	.026
5. I choose to use American medicine over Hmong medicine	.724	.467	.174	1.550	.126
6. If I used American medicine, it would be good for my health	.770	.554	.155	1.391	.169
Questions Measuring the Personal Construct					
(Constant)	26.378	.786		33.561	.000
1. Overeating at mealtimes will keep me from getting hungry between meals	-.625	.457	-.142	-1.367	.176
2. I use Hmong medicine because my grandparents do	-.380	.435	-.095	-.874	.385
3. I choose to eat American foods over Hmong foods at	.450	.421	.112	1.071	.288

school					
4. I eat Hmong foods because they make me feel good	-1.175	.430	-.285	-2.732	.008
5. I like American food because it tastes good	2.750	.594	.475	4.629	.000
6. I am able to use Hmong medicine	-.348	.463	-.093	-.753	.454
7. I use Hmong medicine because it helps my body when I am sick	-.681	.557	-.154	-1.222	.226
a. Dependent Variable = Sum Acculturation Score					

Table 8. Multiple Linear Regression Analysis for Sum Acculturation Score for 14-18 year old females					
Coefficients^a					
Model	Unstandardized Coefficients		Standardized Coefficients		
Questions Measuring the Environmental Construct	B	Std. Error	Beta	t	Sig.
(Constant)	33.051	1.167		28.317	.000
1. My parents take me to a Shaman or a medicine woman when I am sick	-.673	.225	-.270	-2.994	.004
2. I eat rice everyday	-1.297	.555	-.218	-2.337	.022
3. I like the foods that are offered at home	-.593	.456	-.123	-1.301	.197
4. I started eating American foods because of the School Lunch Program	-.402	.250	-.149	-1.609	.111
5. I use American medicine because my parents use them	-.084	.286	-.026	-.293	.770
6. I gain weight because there is always food to eat	-.676	.292	-.212	-2.311	.023
7. My parents take me to an American doctor when I am sick	.674	.297	.204	2.268	.026
Questions Measuring the Behavioral Construct					
(Constant)	33.601	1.048		32.073	.000
1. My parents talk to me about Hmong culture	-.538	.450	-.108	-1.194	.236
2. If I went to a Shaman, it would be good for my health	-.565	.285	-.195	-1.983	.051
3. If I cannot cook, I will not be able to find a good husband (girls only)	-.500	.238	-.193	-2.101	.039
4. Eating Hmong food is good for my body	-.725	.426	-.157	-1.705	.092
5. Foods eaten at school are making my diet more American	.626	.246	.225	2.543	.013
6. If I do not eat Hmong food everyday, I feel like I have not eaten	-.647	.260	-.228	-2.491	.015
7. My mother/ grandmother teaches me how to cook food for the family	-1.207	.508	-.205	-2.378	.020
8. I choose to use Hmong medicine over American medicine	.263	.318	.088	.828	.410
9. If I used Hmong medicine, it would be good for my health	-.245	.413	-.070	-.594	.554
Questions Measuring the Personal Construct					
(Constant)	32.995	1.293		25.527	.000
1. I eat while I watch TV	-.777	.288	-.237	-2.698	.008
2. I eat rice when I feel that I have eaten too much American foods	-.375	.456	-.108	-.823	.413
3. I like to eat Hmong foods because I am used to eating them	-1.032	.508	-.209	-2.030	.046
4. Cooking is important so that I can take care of my future family	-.785	.655	-.121	-1.199	.234
5. I eat rice to make me feel better	-.121	.434	-.038	-.279	.781

6. I eat Hmong foods because they make me feel good	-.295	.390	-.091	-.755	.453
7. I can clean game (squirrel, deer)	-.483	.297	-.167	-1.629	.107
8. I like to hunt/clean game because the men in family do	-.073	.418	-.021	-.174	.862
9. I like to fish because the men in my family do	-.255	.299	-.093	-.851	.397
10. Eating Hmong foods is important in my house	.194	.399	.053	.486	.628
11. Eating Hmong food is important because it makes me more Hmong	-.210	.309	-.071	-.679	.499
12. When I am sick, using Hmong medicine makes me feel better	-1.215	.561	-.354	-2.168	.033
13. I use Hmong medicine because it helps my body when I am sick	.978	.612	.273	1.598	.114
14. I use Hmong medicine because my grandparents do	-.030	.382	-.011	-.078	.938
15. I use Hmong medicine because my parents do	-.324	.512	-.108	-.633	.528
a. Dependent Variable = Sum Acculturation Score					

Table 9. Multiple Linear Regression Analysis for Sum Acculturation Score for 14-18 year old males					
Coefficients^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Questions Measuring the Environmental Construct					
(Constant)	28.108	.947		29.672	.000
1. My parents take me to a Shaman or a medicine woman when I am sick	-.520	.284	-.174	-1.830	.073
2. Hmong medicine is for sale near my house	-.757	.342	-.230	-2.210	.032
3. In the home boys/men go fishing and girls/women cook and clean the fish	-.701	.310	-.213	-2.260	.028
4. My parents give me Hmong medicine when I am sick	-.785	.319	-.236	-2.461	.017
5. Milk is always in my home	1.073	.336	.297	3.192	.002
6. Milk is important to drink	.306	.609	.053	.502	.618
7. I eat foods that are different from what my parents eat	.736	.454	.232	1.619	.112
8. I eat foods that are different from what my grandparents eat	-.038	.429	-.013	-.089	.929
9. I eat squirrel, venison, or other hunted foods	-.748	.607	-.247	-1.233	.223
10. I like squirrel, venison, or other hunted foods	.196	.647	.061	.303	.763
Questions Measuring the Behavioral Construct					
(Constant)	24.709	1.063		23.253	.000
1. The men in my family teach me to hunt squirrel/deer and how to clean them	-.373	.299	-.128	-1.249	.217
2. I know how to cook food for myself	1.162	.542	.244	2.143	.037
3. I am able to use American medicine when I am sick	1.577	.672	.272	2.347	.023
4. I choose to use Hmong medicine over American medicine	-1.324	.432	-.359	-3.066	.003
5. If I went to a Shaman, it would be good for my health	-.605	.368	-.193	-1.644	.106
6. If I used Hmong medicine, it would be good for my health	-.500	.482	-.140	-1.038	.304
Questions Measuring the Personal Construct					
(Constant)	26.143	1.038		25.187	.000
1. Eating fruits is important to keep me healthy	.719	.811	.112	.887	.379
2. I choose to eat American foods over Hmong foods at school	.880	.309	.270	2.845	.006
3. I eat desserts when it is available	.987	.326	.279	3.026	.004
4. I am able to use American medicine	.896	.816	.140	1.098	.277
5. I can hunt	-.629	.347	-.215	-1.815	.075
6. I can clean game (squirrel, deer)	-.653	.397	-.218	-1.647	.106
7. I like squirrel because it smells good	-.200	.505	-.046	-.395	.694
a. Dependent Variable = Sum Acculturation Score					

Table 10. Acculturation Assessment		
<i>What language do you speak at home?</i>	B-US1 (n=144)	B-US2 (n=156)
Only in Hmong	11 (7%)	1 (1%)
More Hmong than English	21 (15%)	23 (15%)
Both Hmong and English equally	76 (53%)	70 (45%)
More English than Hmong	32 (22%)	58 (37%)
Only in English	4 (3%)	4 (2%)
Mean ± sd	3.0 ± 0.89a	3.3 ± 0.76b
<i>What language do you usually think?</i>		
Only in Hmong	16 (11%)	3 (2%)
More Hmong than English	15 (10%)	11 (7%)
Both Hmong and English equally	61 (43%)	55 (35%)
More English than Hmong	39 (27%)	58 (37%)
Only English	13 (9%)	29 (19%)
Mean ± sd	3.1 ± 1.1a	3.6 ± 0.93b
<i>Your closest friends are?</i>		
All Hmong	49 (34%)	32 (20%)
More Hmong than Americans	42 (29%)	68 (44%)
About half and half	45 (31%)	42 (27%)
More Americans than Hmong	5 (4%)	13 (8%)
Only Americans	3 (2%)	1 (1%)
Mean ± sd	2.1 ± 1.0a	2.3 ± 0.90a
<i>What languages do you speak with friends?</i>		
Only in Hmong	8 (5%)	1 (1%)
More Hmong than English	13 (9%)	12 (8%)
Both Hmong and English equally	73 (51%)	79 (50%)
More English than Hmong	37 (26%)	50 (32%)
Only English	13 (9%)	14 (9%)
Mean ± sd	3.2 ± 0.94a	3.4 ± 0.80a
<i>I eat (overall dietary acculturation)</i>		
Only Hmong foods	6 (4%)	1 (1%)
Mostly Hmong foods	31 (22%)	24 (15%)
Equal amounts of Hmong and American foods	95 (66%)	116 (74%)
Mostly American foods	12 (8%)	14 (9%)
Only American foods	0	1 (1%)
Mean ± sd	2.7 ± 0.65a	2.9 ± 0.54b
<i>I eat....for breakfast.</i>		

Only Hmong foods	9 (6%)	5 (3%)
Mostly Hmong foods	16 (11%)	23 (15%)
Equal amounts of Hmong and American foods	77 (54%)	76 (49%)
Mostly American foods	37 (26%)	43 (27%)
Only American foods	4 (3%)	9 (6%)
Mean ± sd	3.1 ± 0.86a†	3.2 ± 0.87a
<i>I eat...for lunch.</i>		
Only Hmong foods	8 (5%)	0
Mostly Hmong foods	14 (10%)	6 (4%)
Equal amounts of Hmong and American foods	65 (45%)	69 (44%)
Mostly American foods	46 (32%)	58 (37%)
Only American foods	11 (8%)	23 (15%)
Mean ± sd	3.3 ± 0.94a	3.6 ± 0.78b
<i>I eat...for dinner.</i>		
Only Hmong foods	24 (17%)	17 (11%)
Mostly Hmong foods	52 (36%)	72 (46%)
Equal amounts of Hmong and American foods	57 (40%)	57 (37%)
Mostly American foods	9 (6%)	10 (6%)
Only American foods	1 (1%)	0
Mean ± sd	2.4 ± 0.86a†	2.4 ± 0.77a
<i>I eat...for snacks.</i>		
Only Hmong foods	9 (6%)	1 (1%)
Mostly Hmong foods	9 (6%)	6 (4%)
Equal amounts of Hmong and American foods	58 (41%)	53 (34%)
Mostly American foods	49 (34%)	81 (52%)
Only American foods	19 (13%)	15 (9%)
Mean ± sd	3.4 ± 1.0a	3.7 ± 0.73a
<i>I see myself as?</i>		
Hmong	13 (9%)	10 (6%)
Hmong-American	131 (91%)	143 (92%)
American	0	3 (2%)
Mean ± sd	1.9 ± 0.29a	2.0 ± 0.29a
<i>Acculturation Score (Mean ± sd)</i>		
28.3 ± 4.9a		
30.3 ± 4.1b		
<p>B-US1 = Born and/or raised in the US and 9-13 years old B-US2 = Born and/or raised in the US and 14-18 years old ^{a & b} Post-hoc Tukey HSD multiple comparisons test, means between groups significantly different at p≤0.05. † Missing=1</p>		

Chapter 7:

Summary of Results, Conclusions, and Implications

ABBREVIATED RESULTS

Phase 1: Community Mapping and Food Store Survey Project

The following results are taken from a submitted manuscript (Franzen, L., and C. Smith. Food system access, shopping behavior, and influences on purchasing groceries in adult Hmong. *American Journal of Health Promotion*, In Press).

According to Asian census data and business/store assessment, St. Paul had the highest Hmong population density, specifically the Summit/University and Thomas/Dale neighborhoods. These areas also had the highest density of Hmong/Asian grocery stores.

When surveyed, some differences and similarities were found among Asian stores and between American and Asian stores. American stores had several ethnic fruits, vegetables, and grains also found in Hmong/Asian stores. Store B sold some organ meats, whereas store A did not. Both American stores had an Asian food aisle. Compared to American stores, Hmong/Asian stores typically had more varieties of fish, seafood and rice, less dairy foods, and no bread. Compared to other Hmong/Asian stores, store 1 was the only store with bread products, fewer organ meats, a smaller fish and seafood selection, and a full dairy section. With the exception of Hmong/Asian store 2 and 3, WIC foods were available in all stores. Just as the American stores had an Asian food aisle, Hmong/Asian store 5 had an American food aisle. Packaging varied across Hmong/Asian stores, with some products in open containers without packaging or labels, whereas others had products wrapped in plastic with labels including expiration dates and prices.

The food survey table included 75 items, with 58 having CPIs and 19 were outdated. Among the stores, 153 prices were over and 96 prices were under 20% of the CPI. Store A had 22 items over and 14 items under 20% of the CPI, with 2 items over 100% of the CPI (strawberries, yellow onions). Store B had 22 items greater and 12 items less than 20% of the CPI, with 5 items over 100% of the CPI (cabbage, cucumbers, yellow onions, chicken breast, and chicken legs). Store 1 had 18 items over and 14 items under 20% of the CPI, with strawberries 175% of the CPI. Store 2 had 17 items greater and 5 items less than 20% of the CPI, with 4 items over 100% of the CPI

(chicken legs, pork sausage, 2% milk, macaroni). Store 3 had 11 items greater and 8 items less than 20% of the CPI, with 2 items over 100% of the CPI (corn and macaroni). Store 4 had 15 items greater and 14 items less than 20% of the CPI, with 3 items over 100% of the CPI (green beans, corn, and spaghetti). Store 5 had 19 items greater and 9 items less than 20% of the CPI, with 3 items over 100% of the CPI (strawberries, cabbage, and corn). Store 6 had 14 items over and under 20% of the CPI, with 2 items over 100% of the CPI (macaroni, spaghetti). Store 7 had 16 items greater and 5 items less than 20% of the CPI, with 2 items over 100% of the CPI (corn, yellow onions). Items consistently over 100% of the CPI were corn, cucumbers, green beans, and yellow onions, with outdated prices from 1989 to 2000.

Phase 2: Adult and Child Focus Groups

Adult Data

The following results are taken from submitted manuscripts: 1) Franzen, L., and C. Smith. Food system access, shopping behavior, and influences on purchasing groceries in adult Hmong. *American Journal of Health Promotion*, In Press; and 2) Franzen, L., and C. Smith. Acculturation and environmental change impacts dietary habits among adult Hmong. *Appetite*, 2009; 52(1):173-183).

Demographic Information

Twenty-one males (M) and 48 females (F), aged 18 to 64 years, participated in focus groups. B-US was significantly younger, had more education, and smaller household sizes than B-TL¹ and B-TL², additionally they used food assistance programs less and had higher incomes than B-TL¹. Furthermore, B-TL² was significantly older, had higher education and income levels, and used food assistance programs less compared to B-TL¹. B-TL¹ participants had an average BMI of 27.1 ± 3.6 , B-TL² participants had an average BMI of 27.4 ± 4.1 , and B-US participants had an average BMI of 30.1 ± 7.1 .

