HEALTHY AGING IN THE NORTH: SOCIOCULTURAL INFLUENCES ON DIET AND PHYSICAL ACTIVITY AMONG OLDER ADULTS IN ANCHORAGE, ALASKA

Britteny M. Howell

University of Kentucky, britteny.howell@uky.edu

Author ORCID Identifier: https://orcid.org/0000-0002-9724-5367

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Britteny M. Howell, Student

Dr. Deborah L. Crooks, Major Professor

Dr. Sarah Lyon, Director of Graduate Studies
HEALTHY AGING IN THE NORTH: SOCIOCULTURAL INFLUENCES ON DIET AND PHYSICAL ACTIVITY AMONG OLDER ADULTS IN ANCHORAGE, ALASKA

DISSERTATION

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the College of Arts and Sciences at the University of Kentucky

By

Britteny M. Howell
Lexington, Kentucky

Advisor: Dr Deborah Crooks, Associate Professor Emerita of Anthropology

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https://orcid.org/0000-0002-9724-5367
ABSTRACT OF DISSERTATION

HEALTHY AGING IN THE NORTH: SOCIOCULTURAL INFLUENCES ON DIET AND PHYSICAL ACTIVITY AMONG OLDER ADULTS IN ANCHORAGE, ALASKA

Increasing rates of overweight, obesity, and related cardiovascular diseases among older adults in the United States present unique public health challenges. Cross-cultural research has shown marked variation in health across the world’s elder populations because aging is a biological process rooted in sociocultural context. The sociocultural environment contributes to complex negotiations of food and physical activity patterns for older adults. It is well established in the literature that urban residents report low levels of physical activity and have easy access to fast food outlets, which tend to be concentrated in lower-income neighborhoods. I utilize a biocultural framework, integrating nutritional anthropology with healthy aging perspectives to recognize the role of the social determinants of health throughout the lifespan. This anthropological study integrates qualitative and quantitative methods to answer the following research question: What is the relationship between the sociocultural factors that shape diet, physical activity, and nutritional status among Alaskan elders in Anchorage? The results indicate that diet and physical activity practices in this sample do not meet national recommendations and that diet differs adversely from national reference samples. Statistical analyses indicate that the media and friends positively influenced older adults to increase their energy expenditure. Family influences increased fruit consumption, while participation in cultural and social events increased intake of fats and sweets. Cultural identity was an important factor for Alaska Native participants’ dietary selections. Social supports increased access to healthy foods and safe physical activities. This research suggests that trying to reach older adults with diverse needs through a variety of channels, including the media, social networks, and social events, can help alleviate some of the barriers to healthy diet and exercise patterns. These data indicate a need for culturally-responsive programs that maintain relationships with family members and make connections between elders with similar healthy aging goals in order to improve diet and physical activity practices.

KEYWORDS: Dietary patterns, physical activity, sociocultural influences, healthy aging, Alaska, nutritional status
HEALTHY AGING IN THE NORTH: SOCIOCULTURAL INFLUENCES ON DIET AND PHYSICAL ACTIVITY AMONG OLDER ADULTS IN ANCHORAGE, ALASKA

By

Britteny M. Howell

Deborah L. Crooks, PhD
Director of Dissertation

Sarah Lyon, PhD
Director of Graduate Studies

July 1, 2017
Date
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# TABLE OF CONTENTS

Acknowledgements ........................................................................................................ iii
List of Tables .................................................................................................................. viii
List of Figures ............................................................................................................... x

Chapter 1: *Introduction* .............................................................................................. 1
  Project Overview ........................................................................................................... 4
  Theoretical Framework ............................................................................................... 7
    Nutritional Anthropology in Biocultural Perspective ................................................. 7
    Social Determinants of Healthy Aging ....................................................................... 11
Defining Culture, Older Adulthood, and Nutritional Status ......................................... 15
Research Site ................................................................................................................. 18
Description of Chapters ............................................................................................... 26

Chapter 2: *Relationships of Health, Aging, and Nutritional Status:*  
  *Situating the Study within the Literature* .................................................................. 29
  Patterns and Practices of Older Adults ....................................................................... 30
    Aging and Nutritional Status ................................................................................. 31
    Dietary Intake ......................................................................................................... 34
    Physical Activity .................................................................................................... 39
  Environmental Influences on Diet and Physical Activity ........................................... 43
    The Circumpolar North ......................................................................................... 43
    Urban Challenges & Opportunities ....................................................................... 47
  The Sociocultural Environment ............................................................................... 50
    Culture .................................................................................................................. 51
    The Media ............................................................................................................ 56
  Social Influences ...................................................................................................... 59
Conclusions ................................................................................................................... 64