Food Frequency Questionnaire Results

Significant differences ($p < 0.05$) in food consumption patterns before and after migration to the US were noted within B-TL¹ and B-TL². B-TL¹ reported consuming

bananas, sweet and unsweetened cereal, pizza, spaghetti, canned soup, peanut butter and jelly sandwiches, and chocolate more frequently after moving to the US. B-TL² reported consuming papaya, taro, and eggplant less frequently and consuming several produce items, meat, dairy, breads and cereals, American foods (i.e. pasta, pizza, hamburgers, sandwiches, potato chips), and beverages (kool-aid, lemonade, sweetened coffee and tea) more frequently after moving to the US. B-TL² reported consuming carrots, bacon, wheat bread, pasta, spaghetti, and lunchmeat sandwiches more frequently and purple yams, mushrooms, taro, squirrel, and tri-color less frequently than B-TL¹. Significant differences in food consumption patterns were noted between B-US and B-TL¹ and B-TL² for foods consumed in the US. Compared to B-TL¹, B-US reported consuming more carrots, pasta, spaghetti, and lunchmeat sandwiches and less traditional produce items, pork, hunted game foods, tofu, eggs, soymilk, milk, rice noodles, sticky rice, unsweetened cereal, canned stew, cakes, and tri-color. B-US reported consuming less produce items, pheasant, venison, 1% and 2% milk, wheat bread, hot cereal, egg salad, jellies, lemonade, and sweetened coffee than B-TL².

There were no significant associations between BMI and reported frequency of foods consumed. Age was positively associated with the consumption of plantain, bananas, mango, apples, oranges, bamboo, taro, cucumbers, lettuce, spinach, duck, fish, pheasant, venison, soymilk, hot cereal, egg and vegetable salad, and sweetened coffee and tea. Total acculturation scores and years lived in the US were negatively associated with reported consumption of coconut, bananas, pineapples, mango, oranges, Asian pears, bamboo, purple yams, mushrooms, taro, eggplant, cucumbers, Chinese broccoli, pork, tofu, squirrel, rice noodles, unsweetened cereal, canned stew, and tri-color, whereas total number of people in the household was positively associated with reported consumption of these foods. Total acculturation scores and years lived in the US were positively associated with reported consumption of carrots, bacon, pasta, spaghetti, lunchmeat sandwiches, and chocolate. Total acculturation scores were positively associated with years lived in the US and household income and negatively associated with total number of people in the household and food assistance usage (WIC, FSP, and NSLP).

Acculturation Assessment Results

Acculturation was assessed by examining years lived in the US, language usage, social connections, eating behaviors, and BMI. Average years lived in the US was 2.3 ± 0.7 for B-TL¹, 26.2 ± 6.2 for B-TL², and 24.6 ± 3.9 for B-US. Years lived in the US was positively associated with acculturation scores, education, and income levels and negatively associated with food assistance program use (WIC, FSP, and NSLP) and household size. B-US had significantly higher scores for all six acculturation questions compared to B-TL¹. B-US had significantly higher acculturation scores for language use questions compared to B-TL². B-TL² had significantly higher acculturation scores for language use questions and who their closest friends were compared to B-TL¹. The dietary acculturation assessment question showed B-US was significantly more acculturated than B-TL¹, however B-TL² was not significantly different from B-TL¹ or B-US. Overall, based on a summation of the acculturation questions, B-US was significantly more acculturated (19.2 ± 3.1) than B-TL¹ (9.4 ± 2.3) and B-TL² (15.2 ± 3.9) ($P \leq 0.05$). Also, B-TL² was significantly more acculturated than B-TL¹. All three groups had similar perceptions about their health, but B-TL¹ perceived their diets as being significantly better than B-US. B-TL¹ and B-TL² women and men were on average overweight, whereas B-US men were on average obese and women were at the high end of the overweight category.

Focus Group Themes

Qualitative data analysis from focus group methodology showed that dominant themes were: 1) acculturation of the Hmong into the American food system; 2) determinants of store type; 3) Hmong food has a mainstream factor¹⁰⁵; 4) cultural values impact eating and lifestyle behaviors; 5) food insecurity history influences post-migration behavior; 6) acculturation level impacts BMI through diet and exercise; and 7) health status is influenced by changed environments. Table 5 presents selected quotes by theme.

Theme 1: Acculturation of the Hmong into the American Food System

In Laos and Thailand, B-TL¹ and B-TL² accessed the food system through local markets. They reported not having refrigeration for food so it was purchased daily and

in limited quantities to avoid spoilage. Most walked to markets, which were described as flea markets with open spaces. Fruits and meats were identified as costly and not frequently purchased. Gardening and farming increased availability and consumption of produce. Many B-TL¹ and B-TL² stated a variety of foods were available in Thailand, but limited monetary resources hindered their purchasing ability. Migration to the US drastically changed food acquisition for B-TL¹ and B-TL². Refrigeration and financial security increased food purchases in quantity and variety. B-TL¹ and B-TL² reported that grocery shopping frequency declined, but the quantity purchased per visit increased. Most drove or took a bus to the store. Many discussed utilizing Farmer's markets during summer months. Gardening has remained a constant for many and used to increase the availability of desired Asian produce. When B-TL migrated to the US, government assistance programs greatly improved food purchasing ability and food security status, but at the same time encouraged their transition to American foods.

Theme 2: Determinants of Store Type

Where participants chose to grocery shop was influenced by price, food availability, familiarity, available transportation, store location, and business hours. Many shopped at American stores for general food items. Hmong/Asian stores were used for specific items (rice, noodles, sauces, organ meats, herbs, and seafood) because prices were higher or items were unavailable at American stores. Hmong/Asian stores were identified as having more varieties of rice available and in bulk (up to 100 pound bags). If American foods were in Hmong/Asian stores they were reported as being more expensive and limited in variety. Differing tastes and preferences within households also influenced shopping site. Differences were found in eating patterns between adults (more Asian food consumption) and kids (more American food consumption). Language ability determined how familiar and comfortable B-TL¹ was to shopping in American stores. Those with limited English capabilities preferred American stores, but the absence of an English speaking companion led them to shop at Hmong/Asian stores. Some circumvented this problem by going to American stores with Hmong workers. Newly immigrated Hmong who walked to stores used those closest to their residence and those with access to a vehicle or public transportation had more options. Most

Hmong/Asian stores were reported to have limited business hours compared to American stores, so trips to Asian/Hmong stores were less frequent and preplanned for B-TL² and B-US.

Theme 3: Hmong Food has a Mainstream Factor

Some B-TL² and B-US reported making certain dishes less often and instead utilizing outside sources such as Hmong/Asian grocery stores or restaurants because of convenience. The availability of pre-made foods allowed them to continue eating traditional foods without spending their time preparing or cooking it. Restaurants were also identified as another place where traditional foods could be purchased at a reasonable price. The availability of more Asian foods in American stores has increased the incidence of “one stop shopping” for Hmong, decreasing their visits to Hmong/Asian stores. American stores were reported to have Asian food aisles with sauces, oils, noodles, pastes/mixes, and rice in 25 to 50 pound bags.

Theme 4: Cultural Values Impact Eating and Lifestyle Behaviors

Traditional eating patterns involved rice consumption for 2, if not 3 meals per day. Rice was often referred to as the “main dish” and eaten throughout the day. Household rice consumption ranged from 25 to 50 pounds of uncooked rice per month and 100 pounds for a large family. A traditional meal included rice, vegetables, and a meat dish. Several stated specific foods were not tied to meal times. Traditional foods were described as bland with few herbs and spices. The evening meal typically had 2-3 main dishes with a bland, boiled vegetable dish included for grandparents. Traditionally, fruit was not viewed as an essential part of the diet because it was costly and not as important compared to vegetables and rice. If participants farmed or lived near the jungle fruit access and consumption increased. In the US fruit was described as an appetizer, coffee table item, or present at special occasions. Having desserts or snacking was also not practiced in Laos and Thailand.

Both men and women stated that traditionally the daughter-in-law or the eldest daughter were responsible for cooking and cleaning, done out of obligation or desire for acceptance, while the mother and/or grandmother typically served in a supervisory capacity. Women highlighted a hierarchy of cooking responsibilities among female

siblings, with the oldest sister being responsible for the majority of the cooking and cleaning. Both genders stated that men were not as active in cooking and cleaning. However, food preparation was conducted by men after hunting or fishing to prepare specialty dishes.

Theme 5: Food Insecurity History Influences Post-migration Behavior

Food insecure participants living in Laos and Thailand devised strategies such as working, food support networks, and food stretching to reduce it. Main sources of income came from women sewing and adults and children working on local farms. Children typically started working between 8 and 10 years old and donated half their wages to parents. Participants stated outside language proficiency increased job marketability. Many reported that food support networks in refugee camps lacked consistency, within and across different camps. Within a camp food supplies shifted between adequate and inadequate. Participants said meat, rice, and vegetables were usually provided, whereas fruits were rarely given. Some camps regularly received limited to no food rations, which forced them to purchase food from Thai villagers. Some had relatives in the US who sent money to help with financial insecurity. Family members within the village would share food if they could. Adding different foods such as corn, beans, herbs, or seasonings to rice was a common food stretching strategy. Meat was rarely purchased and rice was flavored with salt, hot pepper, lemon grass, cucumber, and ginger.

During the transition period from Asia to the US, alterations in dietary behavior were described. Food insecure adults living in the US (B-TL¹, B-TL², and B-US) also discussed using the American food safety net system (i.e. food assistance programs). Living in the US increased access to a variety of affordable foods and sometimes led to excessive food purchases and consumption. Others noted that increased consumption of sugary and fatty foods in the US coincided with increased health problems and weight gain. Some noted they were food insecure in Laos/Thailand but were leaner and potentially healthier than they are now in the US. Newly arrived immigrants found food assistance programs readily available and helpful in providing food. Commonly used programs were WIC, the Food Stamp Program (FSP), and the National School Lunch

Program (NSLP). Second generation Hmong (B-US) tended to shift away from food insecurity and usage of food assistance programs with only a few using the FSP or WIC for formula.

Theme 6: Acculturation Level Impacts BMI through Diet and Exercise

Nutrition transitions experienced by the Hmong included decreased consumption of rice in younger generations, altered food preparation methods, increased consumption of convenience/processed foods, the introduction of snacking, and food assistance programs introducing foods outside cultural norms. Rice was previously identified as a staple in the diet, however, some younger participants expressed decreased consumption because they stated it was not a daily requirement, they got tired of it, or because of a low carbohydrate diet. Previously, fried and processed/convenience foods were not a common practice in Laos and Thailand and changes in preparation methods were attributed to increased oil access, absence of grandparents in the household, busy lifestyles, cooking time needed for traditional food, and cost of fresh foods. Younger generations tended to report consuming more baked, stir fried, and American foods, while older generations preferred more boiled, traditional Hmong dishes. Desired sweetness level of foods also differed, with older generations having a lower threshold for sweetness compared to younger. Snacking between meals was identified as a change from the traditional diet and examples given were papaya salad, candy bars, fast food, cereal, Asian crackers, egg rolls, crackers, fruit, and American foods (pizza, hamburgers, hot dogs, bread, cheese, desserts). Food assistance programs (WIC, FSP, NSLP) were seen as catalysts for introducing foods outside of cultural norms into diets. Some participants recalled enjoying school lunch whereas others felt forced to eat it. Participants stated their kids ate school lunch because it was more convenient than packing a lunch.

Physical inactivity was also attributed to the rise in obesity in the Hmong. Many parents said children were inactive partly because of competing non-exercise activities, such as video games, television, and the computer. Many participants noted that as their parents became more “Americanized” their physical activity level, as well as the participants’ younger siblings, declined. Some participants felt exercise had little

cultural value because in Laos and Thailand working was exercise. When participants discussed attempts to lose weight the method was typically dietary alterations as opposed to physical activity and was not met with much success.

Theme 7: Health Status is Influenced by Changed Environments

Many participants changed their eating behaviors in conjunction with individual or family-related health problems. Several changed their eating habits because a parent or spouse in the household was ill by eating less meat and increasing their fruit and vegetable intake. As obesity has increased and health declined in this population, perceptions about body image have also changed. Several B-US participants stated cultural values tied to weight placed more emphasis on being plump. B-TL² discussed how they were thin prior to living in the US and that plumpness was considered a status symbol and sign of hardiness. The preference for larger sizes in the past appeared to be linked to food shortages and survival rates. However today, young women commented on struggling to please their families by preparing foods they liked while trying to maintain a healthy body weight. The younger generation also expressed feeling pressured by older generations to have children who were more plump. However, currently if someone was overweight/obese in the US, some considered this to be negative in terms of attractiveness. The desire for plump children still existed for some newly immigrated mothers.

Child Data

The following results are taken from submitted manuscripts: 1) Franzen, L., and C. Smith. Differences in stature, BMI, and dietary practices between US born and newly immigrated Hmong children. *Social Science and Medicine*. 2009; doi:10.1016/j.socscimed.2009.05.015.; and 2) Franzen, L., and C. Smith. Intergenerational Dietary Differences among Hmong Adults and Children. *Public Health Nutrition*. Submitted, under review.

Demographic Information

Sixty-eight Hmong children (36 M and 32 F), ages 9 to 18 years, participated in the focus groups (**Chapter 4, Table 1**). B-TL were 15.7 ± 1.3 years old and all attended high school. For height-for-age, 43% had short stature ($<5^{\text{th}}$ percentile) and 57% were between the 5^{th} and 50^{th} percentile. The average BMI for this group was 21.7 ± 2.6 kg/m^2 . For BMI-for-age, 19% were at risk for being overweight ($\geq 85^{\text{th}}$ but $< 95^{\text{th}}$ percentile). B-US² were 15.9 ± 1.2 years old, 8% were in middle school, and 92% were in high school. For height-for-age, 28% had short stature, 60% were between the 5^{th} and the 50^{th} percentile, and 12% were greater than the 50^{th} percentile. The average BMI for this group was 26.9 ± 4.8 kg/m^2 . For BMI-for-age, 20% were at risk for being overweight and 40% were overweight ($\geq 95^{\text{th}}$ percentile). B-US¹ were 11.4 ± 1.3 years old, 36% were in elementary school and 65% were in middle school. For height-for-age, 73% were between the 5^{th} and the 50^{th} percentile and 27% were $> 50^{\text{th}}$ percentile. The average BMI for this group was 21.6 ± 3.6 kg/m^2 . For BMI-for-age, 36% were at risk for being overweight and 27% were overweight.

Acculturation Assessment Results

Acculturation level was assessed by looking at language usage, social connections, eating behaviors, and anthropometric data (**Chapter 4, Table 2**). Perceptions of diet and health were significantly different among all groups, with B-TL perceiving their diet and health the highest and B-US² perceiving theirs the lowest. B-TL scored significantly lower on acculturation questions regarding language use compared to B-US¹ and B-US². B-TL scored significantly lower than B-US¹ for social connections (closest friends). There were no significant differences among the groups for the dietary acculturation question, indicating that all three groups have similar eating patterns although B-TL has only been in the US for ≤ 5 years. When looking specifically at meal times, irregardless of group, children reported that breakfast was a mix of Hmong and American food, lunch was mostly American food, and dinner was mostly Hmong food. Based on the overall acculturation score (a summation of the five acculturation questions) B-TL was significantly less acculturated compared to both B-US¹ and B-US². B-US¹ had significantly higher height-for-age percentiles compared to

B-TL and B-US². B-TL had significantly lower BMI-for-age percentiles compared to both B-US¹ and B-US².

Focus Group Themes

Five dominant themes were identified through evaluation of the focus groups and these were: 1) meal time patterns; 2) intergenerational dietary differences; 3) future health concerns; 4) determinants of food health; and 5) changing cultural traditions.

Theme 1: Meal Time Patterns

Almost all B-TL lived in refugee camps prior to living in the US and some suffered from food insecurity, which was combated with food sharing among friends and family, income from sewing (mothers and daughters), relatives in the US sending monetary aid, fathers working temporary jobs or doing manual labor, or borrowing money from Thai people. Rice, eggs/omelets, and different types of soups were eaten daily and irregardless of meal time. Food preparation was typically boiled or steamed. Fruits were often consumed at lunch, but not eaten daily because of expense. Snacking between meals and desserts were absent prior to the US.

In the US, for B-TL and B-US, breakfast was absent or included Hmong or American foods. Not eating breakfast at home was attributed to lack of time, not being hungry, or because they ate school breakfast. The majority ate school lunch, with a few who brought a packed lunch. The evening meal contained rice and a mix between boiled soups and stir fried dishes. Some reported that parents opted for convenience food during the week and made more traditional dishes on the weekends. Some snacked after school and some did not. A change for B-TL was the incorporation of snacking after school and the occasional dessert after meals. A quote representative of this theme was, “sometime I eat rice with chicken and eggs and sometime I eat cereal with milk [for breakfast] (B-TL, F).”

Theme 2: Intergenerational Dietary Differences

Differing degrees of dietary acculturation were reported between children, parents, and grandparents. Food assistance programs, peer influences, and the media played a contributing role in exposing children to different foods and preparation styles outside cultural norms, which widened the dietary acculturation gap between children

and adults. A quote representative of this themes was, “cause like the older folks, like your grandparents and parents, they like more of the boiled things...but then we’re young...we like stir fry (B-US², F).”

Theme 3: Future Health Concerns

Several expressed concern about their future health in relation to diabetes, hypertension, and obesity. These health concerns originated from children observing ill grandparents or other relatives as well as parent’s concern over their eating and physical activity habits. A quote representative of this theme was, “he [dad] encourages us to eat healthy foods [because] my grandpa and grandma have high blood sugar...so they [parents] want us to be healthy when we get older (B-US¹, F).”

Theme 4: Determinants of Food Health

Food safety, components, and preparation style all influenced whether foods were considered healthy. For some the label “healthy” was related to if a food/dish was considered Hmong or American, whereas others stated that it depended on what type of Hmong/American food/dish you were consuming because both categories had healthy and unhealthy items. A quote representative of this theme was, “I just think it’s the way they’re cooked, cause some Hmong food can be really bad for you, like egg rolls, I know those are bad cause it’s just like fried oil and the oil is still in the egg roll when you eat it and you can taste it (B-US², M).”

Theme 5: Changing Cultural Traditions

Many children stated their traditions and culture were in the process of changing, with the potential for contraction and loss in some areas. Factors contributing to these changes were emphasis placed on educational attainment, alterations in marriage rituals (age of onset and partner characteristics), decline in traditional cooking methods/knowledge, and gradual shifts in gender roles (cooking, household, and caregiver responsibilities). A quote representative of this theme was, “I am totally against it [arranged marriages]... for us it’s weird, but for them it’s tradition...they like to know that person will treat you well...but our way of seeing it is it’s weird, cause we grew up in American society and do things differently than them (B-US², M).”

Productions of Silence: Identity Shift in Hmong Culture

The following results are taken from this submitted manuscript: Franzen L, Smith C. Productions of Silence: Identity Shift in Hmong Culture. *Current Anthropology*. Submitted, under review.

Based on results of both the adult and child focus groups a paper was written on how there may be a modern/non-modern dichotomy forming in relation to identity, with those who have aligned themselves with a perceived more “modern”, American identity (nontraditional, Christian, use biomedicine, and speak English fluently) versus those who have aligned themselves with a more “non-modern”, Hmong identity (traditional, Shaman, use traditional medicine, and speak Hmong fluently). There are also those that fall somewhere in between the two ends of the dichotomy and are attempting to form an identity that houses desired aspects of both Hmong and American culture (Hmong-American). This process would show how the Hmong are not only in the process of describing their identity but are also contributing to its construction, whether it be in the form of an absent other or about themselves. Thus, the objective was to investigate what factors contribute to shifts in identity and what characteristics are assumed by associating or not associating with these intercultural identity categories. Dominant themes for this paper were: 1) language contraction and loss; 2) shifting religious practices and beliefs; 3) merging medicinal practices; and 4) acculturation level.

Theme 1: Language Contraction and Loss

During discussions a trend emerged that younger generations were speaking less Hmong and more English. Many adolescents predicted that in future generations Hmong language use would be greatly reduced, if not lost completely and that “Americanization” was associated with decreased Hmong language fluency. Many adults reported conversing in Hmong with their parents or other elder relatives, whereas they conversed principally in English with their children. Children living in extended families had more exposure to the Hmong language and were more likely to comprehend and speak it, but changes in household dynamics have disrupted this transmission pattern. Adolescents not living in extended families often stated they were unable to converse with their grandparents who only spoke Hmong.

The educational system has played an important role in the maintenance of dominant languages as well as contributed to language and cultural shifts. Adolescent Hmong typically stated they spoke fluent Hmong when they were younger but once introduced to the school system their ability to maintain this fluency diminished. Some requested their parent's converse with them in Hmong regularly to help with language maintenance but requests were usually denied. Education was discussed as a priority and highly valued for children and young adults partly because their parents wanted them to be educated and successful. Delaying marriage to finish their education was a common theme throughout groups. Adolescents also commented that educated girls were more valuable because they brought in a higher bride price. Children in our groups followed their parent's example when it came to language use in the home.

Theme 2: Shifting Religious Practices and Beliefs

Another driving force behind structural changes and identity shifts for some of our participants was choosing to value Christianity over Shamanism. Newly immigrated adults and children, however, typically still valued Shamanism and traditional methods of religion and medicine. A part of being modern and American for some meant shedding the "old" ways of Shamanism and adopting the "new" ways of Christianity. With this replacement, silent spaces have been produced in the form of marginalization of Shamanism, medicine women, traditional medicine use and knowledge, and herb gardening. When asking adult Hmong focus group participants from a local Christian based church about traditional aspects of the Hmong culture, Shamanism always entered the verbal landscape, and inevitably was talked about in contrast to Christianity with a negative tone.

Shamanism was considered by many as an old tradition that older generations (parents and grandparents) still practiced and in many cases for younger generations Christianity was favored, which has resulted in a loss of common ground and subsequently widens the silent space between generations. Participants that were born in the US blatantly stated they were more "Americanized" and "modernized" and this usually occurred in conjunction with discussions regarding being Christian. In essence, practicing Christianity was viewed as modern, American, and a rational way of

conducting oneself whereas practicing Shamanism was viewed as a non-modern, un-American, and an irrational way of conducting oneself.

Young adults and adolescents expressed a willingness to rebel against their cultural traditions in order to maintain their American, Christian, and modern identity. For example, traditionally when a woman marries she would follow her husband's clan-related beliefs and practices. However, one woman discussed how she and her husband opposed the tradition and were going to go against her husband's faith and raise their child in the church. Another way of silencing religious practices involved the conversion of Shaman women upon marriage into a Christian family. Adolescents also had a negative view of some Hmong traditions, especially arranged marriages and practices related to calling the spirit. There seems to be a dichotomizing mechanism that places some subsets of Hmong tradition and culture into a box labeled unreasonable, and should be eliminated in the future.

Theme 3: Merging Medicinal Practices

Shifts in religious practices and beliefs have resulted in the marginalization of Shamans and medicine women with respect to their healing capabilities. Children often viewed medicine used in Laos and Thailand as something practiced out of necessity because modern medicinal forms were unavailable. Adults typically stated Shamans were appropriate to use in times of psychological or spiritual distress, whereas medicine women had physical treatments in the form of herbs, bark, or a mixture of natural ingredients. Several younger adults expressed wariness towards the treatments provided by medicine women. This distrust in the "old ways" led to non-use and expedited silent spaces within medical traditions. Many young adults questioned whether someone in a position to heal was educated and whether their form of treatment would actually provide positive results, which brings us to the importance of referentiality not only in speech acts but also in tangible written texts.

Young adults disapproved of their parent's mixture of Hmong and Western medicines because of unknown potential interactions and ingredients in herbal mixtures. It appeared younger participants felt a major barrier to placing trust in these practices was the mysterious factor herbal treatments held because they were missing labels and

credentials. Western medicines have labels, are prescribed by an accredited doctor, and scientific research has been conducted on them. Younger adults preferred Western doctors and the biomedical model over traditional medicines because there is a supposed reference point, something they can visibly see, read, and has verification of truth printed on the bottle.

Younger adolescents also expressed disapproval of traditional medicine with their reasoning typically grounded in religion. Hmong who practiced Shamanism viewed their religious practices as coinciding with traditional healing and medicine, whereas Christian Hmong saw their religion as synonymous with Western medicine use. Some adolescents and young adults were not able to place their trust in traditional medicines/practices because there was no representation of their Christian, modern, and American identity. Older generations seem to do in addition to traditional ways whereas in some cases younger may replace or substitute wholly.

With this decline in traditional medicine use in younger generations the trend of decreased herb gardening for medicinal purposes has also emerged. Many young women said their mothers or grandmothers had medicinal herb gardens, but they did not. Barriers to participating in and continuing this practice included lack of standardization and referenced documentation of herbs used by their mothers and grandmothers. Young women desired a written text, which contained referential information about herbs, not an oral transmission of passing information. They did not want to rely on memory and practice, but instead yearned for tangible texts they could refer back to on their own time table. By not accepting oral forms of transmission for traditional knowledge and practices young women were contributing to the growing silence in medicinal herb gardening.

Theme 4: Acculturation Level

Although some participants aligned themselves with an American identity (non-traditional, Christian, modern, use biomedicine, and speak English fluently) versus a Hmong identity (traditional, Shaman, not modern, use traditional medicine, and speak Hmong fluently), many fell somewhere in between the two ends of the acculturation spectrum. Some children were confronted with conflicting cultural beliefs and traditions

because one side of the family practiced Shamanism whereas the other side was Christian. In some cases traditional practices were neutralized or grandfathered in when properly justified and viewed as non-threatening to their acculturated American identity. Some expressed levels of acceptability when it came to Shaman practices, dabbling in both Christian and Shaman practices depending on the situation. B-US children expressed that updating or modernizing traditions may be a potential preservation method for their culture. For those that would experiment with both traditional medicine and biomedicine, it was whatever type of medicine would provide positive results. B-TL participants particularly stated they would try Hmong medicine first and if desired results were not achieved they would try Western medicine and vice versa.

Newly immigrated Hmong (B-TL¹ and B-TL³) were in a tremendous stage of transition. Adults and adolescents were especially caught between two worlds, rooted in their culture of origin but expected to flourish in their new surroundings in the US. Newly immigrated adolescents, however, will likely incorporate more dominant cultural traits because they are being educated in the American school system, exposed to American foods at school and through food assistance programs, and interacting with non-Hmong peers. Already the B-TL³ groups expressed marriage would be delayed because of their education. They also stated that keeping Hmong foods as well as adding different foods into their diets was important. They also discussed how Hmong born in the US were better able to go between the two cultures, whereas for them it was more difficult. Although they could speak some English, were able to understand most of our questions, had adjusted to and embraced foods offered at school, and were influenced by clothing and hair styles in the US, religion had been left untouched. Shamanism was talked about in a positive manner and without restraint or hesitation. Many had male family members who were Shamans and were used to determine illness.

Phase 3: Survey and Nutritional Status Assessment of Hmong Children

Participants included 56% females and 44% were males (**Chapter 7, Table 1**) with average ages of 11.4 ± 1.3 (B-US¹) and 15.8 ± 1.3 (B-US²) years old. Approximately 50% of children were classified as overweight/obese and no significant differences were found between age groups for BMI-for-Age percentiles.

BMI-for-Age Percentiles and SCT Survey Questions

B-US¹ and Female

Spearman correlations for environmental questions and BMI percentiles found 11 questions significantly correlated (**Chapter 7, Table 2**). BMI percentiles were run as the dependent variable with significantly correlated survey questions measuring the environmental construct as independent variables through multiple linear regression to determine factors most predictive of BMI percentiles. Approximately 60% ($R^2=0.601$) of the variance was explained by these questions, with four questions making a significant addition to the prediction of the variance (Table 2). The negatively correlated questions included, “*I started eating American foods because my family was on WIC*” and “*My parents take me to an American doctor when I am sick*”. The positively correlated questions were, “*My parents tell me I should lose weight*” and “*I eat chips, candy, and pop because the people I care about do*”. Due to collinearity, questions #10 and 11 (*Even when I am full my parents/grandparents want me to eat more*) were tested as a group and changed the R^2 for the model significantly ($p=0.003$) by 9%. Spearman correlations for behavioral questions and BMI percentiles found four questions were significantly correlated and multiple linear regression analysis showed they explained 14% of the variance ($R^2=0.135$), with none of the questions making a significant addition to the prediction of the variance. Three questions from the personal construct were significantly correlated to BMI percentiles and multiple linear regression analysis found they explained 20% of the variance ($R^2=0.195$). Two questions made a significant addition to the prediction of the variance and were, “*I choose to eat American foods over Hmong foods at school*” (negatively correlated) and “*If I eat less rice, I will lose weight*” (positively correlated).

B-US¹ and Male

Spearman correlations for environmental questions and percentiles showed 13 questions as being significantly correlated (**Chapter 7, Table 3**). BMI percentiles were run as the dependent variable with the significantly correlated survey questions measuring environment as independent variables through multiple linear regression to see which questions were most predictive of BMI percentiles. Approximately 55% ($R^2=0.545$) of the variance was explained by these questions, with two questions making a significant addition to the prediction of the variance. The questions included, *“In the home boys/men do the cleaning and go hunting”* (negatively correlated) and *“My parents tell me I should lose weight”* (positively correlated). Because of collinearity, questions #7-9 were tested as a group and there was a significant change ($p=0.018$) in the R^2 value for the model by 11%. Ten questions measuring behavior were significantly correlated to BMI percentiles. BMI percentiles were run as the dependent variable with the significantly correlated survey questions measuring behavior as independent variables through multiple linear regression to see which questions were most predictive of BMI percentiles. Approximately 33% ($R^2=0.328$) of the variance was explained by these questions, with two questions making a significant addition to the prediction of the variance. The negatively correlated questions included, *“Eating American food is good for my body”* and *“The men in my family teach me to fish”*. Seventeen questions measuring the personal construct were significantly correlated to BMI percentiles. BMI percentiles were run as the dependent variable with the significantly correlated survey questions measuring personal as independent variables through multiple linear regression to see which questions were most predictive of BMI percentiles. Approximately 40% ($R^2=0.401$) of the variance was explained by these questions, but none of the questions made a significant addition to the prediction of the variance.

B-US² and Female

Spearman correlations for environmental questions and percentiles found 9 questions as being significantly correlated (**Chapter 7, Table 4**). BMI percentiles were run as the dependent variable with the significantly correlated survey questions measuring environment as independent variables through multiple linear regression to

see which questions were most predictive of BMI percentiles. Approximately 51% ($R^2=0.51$) of the variance was explained by these questions and four questions made a significant addition to the prediction of the variance. Negatively correlated questions included, *“I eat snack foods like chips, candy, and pop when I watch TV”* and *“My grandparents tell me I should gain weight”*. The positively correlated questions were, *“My parents tell me I should lose weight”* and *“I cannot lose weight because there is too much food to eat”*. Three questions measuring the behavioral construct were significantly correlated with BMI percentiles. BMI percentiles were run as the dependent variable with the significantly correlated survey questions measuring behavior as independent variables through multiple linear regression to see which questions were most predictive of BMI percentiles. Approximately 16% ($R^2=0.155$) of the variance was explained by these questions, with two questions making a significant addition to the prediction of the variance, which were, *“I have made it a habit to overeat at mealtimes”* (positively correlated) and *“Eating American food is good for my body”* (negatively associated). Spearman correlations for personal questions and percentiles showed 10 questions as being significantly correlated. BMI percentiles were run as the dependent variable with the significantly correlated survey questions measuring personal as independent variables through multiple linear regression to see which questions were most predictive of BMI percentiles. Approximately 33% ($R^2=0.333$) of the variance was explained by these questions, with two questions making a significant addition to the prediction of the variance. These questions were, *“If I eat less rice I will lose weight”* (positively correlated) and *“I eat chips, candy, and pop to make me feel better”* (negatively correlated). Because of collinearity, questions #6-8 were entered as a grouped and did significantly change the R^2 value between models ($p=0.002$) by 13%.

B-US² and Male

Spearman correlations for environmental questions and percentiles showed 8 questions as being significantly correlated (**Chapter 7, Table 5**). BMI percentiles were run as the dependent variable with the significantly correlated survey questions measuring environment as independent variables through multiple linear regression to

see which questions were most predictive of BMI percentiles. Approximately 52% ($R^2=0.522$) of the variance was explained by these questions, with two questions making a significant addition to the prediction of the variance. These questions included, “*My parents tell me I should lose weight*” (positively correlated) and “*I eat snack foods like chips, candy, and pop when I watch TV*” (negatively correlated). Three questions measuring the behavioral construct were significantly correlated with BMI percentiles. BMI percentiles were run as the dependent variable with the significantly correlated survey questions measuring behavior as independent variables through multiple linear regression to see which questions were most predictive of BMI percentiles. Approximately 15% ($R^2=0.148$) of the variance was explained by these questions, with one question making a significant addition to the prediction of the variance, which was “*I have made it a habit to overeat at mealtimes*” (positively correlated). Spearman correlations for personal questions and percentiles showed 8 questions as being significantly correlated. BMI percentiles were run as the dependent variable with the significantly correlated survey questions measuring personal as independent variables through multiple linear regression to see which questions were most predictive of BMI percentiles. Approximately 36% ($R^2=0.356$) of the variance was explained by these questions, with three questions making a significant addition to the prediction of the variance. Positively correlated questions included, “*If I eat chips, candy, and pop I gain weight*” and “*I can clean game (squirrel, deer)*”. The negatively correlated question was “*I eat desserts because I like sweets*”. Because of collinearity, questions #5 and 6 were tested as a group and there was a significant change ($p=0.01$) in the R^2 value for the model by 12%.

Sum Acculturation Scores and SCT Survey Questions

B-US¹ and Female

Pearson correlations for environmental questions and acculturation score found 11 questions as being significantly correlated (**Chapter 7, Table 6**). Acculturation scores were run as the dependent variable with the significantly correlated survey questions measuring environment as independent variables through multiple linear regression to determine questions most predictive of score. Approximately 41%

($R^2=0.408$) of the variance was explained by these questions, with one question making a significant addition to the prediction of the variance. This question was, “*I eat snack foods like chips, candy, and pop when I watch TV*” ($p<0.01$, positively correlated). Due to collinearity, questions #9-11 on Hmong medicine use were tested as a group and changed the R^2 model significantly ($p=0.036$) by 9%. Ten questions measuring behavior were significantly correlated to acculturation score. Acculturation scores were run as the dependent variable with the significantly correlated survey questions measuring behavior as independent variables through multiple linear regression to see which questions were most predictive of scores. Approximately 36% ($R^2=0.355$) of the variance was explained by these questions, with two questions making a significant addition to the prediction of the variance. These questions included, “*I am able to use Hmong medicine when I am sick*” (negatively correlated) and “*I am able to use American medicine when I am sick*” (positively correlated). Pearson correlations for personal questions and acculturation score showed 15 questions as being significantly correlated. Acculturation scores were run as the dependent variable with the significantly correlated survey questions measuring personal as independent variables through multiple linear regression to see which questions were most predictive of the score. Approximately 42% ($R^2=0.421$) of the variance was explained by these questions, with one question making a significant addition to the prediction of the variance. This question was, “*I like American food because it tastes good*” (positively correlated). Due to collinearity, questions #7-10 on Hmong medicine use were tested as a group and changed the R^2 value for the model significantly ($p=0.036$) by 11%.

B-US¹ and Male

Pearson correlations for environmental questions and acculturation score found 13 questions as being significantly correlated (**Chapter 7, Table 7**). Acculturation scores were run as the dependent variable with the significantly correlated survey questions measuring environment as independent variables through multiple linear regression to see which questions were most predictive of score. Approximately 58% ($R^2=0.581$) of the variance was explained by these questions and four questions made a significant addition to the prediction of the variance. Positively correlated questions

included, *“I like American foods”*, *“My parents take me to an American doctor when I am sick”*, and *“I eat more American foods than my parents do”*. The negatively correlated question was, *“I like Hmong foods”*. Due to collinearity, questions #11-13 on Hmong medicine use were tested as a group and changed the R^2 for the model significantly ($p=0.025$) by 7%, indicating those questions on Hmong medicine use and the previously mentioned significant questions were more predictive of the variance. Six questions measuring the behavioral construct were significantly correlated to acculturation score. Acculturation scores were run as the dependent variable with the significantly correlated survey questions measuring behavior as independent variables through multiple linear regression to see which questions were most predictive of score. Approximately 33% ($R^2=0.330$) of the variance was explained by these questions and three questions made a significant addition to the prediction of the variance. The positively correlated question was, *“I know how to cook American food”*. The negatively correlated questions were, *“I choose to use Hmong medicine over American medicine”* and *“My mother/grandmother teaches me how to cook food for the family”*. Because of collinearity, questions #3 and 4 on Hmong medicine use and questions #5 and 6 on American medicine use were tested as a group and changed the R^2 for the model significantly by 10% ($p=0.015$) and 8% ($p=0.028$) respectively. Pearson correlations for personal questions and acculturation score showed 7 questions as being significant. Acculturation scores were run as the dependent variable with the significantly correlated survey questions measuring personal as independent variables through multiple linear regression to see which questions were most predictive of score. Approximately 42% ($R^2=0.423$) of the variance was explained by these questions, with two questions making a significant addition to the prediction of the variance. The questions included, *“I eat Hmong foods because they make me feel good”* (negatively correlated) and *“I like American food because it tastes good”* (positively correlated).

B-US² and Female

Pearson correlations for environmental questions and acculturation score found 7 questions as being significantly correlated (**Chapter 7, Table 8**). Acculturation scores were run as the dependent variable with the significantly correlated survey questions

measuring environment as independent variables through multiple linear regression to see which questions were most predictive of score. Approximately 34% ($R^2=0.339$) of the variance was explained by these questions, with four questions making a significant addition to the prediction of the variance. Negatively correlated questions were, “*My parents take me to a Shaman or a medicine woman when I am sick*”, “*I eat rice everyday*”, and “*I gain weight because there is always food to eat*”. The positively correlated question was, “*My parents take me to an American doctor when I am sick*”. Nine questions measuring the behavioral construct were significantly correlated with acculturation score. Acculturation scores were run as the dependent variable with the significantly correlated survey questions measuring behavior as independent variables through multiple linear regression to see which questions were most predictive of score. Approximately 41% ($R^2=0.414$) of the variance was explained by these questions and five questions made a significant addition to the prediction of the variance. Negatively correlated questions included, “*My mother/grandmother teaches me how to cook food for the family*”, “*If I do not eat Hmong food everyday, I feel like I have not eaten*”, “*If I went to a Shaman, it would be good for my health,*” and “*If I cannot cook, I will not be able to find a good husband*”. The positively correlated question was, “*Foods eaten at school are making my diet more American*”. Pearson correlations for personal questions and acculturation score showed 15 questions as being significantly correlated. Acculturation scores were run as the dependent variable with the significantly correlated survey questions measuring personal as independent variables through multiple linear regression to see which questions were most predictive of score. Approximately 48% ($R^2=0.479$) of the variance was explained by these questions, with three questions making a significant addition to the prediction of the variance. The questions were all negatively correlated and included, “*I eat while I watch TV*”, “*I like to eat Hmong foods because I am used to eating them*”, and “*When I am sick, using Hmong medicine makes me feel better*”.

B-US² and Male

Pearson correlations for environmental questions and acculturation score showed 10 questions as being significantly correlated (**Chapter 7, Table 9**).

Acculturation scores were run as the dependent variable with the significantly correlated survey questions measuring environment as independent variables through multiple linear regression to see which questions were most predictive of score. Approximately 64% ($R^2=0.643$) of the variance was explained by these questions, with four questions making a significant addition to the prediction of the variance. Negatively correlated questions included, "*In the home boys/men go fishing and girls/women cook and clean the fish*", "*My parents give me Hmong medicine when I am sick*", and "*Hmong medicine is for sale near my house*". The positively correlated question was, "*Milk is always in my home*". Because of collinearity, questions #7 and 8 on eating different foods than parents/grandparents were tested as a group and changed the R^2 for the model significantly by 5% ($p=0.04$). Six questions measuring the behavioral construct were significantly correlated with acculturation score.

Acculturation scores were run as the dependent variable with the significantly correlated survey questions measuring personal as independent variables through multiple linear regression to see which questions were most predictive of score. Approximately 50% ($R^2=0.495$) of the variance was explained by these questions and with three questions making a significant addition to the prediction of the variance. Positively correlated questions were, "*I know how to cook food for myself*" and "*I am able to use American medicine when I am sick*". The negatively correlated question was, "*I choose to use Hmong medicine over American medicine*". Pearson correlations for personal questions and acculturation score showed 7 questions as being significantly correlated. Acculturation scores were run as the dependent variable with the significantly correlated survey questions measuring personal as independent variables through multiple linear regression to see which questions were most predictive of score. Approximately 60% ($R^2=0.597$) of the variance was explained by these questions, with two questions making a significant addition to the prediction of the variance. Both questions were positively correlated and included, "*I choose to eat American foods over Hmong foods at school*" and "*I eat desserts when it is available*". Because of collinearity, questions #5-7 regarding hunting were tested as a group and changed the R^2 for the model significantly by 16% ($p=0.001$).

Acculturation Assessment Data

B-US² reported speaking more English at home and thinking in English more compared to B-US¹ (**Chapter 7, Table 10**). Both groups had similar scores for social connections (closest friends) with approximately 60% reporting they were more Hmong than Americans to about half and half. About 80% of both groups reported speaking equal amounts of Hmong and English or more English than Hmong with friends. Looking at eating patterns, the overall dietary acculturation question (I eat) and lunch scores were significantly different between groups, with B-US² reporting a higher consumption of American type foods than B-US¹. Breakfast, dinner, and foods eaten for snacks were not significantly different. For breakfast, children reported eating about equal amounts of Hmong and American foods. Dinner was reported as being mostly Hmong foods to equal amounts of Hmong and American food. Snacks were reported as being equal amounts of Hmong and American foods to mostly American foods. Self-perception was not significantly different, with almost all children perceiving themselves as Hmong-American. Overall acculturation score was significantly higher for B-US² (30.3 ± 4.1) compared to B-US¹ (28.3 ± 4.9).

For B-US¹ BMI-for-Age percentiles were significantly and positively associated with language spoken at home and language thought in at the $p < 0.05$ level. Overall acculturation scores were positively and significantly associated with all of the acculturation questions at the $p < 0.01$ level. The most highly correlated questions ($R^2 > 0.60$) were language spoken at home, language thought in, language spoken with friends, overall dietary acculturation, and what was eaten for lunch and snacks. For B-US², BMI-for-Age percentiles were only positively and significantly associated with the question regarding language spoken with friends at the $p < 0.05$ level. Acculturation score was positively and significantly associated with all of the acculturation questions at the $p < 0.01$ level. The most highly correlated questions ($R^2 > 0.60$) were language spoken at home, language thought in, and language spoken with friends.

CONCLUSIONS & IMPLICATIONS

This study assessed the impact of environmental change and acculturation on Hmong adults and children, who have lived in the US for varying amounts of time, by investigating changes in food system access, grocery purchasing influences, eating behavior, BMI, and health status. This research has shown how the combination of quantitative (GIS mapping, food store surveys, acculturation assessment, FFQ, theory based survey) and qualitative (focus group discussions) methodologies has the potential to provide a more complete picture of how immigrants adapt to their new food environments. As more immigrants become introduced to food secure, obesogenic environments, such as the US, it will be important to examine how this transition impacts the health of current and future generations.

For Hmong adults who have transitioned into the US, changes in their environment and increased levels of acculturation have negatively impacted physical activity patterns, dietary intake, BMI status, and their general health. These changes have not only impacted their health behaviors, but also their grocery purchasing and food preparation habits. Years lived in the US, nativity, previous food insecurity, and experiences during formative years may play a role in language, social, and dietary acculturation as well as purchasing behaviors. Hmong who were well established in the Twin Cities (in the US ~25 years) had an acculturation level in between newly immigrated and US born individuals, indicating the previously mentioned factors place limitations on level of acculturation or orientation to the host society. Although generations born and/or raised in the US have made food security, financial, and educational advancements, their risk for early onset obesity and chronic disease development, such as type 2 diabetes and hypertension, may be much higher than their foreign-born counterparts.

For Hmong children, acculturation level, length of time in the US, and place of birth play a role in BMI and stature status, physical activity and dietary patterns, and cooking and food preparation knowledge. Increased acculturation was associated with higher BMIs and dietary acculturation, with over half of the children born in the US classified as overweight/obese and less than a quarter of the children born overseas

classified as overweight/obese. Given childhood obesity has significant public and fiscal impacts; this research shows the importance of examining obesity patterns of Hmong and how acculturation of the diet occurs. In the future it will be important to create health promotion programs that are culturally appropriate to support physical activity and healthy eating habits for children in acculturating families.

Cultural losses in the Hmong community, in the form of language contraction/loss and partial and/or complete discontinuation of some traditional practices, have produced silences between younger and older generations. There are generational gaps in communication with one another, where the flow of knowledge in an oral capacity for some has been partially if not totally severed. For some in the Hmong community, Shamanism and its associated medicinal practices/rituals have been devalued and their validity questioned. A modern identity for segments of the Hmong community has been composed by linguistic discourses and building contrastive opposites. Often, what is silenced is much more informative about the cultural evolution of a group. In this case, the Hmong are constructing their identity through the language and physical actions not taken just as much as those that are. The Hmong language, and cultural practices associated with it, is acutely tied to a symbol of identity that younger generations may be trying to stifle in word and deed. As successive generations are born in the US, it will be imperative to observe how changes in environment and acculturation mediate silences in language and action.

Information gained from this research project is greatly needed by health care professionals, educators, and community leaders so that steps can be taken to prevent or reduce problems associated with food access, food choices and associated health problems in the Hmong community. Results may offer important strategies for developing interventions for Hmong children aimed at reducing and preventing obesity through culturally appropriate dietary and activity modifications. Gender and age differences may require the need for separate programs or at least special considerations for boys and girls in different age groups. Due to the uniqueness of the Hmong culture, it is important for non-Hmong professionals to meet with and incorporate the knowledge of leaders and key informants in the Hmong community into intervention

projects prior to designing and implementing programs. In both focus groups and survey analysis, children identified parents, grandparents, and peers in their community as important people in their lives. Therefore, family and community involvement should be incorporated into interventions. Early nutrition education focused on attaining and maintaining healthy eating behaviors could help reduce the incidence of childhood overweight/obesity, and subsequent adult obesity in this population.

Based on the findings from this research project, future directions of research related to the Hmong community include: 1) the instigation and evaluation of health education and health promotion interventions for Hmong children and their parents aimed to increase healthy eating and physical activity behaviors that are culturally appropriate; 2) the development and implementation of interventions with both overweight/obese children in and out of school and adults in community settings; 3) the addressing of social support and social integration issues (interrelationships among peer networks, parental attributes, extended family) in addition to the cultural and environmental factors of acculturation so that education and interventions will be well received; and 4) the implementation of a longitudinal analysis of Hmong families experiencing acculturation, with the assessment of dietary intake, physical activity patterns, and prevalence of obesity and obesity related chronic diseases measured while residing in the US (newly immigrated and well established).

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APPENDIX

Table 1. Adult Focus Group Questions and Sample Prompts.

Focus Group Questions	Sample Prompts
1. What is your name and where were you born?	Has everyone migrated over from Thailand/Laos? How long have you been in the US? How long have you been in Minnesota? Why did you move to Minnesota?
2. What is your favorite food and why?	Why is that your favorite food? What is it about that food that makes it your favorite?
3. What kinds of foods did you eat prior to living in the U.S.? /For those born in or grew up in the U.S.- What kinds of foods did you eat growing up?	If you lived in a refugee camp, were these considered traditional Hmong foods? Why are those Hmong foods? What did the breakfast, lunch, and dinner meal look like? What kinds of snacks/desserts did you eat?
4. Before coming to the US did you have enough to eat or when you were younger was there always enough food?	When you didn't have enough to eat what did you do to get food? Did you ever eat "alternative" foods (rodents, insects, animals)? How often? Did you have a lot of meat? Was fruit consumed very often?
5. How have your eating habits changed since you came to the U.S. or compared to when you were younger?	How often do you eat Hmong foods? How would you define traditional Hmong food? What do you consider to be American foods? How often do you eat American food? Fast food? Have you ever eaten a traditional meal in an American home? Do the foods you eat differ from your parents or grandparents?
6. What kinds of foods do your children like to eat?	Is it different from what you eat and how? Do your kids like Hmong food versus American food? Do your kids eat school lunch or do they take a bagged lunch?
7. How do you like your kids (skinny, plump, or just right) and why?	Did your parents/grandparents ever make positive or negative comments about weight? What do you think about the saying "a healthy baby is a fat baby?"
8. Where do you buy your groceries?	Do you shop at more Asian or American stores? Do you shop there because of price, comfort, or variety? Does location of the store impact frequency?
9. What types of foods do you buy at Asian/Hmong stores compared to American stores?	Where do you buy rice and how much do you buy? Are there special sauces/herbs/meats that you buy at Asian/Hmong stores? Can you always find the foods you want at American stores?
10. How do tastes/preferences of household members influence grocery purchases?	Do you live in an extended family? Whose food preferences have the highest value (elders, parents, or children)? Do you shop at different stores for different tastes/preferences?
11. What do you think of your diet?	What are the good and bad things about it? How do you think diet is related to health? Does what you eat impact your health? What kind of health messages do you get from your community/culture? What are solutions to mixed health messages?
12. Do you use food stamps or have you used them in the past?	If yes→ a.) What kinds of foods do you buy with them? If no→ b.) What are the reasons not to use them?
13. When you are sick what kind of medicine do you use and why (Hmong vs. Western)?	Do you have any concerns about you or your child's health? Is Hmong medicine better than Western medicine or vice versa and why? Have you gone to a medicine woman or a shaman and what kind of treatment did you receive?

STATEMENT OF INFORMED CONSENT

This project is being conducted by Chery Smith, PhD, MPH, RD and Lisa Franzen, MS, in the Department of Food Science and Nutrition at the University of Minnesota.

This is a research group talk about the foods eaten by Hmong people. We want to hear more about what foods you buy, what foods you ate before and after coming to the United States, if you can always find the types of foods that you like to eat, and who or what helps you make food choices. Only limited research has been reported about the dietary habits of the Hmong population in either their homeland or here in the United States. Each focus group will last for approximately 90 minutes, with a 6 to 8 people in each group. Focus groups will be held in conference rooms at various community locations (community center, community libraries, or at the Department of Food Science and Nutrition at the University of Minnesota). In addition to participation in the focus groups, we will measure your height and weight at the end of the session in a private area. In order to participate in the study you are required to have your height and weight measured. Demographic information will also be collected, including: age, education level, origin, length of time in the US, food assistance programs, income, occupation, number of people in your household, and types of foods eaten. You do not have to answer all of the questions on the demographic form. Please read this form carefully and ask any questions you may have before agreeing to this project.

Risks and Benefits of being in the Study

You may not benefit from taking part in this research study, although for some it will provide an opportunity to discuss your experiences. The risks in taking part in this study are minimal.

Compensation: You will receive a monetary gift of \$20 for your participation.

Confidentiality:

Focus groups will be audio taped and transcribed verbatim. The records of this study will be kept private in a locked file in Dr. Smith's office. All transcripts and tapes will be stored in a locked area in Dr. Smith's office and only members of the research team will have access to the material. Your names will never be made public information or given out to anyone other than the researchers involved in the study. If the information from the study becomes published, your identity will not be given out; it will remain confidential.

Voluntary Nature of the Study:

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the University of Minnesota. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

Contacts and Questions:

Those conducting this research project are Dr. Chery Smith and Lisa Franzen. You may ask any questions you have now. If you have questions later, you are encouraged to contact Chery Smith at (612) 624-2217 or Lisa Franzen at (612) 695-7750. You will be given a copy of this form to keep for your own records.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), you are encouraged to contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

Your participation in this focus group implies consent. I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

Signature: _____ Date: _____

Signature of Investigator: _____ Date: _____

INFORMATION SHEET for _____

Please circle the best choice or complete the blank

1. AGE: _____
2. GENDER
 - a. Female
 - b. Male
3. WHERE DID YOU LIVE BEFORE COMING TO THE UNITED STATES?
 - a. Thailand
 - b. Laos
 - c. China
 - d. Vietnam
 - e. France
 - f. Other: _____
4. HOW MANY YEARS HAVE YOU LIVED IN THE UNITED STATES? _____
5. WHAT YEAR DID YOU COME TO THE UNITED STATES? _____
6. HOUSEHOLD INCOME
 - a. Less than \$10,000
 - b. \$10,001-\$19,999
 - c. \$20,000-\$39,999
 - d. \$40,000-\$59,999
 - e. Greater than \$60,000
 - f. Unemployed
7. IS ANYONE IN YOUR HOUSEHOLD CURRENTLY ON ANY OF THESE PROGRAMS?
 - a. Food Stamp Program
 - b. Food Distribution
 - c. School Meals (free or reduced lunch program)
 - d. Minnesota Food Assistance Program
 - e. Women, Infants, and Children (WIC)
 - f. Other: _____
8. EDUCATION
 - a. Less than high school
 - b. Some high school
 - c. Completed high school/GED
 - d. Some undergraduate/college/technical/vocation school
 - e. Completed undergraduate/college/technical/vocational school
 - f. Completed graduate/professional school
9. TOTAL NUMBER OF PEOPLE IN HOUSEHOLD: _____
10. NUMBER OF CHILDREN IN HOUSEHOLD: _____
11. IN GENERAL, WOULD YOU SAY THAT YOUR HEALTH IS:
 - a. Poor
 - b. Fair
 - c. Good
 - d. Very Good
 - e. Excellent
12. IN GENERAL, WOULD YOU SAY THAT YOUR DIET IS:
 - a. Poor
 - b. Fair
 - c. Good
 - d. Very Good
 - e. Excellent

Hmong Project Food Frequency Instrument. Developed by: Lisa Franzen, MS, RD and Chery Smith, PhD, MPH, RD, Department of Food Science and Nutrition, University of Minnesota (2006).

PLEASE CIRCLE THE FOODS YOU EAT AND PLACE AN X IN THE BOX THAT RELATES TO HOW OFTEN YOU EAT THOSE FOODS. PLEASE NOTICE THE FIRST SECTION WANTS TO KNOW FOODS EATEN BEFORE COMING TO THE UNITED STATES AND THE SECOND SECTION WANTS TO KNOW FOODS EATEN AFTER COMING TO THE UNITED STATES.

1. Foods eaten before coming to the United States							2. Foods eaten after coming to the United States						
Fruits	Daily	2-3 times per week	1 time per week	2-3 times per month	Holidays Only	Never	Fruits	Daily	2-3 times per week	1 time per week	2-3 times per month	Holidays Only	Never
Plantain							Plantain						
Coconut							Coconut						
Tamarind							Tamarind						
Rambutan							Rambutan						
Bananas							Bananas						
Pineapple							Pineapple						
Papaya							Papaya						
Mango							Mango						
Apples							Apples						
Oranges							Oranges						
Grapefruit							Grapefruit						
Grapes							Grapes						
Strawberries							Strawberries						
Asian pears							Asian pears						
Vegetables							Vegetables						
Bamboo shoots							Bamboo shoots						
Purple yams							Purple yams						

1. Foods eaten before coming to the United States							2. Foods eaten after coming to the United States						
Vegetables	Daily	2-3 times per week	1 time per week	2-3 times per month	Holidays Only	Never	Vegetables	Daily	2-3 times per week	1 time per week	2-3 times per month	Holidays Only	Never
Bean sprouts							Bean sprouts						
Dried fungus/mushrooms							Dried fungus/mushrooms						
Taro							Taro						
Eggplant							Eggplant						
Tomatoes							Tomatoes						
Cucumbers							Cucumbers						
Zucchini							Zucchini						
Lettuce							Lettuce						
Spinach							Spinach						
Carrots							Carrots						
Broccoli							Broccoli						
Chinese Broccoli							Chinese Broccoli						
Naato							Naato						
Meat/ Protein							Meat/ Protein						
Pork							Pork						
Beef							Beef						
Chicken							Chicken						
Tofu							Tofu						

1. Foods eaten before coming to the United States							2. Foods eaten after coming to the United States						
Meat/ Protein	Daily	2-3 times per week	1 time per week	2-3 times per month	Holidays Only	Never	Meat/ Protein	Daily	2-3 times per week	1 time per week	2-3 times per month	Holidays Only	Never
Duck							Duck						
Bacon							Bacon						
Eggs							Eggs						
Fish							Fish						
Pheasant							Pheasant						
Squirrel							Squirrel						
Venison/ Deer							Venison/ Deer						
Dairy							Dairy						
Soymilk							Soymilk						
Skim milk							Skim milk						
1% milk							1% milk						
2% milk							2% milk						
Whole milk							Whole milk						
Yogurt							Yogurt						
Grains							Grains						
Jasmine rice							Jasmine rice						
Rice noodles							Rice noodles						
Sticky rice							Sticky rice						
White bread							White bread						
Wheat bread							Wheat bread						

1. Foods eaten before coming to the United States							2. Foods eaten after coming to the United States						
Grains	Daily	2-3 times per week	1 time per week	2-3 times per month	Holidays Only	Never	Grains	Daily	2-3 times per week	1 time per week	2-3 times per month	Holidays Only	Never
Sweetened cereal							Sweetened cereal						
Unsweet cereal							Unsweet cereal						
Hot cereal							Hot cereal						
Crackers							Crackers						
Pasta							Pasta						
Combo Foods/ Other							Combo Foods/Other						
Pizza							Pizza						
Hamburger							Hamburger						
Macaroni & cheese							Macaroni & cheese						
Spaghetti							Spaghetti						
Egg salad							Egg salad						
Vegetable salad							Vegetable salad						
Canned soup							Canned soup						
Canned stew							Canned stew						
Homemade soup							Homemade soup						

1. Foods eaten before coming to the United States							2. Foods eaten after coming to the United States						
Combo Foods/ Other	Daily	2-3 times per week	1 time per week	2-3 times per month	Holidays Only	Never	Combo Foods/ Other	Daily	2-3 times per week	1 time per week	2-3 times per month	Holiday Only	Never
Peanut butter & jelly sandwich							Peanut butter & jelly sandwich						
Cakes (meat, fruit, bean)							Cakes (meat, fruit, bean)						
Cold meat sandwich							Cold meat sandwich						
Snack cakes							Snack cakes						
Jellies							Jellies						
Tri-color							Tri-color						
Hard candy							Hard candy						
Chocolate bar							Chocolate bar						
Potato chips							Potato chips						
Corn chips							Corn chips						
Pretzels							Pretzels						
Silk worms							Silk worms						
Water bug							Water bug						
Pop							Pop						
Kool-aid							Kool-aid						
Lemonade							Lemonade						
Coffee-sweetened							Coffee-sweetened						
Tea-sweetened							Tea-sweetened						

Hmong Project Food Store Survey. Developed by: Lisa Franzen, MS, RD and Chery Smith, PhD, MPH, RD, Department of Food Science and Nutrition, University of Minnesota (2006).

Date: _____ **Day of the Week:** _____

Store Name: _____

Store Address: _____

Store ID No. _____ **Store Phone No.** _____

- Store Type:**
- Supermarket
 - Large Grocery
 - Small Grocery
 - Farmers Market
 - Convenience
 - Gas/Grocery
 - Ethnic/Specialty
 - Other

Square Footage of Store: _____

READ THE FOLLOWING TO THE STORE MANAGER PRIOR TO CONDUCTING THE STORE SURVEY:

“Hi my name is Lisa Franzen/Dr. Chery Smith and I am a graduate student/professor at the University of Minnesota. I am doing a market survey of grocery stores in the Minneapolis/St. Paul, Minnesota areas that are frequently visited by Hmong, or is ethnically specific to Hmong, on the availability of food items and their prices. Foods selected for this survey are based on USDA's thrifty food plan market basket list for U.S. city average as well as Midwest Urban and on types of foods or common themes found among commonly visited grocery stores or ethnically specific food. The survey looks at store type, location, and food items (brand, weight, price, origin, fresh/frozen, and quality). The information I am collecting will help create a profile of food availability and costs. The information will only be used for this purpose and data collected from stores in each study site will be combined. None of the information collected will be linked to any specific store. Participation in this study is voluntary. Your decision to grant/deny me permission to collect information from your store will not affect your current or future relations with the University of Minnesota.

TO THE DATA COLLECTOR: Please complete the following tables by walking through the store and recording the price and weight of the least expensive item for Each food listed. The table includes the unit of measure that should be selected for Each food. For example, potatoes are measured in pounds, eggs are measured by the dozen. It is important that the prices recorded are for the specific food item in the table with no

substitutions. If a food item is unavailable on the day you visit the store, but are usually in stock, check with the manager for the normal price. If a food is not ever in stock, mark the pricing box with an NA (for “not available”). If a food is on sale, place an “S” next to the price.

Food Item	Brand/ Variety / Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
FRUITS – FRESH NUMBER OF DIFFERENT TYPES OF FRESH FRUITS AVAILABLE: _____								
Apples, any variety (bagged or loose)		Per pound						
Avocado		Per pound						
Bananas		Per pound						
Bananas, Thai		Per pound						
Choyote		Per pound						
Cherries		Per pound						
Coconut		Per pound						
Durian		Per pound						
Grapefruit		Per pound						
Grapes (green or red)		Per pound						
Guava		Per pound						
Jackfruit		Per pound						

Kiwi		Per pound						
Food Item	Brand/ Variety / Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Lemons		Per pound						
Limes		Per pound						
Longans		Per pound						
Lychees		Per pound						
Mango		Per pound						
Melon, bitter		Per pound						
Melons (cantaloupe)		Per pound						
Melons (watermelon)		Per pound						
Melons (honeydew)		Per pound						
Nectarines		Per pound						
Oranges, any variety (bagged or loose)		Per pound						
Papaya		Per pound						
Passion Fruit		Per pound						

Peaches		Per pound						
Food Item	Brand/ Variety / Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Pears		Per pound						
Pears, Asian		Per pound						
Pineapple		Per pound						
Plantains		Per pound						
Plums		Per pound						
Rambutan		Per pound						
Strawberries		Per 12 oz.						
Tamarind, sweet		Per pound						
VEGETABLES – FRESH NUMBER OF DIFFERENT TYPES OF FRESH VEGETABLES AVAILABLE: _____								
Asparagus		Per bunch						
Bamboo		Per pound						
Basil		Per pound						

Food Item	Brand/ Variety / Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Bean Sprouts		Per pound						
Beets		Per pound						
Bok choy		Per bunch						
Broccoli, bunch		Per pound						
Cabbage, head		Per pound						
Carrots, unpeeled (bagged or loose)		Per pound						
Cauliflower, bunch		Per pound						
Celery, bunch		Per pound						
Cilantro		Per pound						
Cilantro, Hmong		Per pound						
Collard greens		Per pound						
Corn, cob		Per pound						

Cucumber		Each						
Food Item	Brand/ Variety Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh- Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Eggplant (any variety)		Per pound						
Green Beans		Per pound						
Green pepper		Each						
Garlic, fresh		Each						
Ginger, fresh		Each						
Lemon Grass		Each						
Lettuce, leaf (green or red)		Per pound						
Mint		Per pound						
Mushrooms		Per pound						
Napa		Per pound						
Okra		Per pound						

Onions, yellow (bagged or loose)		Per pound						
Food Item	Brand/ Variety Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh- Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Onions, green		Per pound						
Onions, green Hmong		Per pound						
Peas, snow		Per pound						
Peas, sugar snap		Per pound						
Peppers, Thai chili		Per pound						
Potatoes (any variety)		5 pound bag						
Pumpkin		Per pound						
Radish		Per pound						
Shallots		Per pound						
Spinach		Per pound						
Sweet potatoes		Per pound						

Squash (seasonal)		Per pound						
Taro (all sizes)		Per pound						
Food Item	Brand/ Variety Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh- Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Tomatoes (any variety)		Per pound						
Watercress		Per pound						
Yams (any variety)		Per pound						
Yuca		Per pound						
Yuchoy		Per pound						
Zucchini		Per pound						
DAIRY PRODUCTS, FRESH NUMBER OF DIFFERENT ITEMS AVAILABLE: _____								
Cheese (any variety)		Per pound						
Cheese, cottage (any variety)		16 ounce carton						
Milk, 1% low fat		1 gallon						

Milk, 2%		1 gallon						
Milk, buttermilk		Per fluid ounce						
Food Item	Brand/ Variety Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh- Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Milk, coconut		1 gallon						
Milk, evaporated		Per 12 ounces						
Milk, skim		1 gallon						
Milk, sweetened condensed		Per 12 ounces						
Milk, whole		1 gallon						
Milk, Vitamin D		1 gallon						
Ice cream, prepackaged		Per ½ gallon						
Soymilk		Per ½ gallon						

Yogurt, natural, fruit flavored		Per 8 ounce individual serving						
Food Item	Brand/ Variety / Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
MEAT AND MEAT ALTERNATIVES, FRESH NUMBER OF DIFFERENT TYPES OF FRESH MEATS AVAILABLE: _____								
Anchovy		Per pound						
Beans, dried		Per pound						
Bacon		Per pound						
Beef, bone		Per pound						
Beef, eye round		Per pound						
Beef, feet		Per pound						
Beef, ground, lean		Per pound						
Beef, knuckle		Per pound						

Beef, liver		Per pound						
Beef, oxtails		Per pound						
Beef, rib eye		Per pound						
Food Item	Brand/ Variety / Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Beef, shank		Per pound						
Beef, short rib		Per pound						
Beef, skin		Per pound						
Beef, smoked		Per pound						
Beef, stomach		Per pound						
Beef, tendon		Per pound						
Beef, tongue		Per pound						
Beef , tripe		Per pound						
Chicken, breasts		Per pound						
Chicken, drumsticks		Per pound						

Chicken, feet		Per pound						
Chicken, fryer, cut-up or whole		Per pound						
Chicken, gizzards		Per pound						
Food Item	Brand/ Variety / Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Chicken, thighs		Per pound						
Chicken, wings		Per pound						
Clams		Per pound						
Cornish game hens		Per pound						
Crab		Per pound						
Crab, snow		Per pound						
Duck, eggs		Per pound						
Duck, feet		Per pound						
Duck, whole		Per pound						
Duck, wings		Per pound						

Eggs, grade A, large		1 dozen						
Eel		Per pound						
Fish, bass		Per pound						
Food Item	Brand/ Variety / Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Fish, broadhead		Per pound						
Fish, catfish		Per pound						
Fish, cod		Per pound						
Fish, cuttlefish		Per pound						
Fish, dace		Per pound						
Fish, dried (shrimp, anchovies, squid, cuttlefish)		Per pound						
Fish, goby		Per pound						
Fish, mackerel		Per pound						
Fish, milk		Per pound						

Fish, mud		Per pound						
Fish, perch		Per pound						
Fish, red snapper		Per pound						
Food Item	Brand/ Variety / Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Fish, red tail		Per pound						
Fish, salmon		Per pound						
Fish, silver barb		Per pound						
Fish, smelt		Per pound						
Fish, snakehead		Per pound						
Fish, sole		Per pound						
Fish, starfish		Per pound						
Fish, tilapia		Per pound						
Fish, trout		Per pound						
Fish, yellow croaker		Per pound						

Frog		Per pound						
Lobster		Per pound						
Meat balls (beef, pork, or fish)		Per pkg.						
Food Item	Brand/ Variety / Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Mussels		Per pound						
Octopus		Per pound						
Oyster		Per pound						
Peanuts		Per pound						
Peanut Butter		Per pound						
Pheasant		Per pound						
Pork, bone		Per pound						
Pork, chop		Per pound						
Pork, ears		Per pound						
Pork, feet		Per pound						

Pork, ground		Per pound						
Pork, ham		Per pound						
Pork, hock		Per pound						
Food Item	Brand/ Variety / Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Pork, loin		Per pound						
Pork, neckbone		Per pound						
Pork, sausage		Per pound						
Pork, shoulder roast		Per pound						
Pork, skin		Per pound						
Pork, smoked		Per pound						
Pork, snout		Per pound						
Pork, spare ribs		Per pound						
Pork, stomach		Per pound						
Pork, tail		Per pound						

Pork, tenderloin		Per pound						
Pork, tongue		Per pound						
Pork, tripe		Per pound						
Food Item	Brand/ Variety / Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Quail		Per pound						
Quail, eggs		Per pound						
Sardines		Per pound						
Scallops		Per pound						
Shrimp		Per pound						
Snail		Per pound						
Soybeans		Per pound						
Squid		Per pound						
Tofu		Per ounce						
Tuna		Per 6 ounce						

Turkey/ham (packaged luncheon meat)		Per pound						
Turkey, breast		Per pound						
Turkey, gizzards		Per pound						
Food Item	Brand/ Variety / Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Turkey, ground		Per pound						
Turkey, leg		Per pound						
Turkey, whole		Per pound						
Turkey, wings		Per pound						
GRAIN FOODS NUMBER OF DIFFERENT TYPES OF GRAINS AVAILABLE: _____								
Bean thread		Per pound						
Bread, white		Per pound						
Bread, whole wheat		Per pound						
Cereal, Kix		Per ounce						
Cereal, Cheerios		Per ounce						

Cereal, Special K		Per ounce						
Noodles, Chinese		Per pound						
Noodles, chow mein		Per pound						
Food Item	Brand/ Variety / Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Noodles, dried		Per pound						
Noodles, egg		Per pound						
Noodles, lai fun		Per pound						
Noodles, lo mein		Per pound						
Noodles, macaroni		Per pound						
Noodles, Oriental		Per pound						
Noodles, spaghetti		Per pound						
Noodles, Vietnamese		Per pound						
Rice, black glutinous		Per pound						
Rice, brown		Per pound						

Rice, flakes		Per pound						
Rice, long grain		Per pound						
Rice, jasmine		Per pound						
Food Item	Brand/ Variety / Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Rice, sticks		Per pound						
Rice, sushi		Per pound						
Rice, sweet		Per pound						
Rice, vermicelli		Per pound						
COMBINATION FOODS NUMBER OF DIFFERENT TYPES OF FOODS AVAILABLE: _____								
Buns (leeks, Cha Shu, custard, sausage, leek & pork)		Per pkg						
Cakes (red bean, pineapple, banana, rice, green tea, pork, taro)		Per pkg						
Dumplings		Per pkg						

Egg rolls		Per pkg						
Packaged Soups		Per 8 ounce						
Potstickers		Per pkg						
Food Item	Brand/ Variety / Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
OTHER NUMBER OF DIFFERENT TYPES OF FOODS AVAILABLE: _____								
Chips (Doritos, Cheetohs)		12.5 oz bag						
Dug Dae		Per pound						
Juicy Juice		Per ounce						
Mang Da Na		Per pound						
Sauce, Soy		Per ounce						
Sauce, Oyster		Per ounce						
Sauce, Fish		Per ounce						
Soda, Coke		Per 12-pack						
Soda, Diet Coke		Per 12-pack						

Soda, Fanta		Per 12-pack						
Soda, Pepsi		Per 12-pack						
Soda, Diet Pepsi		Per 12-pack						
Food Item	Brand/ Variety / Cut	Item Weight/ Unit (desired)	Item Weight/ Unit (actual)	Price (lowest cost)	Origin 1=Shipped 2=Local	Item 1=Sustainable 2=Organic	Fresh/ Fresh/ Frozen	Quality 1=Not ripe 2=Ripe 3=Spoiled
Soda, Seven Up		Per 12-pack						
Soda, Sprite		Per 12-pack						
Silk worms		Per pound						
Sugar, granulated		Per pound						

Table 2. Child Focus Group Questions with Sample Prompts.

Focus Group Questions	Sample Prompts
1. What is your first name and how old are you?	Has everyone migrated over from Thailand/Laos? How long have you been in the US? How long have you been in Minnesota? Why did you move to Minnesota?
2. What is your favorite food and why?	Why do you like this food? What makes it special? Are there any foods you don't like to eat? Why don't you like them? Who in your family eats most like you (mom, dad, brothers, sisters, or grandparents)? Do you prefer sweet or salty foods? Why?
3. Could you tell us a little bit about Hmong foods? Do you still eat them?	How would you describe traditional Hmong food? How would you describe American food? Can you tell us about a typical Hmong breakfast, lunch, and dinner? What kinds of Hmong foods are eaten as snacks? What about desserts?
4. For those born outside the US- Before coming to the US did you have enough to eat or when you were younger was there always enough food?	When you didn't have enough to eat what did you do to get food? Did you ever eat "alternative" foods (rodents, insects, animals)? How often? Did you have a lot of meat? Was fruit consumed very often?
5. How do you decide what foods you are going to eat?	Do you pick what to eat for dinner or does your mom or dad decide? Do you eat until you are full? When you are full, do you stop eating or do your parents/grandparents want you to eat more? Is the food you eat at home different from the food you eat at school? How so?
6. How much TV do you watch a day?	What kind of commercials do they show? Do commercials help you to decide which foods to eat? Does media (TV, internet, magazines) impact how you feel about yourself (body image)? Do your parents/grandparents ever make positive or negative comments about weight?
7. Does your family use food assistance programs?	Is there always enough food at home? Do you like the foods you get with food assistance programs? Do you ever go out to eat at a restaurant or fast food place? What do you usually eat there?
8. What traditions do you think are important/unimportant?	Do any of you have gardens or grow herbs? Do any of your parents still arrange marriages? What are desired characteristics in a mate? How much time do you spend cooking, cleaning, or grocery shopping? Household chores? How do you feel about cultural traditions fading? Which ones are being lost?
9. Do you think that some foods are good/bad for you? What do you think of your diet?	Which ones? Why? Which Hmong/American foods are healthiest? How do you think diet is related to health? What kind of health messages do you get from your community/culture?
10. When you are sick what kind of medicine do you use and why (Hmong vs. Western)?	Is Hmong medicine better than Western medicine or vice versa and why? Have you gone to a medicine woman or a shaman and what kind of treatment did you receive? Can you give us some examples of Hmong medicine and what it is used for?

Children's Assent Form

This group talk is being conducted by Chery Smith, PhD, MPH, RD and a graduate student, Lisa Franzen, MS, RD from the Department of Food Science and Nutrition at the University of Minnesota. You have been asked to take part in a group talk about the foods you eat. We want to learn more about how kids decide what to eat. If you agree to join this group for a talk, we will ask you some questions about the foods you eat, where you get food, if you get to buy the foods you like to eat, and what helps you decide what you are going to eat. Your height and weight will also be taken at the end of the group talk. The group talk will be tape-recorded.

You can ask questions at any time during the talk. Also, if you decide at any time not to finish, you may stop whenever you want. Remember, these questions are only about what you think. There are no right or wrong answers because this is not a test.

You will get \$20 for taking part in this group talk.

Other people will not know if you are in this group talk. We will never use your name with anyone outside of this group. We also ask that you keep what you hear other children say in this group private.

Your parents or guardian have to say it's OK for you to be a part of this group talk. After they decide, you get to choose if you want to do it too. Signing this paper means that you have read this or had it read to you and that you want to be a part of this group talk. If you don't want to be a part of this talk, don't sign the paper. It is up to you if you want to be a part of it and no one will be mad if you don't sign this paper or even if you change your mind later.

Signature: _____ Date: _____

Signature of Researcher: _____ Date: _____

CHILD INFORMATION SHEET for _____

Please circle the best choice or complete the blank

INFORMATION ABOUT YOURSELF:

1. Your age: _____
2. What grade are you in? _____
3. Gender:
 - a. Female
 - b. Male
4. In general, would you say that your health is:
 - a. Poor
 - b. Fair
 - c. Good
 - d. Very Good
 - e. Excellent
5. In general, would you say that your diet is:
 - a. Poor
 - b. Fair
 - c. Good
 - d. Very Good
 - e. Excellent
6. Which of the following is mostly true:
 - a. Breakfast is mostly: Hmong food or American food
 - b. Lunch is mostly: Hmong food or American food
 - c. Dinner is mostly: Hmong food or American food
7. What language(s) do you speak at home?
 - a. Only in Hmong
 - b. More Hmong than English
 - c. Both Hmong and English equally
 - d. More English than Hmong
 - e. Only English
8. In what language do you usually think?
 - a. Only in Hmong
 - b. More Hmong than English
 - c. Both Hmong and English equally
 - d. More English than Hmong
 - e. Only English
9. Your closest friends are _____.
 - a. All Hmong
 - b. More Hmong than Americans
 - c. About half and half
 - d. More Americans than Hmong
 - e. All Americans
10. What languages do you speak with friends?
 - a. Only in Hmong
 - b. More Hmong than English
 - c. Both Hmong and English equally
 - d. More English than Hmong
 - e. Only English
11. "I eat _____."
 - a. Only Hmong foods
 - b. Mostly Hmong foods
 - c. Equal amounts of Hmong and American foods
 - d. Mostly American foods
 - e. Only American foods

PARENTAL CONSENT FORM

This group talk is being conducted by Chery Smith, PhD, MPH, RD and a graduate student, Lisa Franzen, MS, RD from the Department of Food Science and Nutrition at the University of Minnesota.

Your child has been invited to take part in group talk about the foods they decide to eat. Your child has been invited to take part in this group talk because your child is between the ages of 9 and 18 years old. The purpose of this group talk with your child is to learn more about the things that influence food choices among children. By agreeing to let your child take part in this group talk, your child will be asked to share their thoughts and experiences about the types of foods available to them, the foods they choose to eat, and the things that influence the foods they eat. The group talk will only last about 60 minutes with 6 to 8 children in each group. Focus groups will be held in conference rooms at various community locations (community center, community libraries, churches, or at the Department of Food Science and Nutrition at the University of Minnesota). In addition to participation in the focus groups, we will measure your child's height and weight at the end of the session in a private area. In order to participate in the study it is required to have your child's height and weight measured. You will also be asked to fill out a demographic sheet, including information such as your age, gender, education level, number of children in your household, where you currently live, where you lived before coming to the United States, and how long you have lived in the United States. You do not have to answer all of the questions on the demographic form. Please read this form and ask any questions you have before agreeing to let your child take part in this group talk.

Risks and Benefits:

There are no benefits to your child taking part in this research study. The risks in taking part in this study are that we will be asking your child personal questions, such as where they get their food from, which may cause shame or embarrassment.

Compensation: Your child will receive \$20 for taking part in this group talk.

Confidentiality:

All information shared within the group talk will be kept private, in a locked file cabinet in Dr. Smith's office. So we won't miss any of the comments made by your child during the group talk, we will be tape recording the discussion. Only your child's first name will be attached to the transcript. Only Dr. Smith and Lisa Franzen will have access to the collected information. The information collected may be published. Your and your child's privacy will be protected and you and your child will not be identified in anyway. No individual information will be released. Mandatory reporting by the principal investigator will occur should neglect or abuse issues surface.

Voluntary Nature of the Survey:

Your decision to let your child take part (or not take part) in this group talk will not affect any current or future relations with the University of Minnesota or any community public program. If you decide to allow your child to take part in this group talk, you are free to withdraw your child at any time. Also, your child may choose not to answer a question at any time or choose to withdraw at anytime.

Contacts and Questions:

Those conducting this research project are Dr. Chery Smith and Lisa Franzen. You may ask any questions you have now, and if you have any questions later, you may contact Dr. Chery Smith at (612) 624-2217 (csmith@umn.edu) or Lisa Franzen at (612) 695-7750 (franz143@umn.edu). You will be given a copy of this form to keep for your own records.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), please contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

By signing below, you indicate you understand the process involved in this study. I have read the above information. I agree to let my child _____(name) take part in this group talk. I have asked questions and have received answers.

Signature of Parent or Guardian: _____ Date: _____

Signature of Parent of Guardian: _____ Date: _____

Signature of Investigator: _____ Date: _____

Children's Assent Form

You have been asked to take part in a survey about the foods you eat. We want to learn more about how kids decide what to eat. If you agree to take part in this survey, we will ask you to meet with us twice within two weeks. For your first visit, you will be asked to fill out a survey about the foods you eat, where you get food, and what helps you decide what you are going to eat, tell us what you ate and drank the day before (24-hour dietary recall), evaluate your body image, and have your height, weight, blood pressure, arm, waist and hip circumference, and bicep (skin over the bicep muscle), tricep (skin over the tricep muscle), subscapular (skin under the shoulder blade) and suprailiac (skin just above the hip bone) skinfolds measured. For your second visit, you will be asked to do another 24-hour dietary recall and fill out a kid's food frequency questionnaire (FFQ).

You can ask questions at any time during the survey. Also, if you decide at any time not to finish, you may stop whenever you want. Remember, these questions are only about what you think. There are no right or wrong answers because this is not a test.

You will get \$25 for the first visit, provided you finish the survey, evaluate your body image, do the 24-hour dietary recall, and have your measurements taken. You will get another \$25 for the second visit, provided you do another 24-hour dietary recall and finish a FFQ.

Other people will not know if you are in this survey. We will put things we learn about you together with things we learn about other children, so no one can tell what things came from you. If we tell other people about this survey, we will not use your name, so no one can ever tell who we are talking about.

Your parents or guardian have to say it's OK for you to be a part of this survey. After they decide, you get to choose if you want to do it too. Signing this paper means that you have read this or had it read to you and you want to be a part of this survey. If you do not want to be a part of this survey, do not sign the paper. It is up to you if you want to be a part of it and no one will be mad if you do not sign this paper or even if you change your mind later.

Signature: _____ Date: _____

Signature of Researcher: _____ Date: _____

PARENTAL CONSENT FORM

This survey is being conducted by Chery Smith, PhD, MPH, RD and graduate students, Lisa Franzen, MS, RD, and Urvashi Pokhriyal from the Department of Food Science and Nutrition at the University of Minnesota.

Your child has been invited to take part in a survey about the foods they decide to eat. Your child has been invited to take part in this survey because your child is between the ages of 9 and 18 years old. Please read this form and ask any questions you have before agreeing to let your child take part in this survey. This project will require your child to meet with us twice within a two week period. For the first visit, your child will take a survey related to food choice, who or what influences food choice, and food availability, describe what they ate and drank the day before (24-hour dietary recall), assess their body image, and have their height, weight, blood pressure, arm, waist and hip circumferences, and bicep (skin over the bicep muscle), tricep (skin over the tricep muscle), subscapular (skin under the shoulder blade) and suprailiac (skin just above the hip bone) skinfolds measured. The first visit will last approximately one hour and thirty minutes. The second visit will be shorter and your child will be asked to do another 24-hour dietary recall and to complete a kid's food frequency questionnaire (FFQ). Completed parental consent and parent information sheets are required for your child to participate in this study. Measurements on you and/or your spouse, such as height, weight, waist and hip circumferences, and blood pressure, are optional and not required for your child to participate in this study.

Risks and Benefits:

There is a slight risk that your child may feel tired while taking the survey because it is long. However, a benefit from taking part in this study is that a nutritional analysis of your child's 24-hour dietary recall information will be mailed to you if so desired. Also, all measurement data will be provided to you.

Compensation: Your child will receive \$25 for the first visit, provided the survey, 24-hour dietary recall, body image assessment, child measurements, parental consent, and parental information form have been completed and then your child will receive another \$25 for the second visit, providing the 24-hour dietary recall and kid's FFQ are completed. If you and/or your spouse are willing to have your measurements done (height, weight, waist and hip circumferences, and blood pressure) you will receive an additional \$10.

Confidentiality:

All information shared within this survey and the measurements taken will be kept private, in a locked file cabinet in Dr. Smith's office. Only Dr. Smith, Lisa Franzen, Urvashi Pokhriyal, and an undergraduate student assistant will have access to the collected information. We will use only first names on the surveys and these will be converted to ID numbers prior to data entry. The information collected may be published, however, you and your child's privacy will be protected and your names will never be released. Mandatory reporting by the principal investigator will occur should neglect or abuse issues surface.

Voluntary Nature of the Survey:

Your decision to participate in the study and let your child take part (or not take part) in this survey will not affect any current or future relations with the University of Minnesota or any community public program. If you decide to participate in the study and allow your child to take part in this survey, you are free to withdraw as well as withdraw your child at any time. Also, your child may choose not to answer a question at any time or choose to withdraw at anytime.

Contacts and Questions:

Those conducting this research project are Dr. Chery Smith, Lisa Franzen, and Urvashi Pokhriyal. You may ask any questions you have now, and if you have any questions later, you may contact Dr. Chery

Smith at (612) 624-2217 (csmith@umn.edu), Lisa Franzen at (612) 695-7750 (franz143@umn.edu), or Urvashi Pokhriyal at (612) 695-7750 (pokhr001@umn.edu). You will be given a copy of this form to keep for your own records.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), please contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

By signing below, you indicate you understand the process involved in this study.

I have read the above information. I agree to let my child _____ (name) take part in this group talk. I have asked questions and have received answers.

Signature of Parent or Guardian: _____ Date: _____

Signature of Parent of Guardian: _____ Date: _____

Signature of Investigator: _____ Date: _____

THIS SHEET IS FOR PARENTS TO FILL OUT INFORMATION ABOUT THEMSELVES
Please circle the best choice or complete the blank

INFORMATION ABOUT YOU AND YOUR HOUSEHOLD:

1. Your Age: _____
2. Your Gender: a. Female b. Male
3. Your Place of Birth: _____
4. How long have you been living in the United States? _____
5. How long have you been living in the Minneapolis/St. Paul area? _____
6. Where were your parents born? _____
7. How much do you think you weigh? _____ lbs
8. How tall do you think you are? _____ feet _____ inches
9. Household Income
 - a. Less than \$10,000
 - b. \$10,001-\$19,999
 - c. \$20,000-\$39,999
 - d. \$40,000-\$59,999
 - e. Greater than \$60,000
 - f. Unemployed
10. Is anyone in your household currently on any of these programs?
 - a. Food Stamp Program
 - b. Food Distribution
 - c. School Meals (free or reduced lunch program)
 - d. Minnesota Food Assistance Program
 - e. Women, Infants, and Children (WIC)
 - f. Other: _____
11. Education level:
 - a. Less than high school
 - b. Some high school
 - c. Completed high school/GED
 - d. Some undergraduate/college/technical/vocation school
 - e. Completed undergraduate/college/technical/vocational school
 - f. Completed graduate/professional school
12. In general, would you say that your health is:
 - a. Poor
 - b. Fair
 - c. Good
 - d. Very Good
 - e. Excellent
13. In general, would you say that your diet is:
 - a. Poor
 - b. Fair
 - c. Good
 - d. Very Good
 - e. Excellent
14. Total number of people in the household: _____
15. Total number of children in the household: _____

16. Please fill in the requested information about your child that is participating in the survey.

Child's name	Gender	Age	Currently lives with you (Yes/No)	Where child was born	Years lived in the US	Years lived in Minnesota

QUESTIONS:

17. Do you do most of the cooking in your household? a. Yes b. No → If no, who does? _____
18. Are you the primary grocery shopper for the family? a. Yes b. No → If no, who does? _____
19. What language(s) do you speak at home?
 a. Only in Hmong
 b. More Hmong than English
 c. Both Hmong and English equally
 d. More English than Hmong
 e. Only English
20. In what language do you usually think?
 a. Only in Hmong
 b. More Hmong than English
 c. Both Hmong and English equally
 d. More English than Hmong
 e. Only English
21. Your closest friends are _____.
 a. All Hmong
 b. More Hmong than Americans
 c. About half and half
 d. More Americans than Hmong
 e. All Americans
22. I eat _____ for breakfast.
 a. Only Hmong foods
 b. Mostly Hmong foods
 c. Equal amounts of Hmong and American
 d. Mostly American foods
 e. Only American foods
23. I eat _____ for dinner.
 a. Only Hmong foods
 b. Mostly Hmong foods
 c. Equal amount of Hmong and American
 d. Mostly American foods
 e. Only American foods
24. What languages do you speak with friends?
 a. Only in Hmong
 b. More Hmong than English
 c. Both Hmong and English equally
 d. More English than Hmong
 e. Only English
25. Most of my children's friends' parent's are:
 a. All Hmong
 b. More Hmong than Americans
 c. About half and half
 d. More Americans than Hmong
 e. All Americans
26. "I eat ____."
 a. Only Hmong foods
 b. Mostly Hmong foods
 c. Equal amounts of Hmong and American
 d. Mostly American foods
 e. Only American foods
27. I eat _____ for lunch.
 a. Only Hmong foods
 b. Mostly Hmong foods
 c. Equal amounts of Hmong and American
 d. Mostly American foods
 e. Only American foods
28. I eat _____ for snacks.
 a. Only Hmong foods
 b. Mostly Hmong foods
 c. Equal amounts of Hmong and American
 d. Mostly American foods
 e. Only American foods
29. I see myself as (only choose one):
 a. Hmong
 b. Hmong-American
 c. American

**U.S. HOUSEHOLD FOOD SECURITY SURVEY MODULE:
Economic Research Service, USDA , Revised 2006**

FOOD SECURITY SURVEY:

[IF ONE PERSON IN HOUSEHOLD, CIRCLE "I" IN PARENTHETICALS, OTHERWISE, CIRCLE "WE."]

1. Which of the following statements best describes the food eaten in your household in the last 12 months?

- Enough of the kinds of food (I/we) want to eat
- Enough but not always the kinds of food (I/we) want
- Sometimes not enough to eat
- Often not enough to eat
- Don't know

**[IF SINGLE ADULT IN HOUSEHOLD, CIRCLE "I," "MY," AND "YOU" IN PARENTHETICALS; OTHERWISE, CIRCLE "WE," "OUR," AND "YOUR HOUSEHOLD."]
For these statements, please check whether the statement was often true, sometimes true, or never true for (you/your household) in the last 12 months.**

2. "(I/We) worried whether (my/our) food would run out before (I/we) got money to buy more."

- Often true
- Sometimes true
- Never true
- Don't know

3. "The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more."

- Often true
- Sometimes true
- Never true
- Don't know

4. "(I/we) couldn't afford to eat balanced meals."

- Often true
- Sometimes true
- Never true
- Don't know

5. In the last 12 months, did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?

- Yes
- No (Skip 5a)
- Don't know (Skip 5a)

5a. [IF YES ABOVE] How often did this happen?

- Almost every month
- Some months but not every month
- Only 1 or 2 months
- Don't know

6. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food?

- Yes
- No
- Don't know

7. In the last 12 months, were you ever hungry but didn't eat because there wasn't enough money for food?

- Yes
- No
- Don't know

8. In the last 12 months, did you lose weight because there wasn't enough money for food?

- Yes
- No
- Don't know

9. In the last 12 months, did (you/you or other adults in your household) ever not eat for a whole day because there wasn't enough money for food?

- Yes
- No (Skip 9a)
- Don't know (Skip 9a)

9a. [IF YES ABOVE] How often did this happen?

- Almost every month
- Some months but not every month
- Only 1 or 2 months
- Don't know

For statements please check whether the statement was OFTEN true, SOMETIMES true, or NEVER true in the last 12 months for (your child/children living in the household who are under 18 years old).

10. "(I/we) relied on only a few kinds of low-cost food to feed (my/our) child/the children) because (I was/we were) running out of money to buy food."

- Often true
- Sometimes true
- Never true
- Don't know

11. "(I/We) couldn't feed (my/our) child/the children) a balanced meal, because (I/we) couldn't afford that."

- Often true
- Sometimes true
- Never true
- Don't know

12. "(My/Our child was/The children were) not eating enough because (I/we) just couldn't afford enough food."

- Often true
- Sometimes true
- Never true
- Don't know

13. In the last 12 months, did you ever cut the size of (your child's/any of the children's) meals because there wasn't enough money for food?

- Yes
- No
- Don't know

14. In the last 12 months, did (your child/any of the children) ever skip meals because there wasn't enough money for food?

- Yes
- No (Skip 14a)
- Don't know (Skip 14a)

14a. [IF YES ABOVE] How often did this happen?

- Almost every month
- Some months but not every month
- Only 1 or 2 months
- Don't know

15. In the last 12 months, (was your child/were the children) ever hungry but you just couldn't afford more food?

- Yes
- No
- Don't know

16. In the last 12 months, did (your child/any of the children) ever not eat for a whole day because there wasn't enough money for food?

- Yes
- No
- Don't know

Measurements (Optional):

1. Height: (1) _____ **cm;** (2) _____ **cm**

2. Weight: (1) _____ **kg;** (2) _____ **kg**

3. Circumferences:

a. Waist: (1) _____ ; (2) _____

b. Hips: (1) _____ ; (2) _____

4. Blood Pressure: (1) _____ **mmHg;** (2) _____ **mmHg**

University of Minnesota Hmong Child Food and Health Project

This survey was developed by Lisa Franzen, MS, RD and Chery Smith, PhD, MPH, RD in the Department of Food Science and Nutrition at the University of Minnesota (2008).

Thank you for taking this survey! This is a survey to find out how kids make food choices. **There is no right or wrong answer.** If you are not sure what one of the questions means, please ask us and we will be happy to help you.

Name: _____ Age: _____ Grade: _____ Gender: Girl / Boy Location: _____ ID# _____

If you were born in the US, what state were you born in? _____

If you were NOT born in the US: 1) where were you born? _____; 2) How long have you lived in the US? _____

How much do you think you weigh? _____ lbs; How tall do you think you are? _____ feet _____ inches

Please check only one box for each question. Unsure = the question does not apply to you.

Men in family= dad, grandpa, uncle, brother, and/or cousin

I. ENVIRONMENT/SITUATION

Internal

	Strongly Agree	Mostly Agree	Unsure	Mostly Disagree	Strongly Disagree
I eat vegetables everyday.					
I eat fruits everyday.					
Milk is always in my home.					
Milk is important to drink.					
Pop is always available in my home.					
I cannot eat the same foods here as I did before we moved to the United States.					
When living in Laos or Thailand, sometimes I went to bed feeling hungry.					
When living in Laos or Thailand, I ate a lot of chips, candy, and pop.					
While living in Minnesota, I go to bed feeling hungry.					
While living in Minnesota, I eat a lot of chips, candy, and pop.					
We have dessert every night after dinner.					
I eat rice everyday.					

Internal

	Strongly Agree	Mostly Agree	Unsure	Mostly Disagree	Strongly Disagree
Rice is always available in my home.					
If I do not eat rice everyday, I feel hungry.					
When I eat American foods I do not feel full.					
I like the foods that are offered at home.					
I have 2 or more large freezers in my house for meat.					
I like American foods.					
I like Hmong foods.					
I like squirrel, venison, or other hunted foods.					
I eat squirrel, venison, or other hunted foods.					
I started eating American foods because my family was on WIC.					
American medicine is used in my home.					
Hmong medicine is used in my home.					
My parents give me Hmong medicine when I am sick.					
My family grows Hmong medicine in a garden.					
Even if I am full, my parents want me to eat more.					
Even if I am full, my grandparents want me to eat more.					
My parents encourage me to eat so I will be big and strong.					
I gain weight because there is always food to eat.					
I cannot lose weight because there is too much food to eat.					
My parents tell me I should lose weight.					
My grandparents tell me I should gain weight.					
I like to cook food for my family.					
I like to cook food for myself.					

	Strongly Agree	Mostly Agree	Unsure	Mostly Disagree	Strongly Disagree
Internal					
In the home boys/men go fishing and girls/women cook and clean the fish.					
In the home girls/women cook food for the family.					
In the home boys/men do the cleaning and go hunting.					
External					
When I was living in Laos or Thailand, we did not always have enough money to buy food.					
While living in Minnesota, we do not always have enough money to buy food.					
I eat school lunch because I receive free or reduced lunch.					
I do not eat school lunch because it is too expensive.					
When I see chips, candy, or pop on TV, I ask my mom or dad if we can buy it.					
I eat snack foods like chips, candy, and pop when I watch TV.					
TV commercials help me decide which foods I want to eat.					
At parties and celebrations I drink pop and eat sweets/desserts.					
I think I should be thinner because the people on TV are thin.					
I eat school lunch so that I can be more like my non-Hmong friends.					
Hmong foods are easy to find at school lunch.					
I started eating American foods because of the School Lunch Program.					
The foods I eat at school are different than the foods I eat at home.					
I eat the school lunch everyday.					
I bring Hmong foods for lunch to school.					
If I do not like the school lunch, I throw it away.					
I like the foods that are offered at school.					
I eat salads and other vegetables at school.					
I eat fruits at school.					

	Strongly Agree	Mostly Agree	Unsure	Mostly Disagree	Strongly Disagree
External					
There is a place available for me to exercise at school and/or after school.					
Food that is hunted (squirrel, venison/deer) is important to Hmong culture.					
My friends like to eat and hang out at fast food restaurants.					
I like to go hunting.					
I like to go fishing.					
Hmong medicine is for sale near my house.					
My parents take me to an American doctor when I am sick.					
My parents take me to a Shaman or a medicine woman when I am sick.					
Hmong foods are easy to find at grocery stores and restaurants.					

	Strongly Agree	Mostly Agree	Unsure	Mostly Disagree	Strongly Disagree
Observational Learning					
I try to lose weight because people I watch on TV are thin.					
I try to lose weight because my friends try to lose weight.					
I try to lose weight because my parents are worried about my health.					
I eat foods that are different from what my parents eat.					
I eat foods that are different from what my grandparents eat.					
I eat more American foods than my parents do.					
I eat more American foods than my grandparents do.					
I eat less hunted or wild game foods (squirrel, deer) than my parents do.					
I eat chips, candy, and pop because people who I care about do.					
I eat desserts because I see my parents eat them.					
I eat the same foods that I see my friends eat.					
When I see my friends eat a lot, I do too.					
When I see my parents eat a lot, I do too.					
I eat rice because I learned it from my family.					

<u>Observational Learning</u>	Strongly Agree	Mostly Agree	Unsure	Mostly Disagree	Strongly Disagree
I have learned to eat rice with KFC because people I care about do.					
I have learned what American foods are because I watch TV.					
I have learned to make American foods because I watch TV.					
I have learned that boys/men hunt and clean game by watching my parents.					
I have learned that girls/women cook by watching my parents.					
I learn to cook by watching my mother or grandmother while they cook.					
I learn to hunt and clean game by watching the men in my family.					
I learn to fish by watching the men in my family.					
I eat foods that are good for my body because people who I care about do.					
I do not eat fruits because my family does not eat them.					
I do not eat vegetables because my family does not eat them.					
I use American medicine because my parents use them.					
I use American medicine because my grandparents use them.					
I use Hmong medicine because my parents use them.					
I use Hmong medicine because my grandparents use them.					
<u>II. BEHAVIOR: Behavioral Capability</u>					
I have made it a habit to overeat at mealtimes.					
I am able to skip lunch at school if I do not have lunch money.					
I am able to eat lunch everyday because I get free or reduced lunch.					
My family talks to me about foods that I should know how to cook.					
The men in my family teach me to hunt squirrel/deer and how to clean them.					
My mother/grandmother teaches me to how cook food for the family.					
The men in my family teach me to fish.					

	Strongly Agree	Mostly Agree	Unsure	Mostly Disagree	Strongly Disagree
<u>Self-efficacy</u>					
It is hard to eat fruit everyday.					
It is hard to eat vegetables every day.					
I can eat fruits instead of candy.					
I can drink juice or water instead of pop.					
I can choose healthy foods over junk foods.					
I am able to make my own food choices.					
I am able to use Hmong medicine.					
I am able to use American medicine.					
I can cook most traditional Hmong foods.					
I can cook rice.					
I can clean game (squirrel, deer).					
I can hunt.					
I can fish.					
I can maintain a thin body weight.					
I can maintain a normal (not too thin/not too heavy but medium size) body weight.					
<u>Self-control & Performance</u>					
If I am hungry I eat rice or rice with water as a snack.					
I eat rice because it is always in my home.					
I eat while I watch TV.					
When there is nothing to do, I like to eat.					
I look for ways to learn how to cook American food.					

Self-control & Performance

If I overeat then I exercise more.

I try not to eat too much fast food because it is greasy and fattening.

I can skip meals to lose weight.

I can lose weight so I look like the people I watch on TV.

I would rather cook food for myself than wait for someone else to do it.

I look for ways to learn how to cook Hmong food.

Strongly Agree	Mostly Agree	Unsure	Mostly Disagree	Strongly Disagree

Emotional Coping Response

I overeat at mealtimes so I will not be hungry later on.

I finish my plate of food at mealtimes even when I am full.

I eat rice when I am stressed.

I eat rice when I feel that I have eaten too much American foods.

I eat rice to make me feel better.

I eat desserts when it is available.

I eat desserts because I like sweets.

I eat chips, candy, and pop to make me feel better.

I eat vegetables because they are good for my body.

I eat fruits because they are good for my body.

I eat Hmong foods because they make me feel good.

I eat American foods because they make me feel good.

I eat American foods at school because I want to fit in.

I use American medicine because it helps my body when I am sick.

I use Hmong medicine because it helps my body when I am sick.

I eat less food when I feel like I look too heavy.

Emotional Coping Response

I eat more food when I feel like I look too thin.

I cook food for the family because it makes me feel good that I have pleased my mom/grandma.

I hunt and clean game because it makes me feel good that I have pleased the men in my family.

I fish because it makes me feel good that I have pleased the men in my family.

Strongly Agree	Mostly Agree	Unsure	Mostly Disagree	Strongly Disagree

Preferences

I like squirrel because it smells good.

I like American food because it tastes good.

I would like to lose weight.

I would like to gain weight.

My weight is just right.

I would like to be taller.

I would like to be shorter.

My height is just right.

COOKING QUESTIONS:

1. I started cooking food at age _____.
2. I started cooking rice at age _____.
3. I started to cook more complex dishes (i.e. pho, egg rolls, or soups) at age _____.
4. The first three foods I learned to cook were: (1) _____, (2) _____, and (3) _____.

ID # _____

QUESTIONS:

1. What language(s) do you speak at home?
 - f. Only in Hmong
 - g. More Hmong than English
 - h. Both Hmong and English equally
 - i. More English than Hmong
 - j. Only English

2. In what language do you usually think?
 - a. Only in Hmong
 - b. More Hmong than English
 - c. Both Hmong and English equally
 - d. More English than Hmong
 - e. Only English

3. Your closest friends are _____.
 - a. All Hmong
 - b. More Hmong than Americans
 - c. About half and half
 - d. More Americans than Hmong
 - e. All Americans

4. I eat _____ for breakfast.
 - a. Only Hmong foods
 - b. Mostly Hmong foods
 - c. Equal amounts of Hmong and American foods
 - d. Mostly American foods
 - e. Only American foods

6. What languages do you speak with friends?
 - a. Only in Hmong
 - b. More Hmong than English
 - c. Both Hmong and English equally
 - d. More English than Hmong
 - e. Only English

7. I see myself as (only choose one):
 - a. Hmong
 - b. Hmong-American
 - c. American

8. "I eat ____."
 - a. Only Hmong foods
 - b. Mostly Hmong foods
 - c. Equal amounts of Hmong and American foods
 - d. Mostly American foods
 - e. Only American foods

9. I eat _____ for lunch.
 - a. Only Hmong foods
 - b. Mostly Hmong foods
 - c. Equal amounts of Hmong and American foods
 - d. Mostly American foods
 - e. Only American foods

5. I eat _____ for dinner.
- a. Only Hmong foods
 - b. Mostly Hmong foods
 - c. Equal amount of Hmong and American foods
 - d. Mostly American foods
 - e. Only American foods

10. I eat _____ for snacks.
- a. Only Hmong foods
 - b. Mostly Hmong foods
 - c. Equal amounts of Hmong and American foods
 - d. Mostly American foods
 - e. Only American foods

FOOD SECURITY QUESTIONS:

ID # _____

The following questions are about the food situation in your home **during the last month**. Please put an X by the answer that best describes you.

1. Did you **worry** that food at home would run out before your family got money to buy more?
_____ A LOT _____ SOMETIMES _____ NEVER
2. Did the food that your family bought **run out**, and you didn't have money to get more?
_____ A LOT _____ SOMETIMES _____ NEVER
3. Did your meals only include a few kinds of **cheap foods** because your family was running out of money to buy food?
_____ A LOT _____ SOMETIMES _____ NEVER
4. How often were you not able to eat a **balanced meal** because your family didn't have enough money?
_____ A LOT _____ SOMETIMES _____ NEVER
5. Did you have to **eat less** because your family didn't have enough money to buy food?
_____ A LOT _____ SOMETIMES _____ NEVER
6. Has the size of your meals **been cut** because your family didn't have enough money for food?
_____ A LOT _____ SOMETIMES _____ NEVER
7. Did you have to **skip a meal** because your family didn't have enough money for food?
_____ A LOT _____ SOMETIMES _____ NEVER
8. Were you **hungry** but didn't eat because your family didn't have enough food?
_____ A LOT _____ SOMETIMES _____ NEVER
9. Did you not eat for a **whole day** because your family didn't have enough money for food?
_____ A LOT _____ SOMETIMES _____ NEVER

FOOD FREQUENCY QUESTIONNAIRE

ID # _____

PLEASE PLACE AN X IN THE BOX THAT RELATES TO HOW OFTEN YOU EAT THE FOLLOWING FOODS.

Food	Daily	2-3 times/week	1 time/week	2-3 times/month	Holidays Only	Never
Apples						
Bananas						
Carrots						
Mango						
Oranges						
Papaya						
Tomatoes						
Bamboo						
Broccoli						
Cilantro						
Lemon grass						
Lettuce						
Peppers						
Squash						
Taro						
Bacon						
Beef						
Boiled Chicken						
Eggs						
Fish						
Pheasant						
Pork						
Organ meat (tripe, tongue)						
Squirrel						

Food	Daily	2-3 times/week	1 time/week	2-3 times/month	Holidays Only	Never
Venison/Deer						
Cheese						
Milk, flavored						
Milk, white						
Ice cream						
Soymilk						
Yogurt						
Jasmine rice						
Ramen Noodles						
Rice noodles						
Rice with water						
Sticky rice						
Sweetened Cereal						
Unsweetened Cereal						
White bread						
Wheat bread						
Cold meat sandwich						
Cupia						
Egg Rolls						
Hamburger						
Hotdog						
Homemade soup						
Kapong						
La						
Macaroni & cheese						
Papaya salad						

Food	Daily	2-3 times/week	1 time/week	2-3 times/month	Holidays Only	Never
Pasta						
Peanut butter & jelly sandwich						
Pho						
Pizza						
Rice with meat and vegetables						
Spaghetti						
Stir Fry						
Burger King						
McDonald's						
Kentucky Fried Chicken						
French fries						
Potato Chips						
Cake						
Candy						
Cookies						
Chocolate						
Pudding						
Tri-color						
Regular Pop						
Diet Pop						
Kool-Aid						
Tea						
Black pepper						
Butter						
Oil						
Salt						

Anthropometric Measurements:

1. Weight: (1)_____ kg; (2) _____ kg
2. Height: (1) _____ cm; (2) _____ cm
3. Sitting Height: (1)_____ cm; (2) _____ cm
4. Arm Circumferences: (1)_____ ; (2) _____
5. Skin Folds:
 - a. Triceps: (1)_____ cm; (2)_____ cm
 - b. Biceps: (1)_____ cm; (2)_____ cm
 - c. Subscapular: (1)_____ cm; (2)_____ cm
 - d. Suprailiac: (1)_____ cm; (2)_____ cm
6. Waist Circumference: (1)_____ ; (2)_____
7. Hip Circumference: (1)_____ ; (2)_____
8. Blood Pressure: (1)_____ mmHg; (2) _____ mmHg

ID # _____

24-Hour Dietary Recall

<u>Time Consumed</u>	<u>Food Item</u>	<u>Serving Size</u>	<u>Where</u>
Breakfast			
Snack			
Lunch			
Snack			
Dinner			
Snack			

Rice Intake: Breakfast _____; Lunch _____; Dinner _____; Total _____

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Issue number	1
Pages	11

Type of Use	Thesis / Dissertation
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