Chapter 3: *Methods and Data Analysis* ................................................................... 67
  Study Design ............................................................................................................... 70
    Institutional Reviews .............................................................................................. 74
  Recruitment ............................................................................................................... 75
  Description of Research Sites .................................................................................. 77
    Community Centers .............................................................................................. 78
    Senior Living Complexes ...................................................................................... 79
Qualitative Data Collection & Analysis ........................................................................ 81
  Participant Observation ........................................................................................... 82
  Semi-Structured Interviews ..................................................................................... 83
  Qualitative Data Analysis ......................................................................................... 84
Quantitative Data Collection & Analysis ...................................................................... 86
  Anthropometrics ...................................................................................................... 87
  The Questionnaire .................................................................................................. 90
  Sociodemographic Section ...................................................................................... 90
<table>
<thead>
<tr>
<th>Table of Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Frequency Questionnaire</td>
<td>91</td>
</tr>
<tr>
<td>Physical Activity Survey</td>
<td>94</td>
</tr>
<tr>
<td>Sociocultural Influences Survey</td>
<td>96</td>
</tr>
<tr>
<td>Quantitative Data Analysis</td>
<td>100</td>
</tr>
</tbody>
</table>

Chapter 4: Diet, Physical Activity, and Nutritional Status in Anchorage | 103 |
| Sample Characteristics | 104 |
| Dietary Patterns | 109 |
| Physical Activity Patterns | 114 |
| Sociocultural Influences | 121 |
| Conclusions | 126 |

Chapter 5: Media, Friends, Family, and Identity: The Sociocultural Context of Aging in Anchorage | 129 |
| Dietary Practices | 131 |
| Physical Activity Practices | 135 |
| Influences on Diet and Physical Activity | 138 |
| The Media | 139 |
| Friends & Peers | 143 |
| Family Influences | 148 |
| Social Opportunities | 151 |
| Ethnicity and Subsistence Practices | 153 |
| The Physical Environment | 156 |
| Transportation Issues | 160 |
| Financial Concerns | 162 |
| Excess Body Weight | 166 |
| General Health Challenges | 169 |
| Conclusions | 171 |

Chapter 6: Conclusions & Implications | 174 |
| Study Limitations | 186 |
| Personal Lessons Learned | 188 |
| Program & Policy Implications | 192 |
| Contributions to the Literature | 197 |
| Appendices | 200 |
| Bibliography | 230 |
| Vita | 274 |
LIST OF TABLES

Table 3.1. Aims, hypotheses, methods, and sample sizes for study……………………..71

Table 3.2. Data collection methods and timelines..........................................................73

Table 3.3. BMI classifications of nutritional status.........................................................89

Table 3.4. Research hypotheses and analytical techniques.............................................101

Table 4.1. Description of Anchorage Sample (N = 82).................................................105

Table 4.2. Anthropometrics and nutritional status of the sample overall, and separated by sex, age, ethnicity, income, length of residence in Anchorage (ANC), and number of people in the household (HH), and results of t-tests (sex, age, and number of people in the HH only).................................................................106

Table 4.3. ANOVA for nutritional status differences by age, ethnicity, income, number of years in Anchorage (ANC), and number of people living in the household (HH).........................................................................................................................107

Table 4.4. Means and standard deviations (in parentheses) for height, weight, BMI, and waist circumference compared to CDC reference population of older adults, by age and sex (N=82)........................................................................................................108

Table 4.5. Means, standard deviations, and results of t-tests for macronutrients among sample participants compared to recommendations for older adults, separated by sex (N = 73).........................................................................................110

Table 4.6. Mean daily servings, standard deviation (in parentheses), and results of t-tests for various food groups for the sample overall, and separated by age, sex, ethnicity, income, length of time in Anchorage (ANC), and number of people residing in the household (HH)........................................................................................................111

Table 4.7. Mean daily consumption of food categories for sample participants compared with USDA recommendations, and sample HEI scores compared with CDC reference population (standard deviations in parentheses).............113

Table 4.8. Hours spent watching television among sample participants (N = 82)............115

Table 4.9. Most commonly reported CHAMPS activities for sample (N=82)..............115

Table 4.10. Mean weekly frequency (standard deviations in parentheses) for exercise-related activities among Anchorage residents overall, and by age, sex, income, length of time in Anchorage, ethnicity, and number of people in the household (HH), and results of t-tests (sex, age, number of people in the HH only)................................................................................................................116
Table 4.11. Mean weekly energy expenditure in calories (standard deviations in parentheses) for exercise-related activities among Anchorage residents overall, and by age, sex, income, length of time in Anchorage, ethnicity, and number of people in the household (HH), and results of t-tests (sex, age, number of people in HH only)…………………………………………………………………………118

Table 4.12. ANOVA for physical activity by age, ethnicity, income, number of years in Anchorage (ANC), and number of people residing in the household (HH) (N=82)……………………………………………………………………………119

Table 4.13. Frequency of sociocultural influences survey (SIS) responses (N = 82)….121

Table 4.14. Frequency of rankings (percentage and Ns, in parentheses) and results of chi-square test for sociocultural influences of the sample overall, and by sex, age, ethnicity, income, length of time in Anchorage (ANC), and number of people in the household (HH)…………………………………………………………………………………………122

Table 4.15. Mann-Whitney U test results and median scores for nutritional status, physical activity, HEI, and average daily servings of food groups for the six sociocultural variables……………………………………………………………………………………125

Table 5.1. Description of Semi-Structured Interview Participants (N=15)……………….130
LIST OF FIGURES

**Figure 1.1.** The model of successful aging focuses on survival age, good health, behaviors, and the absence of disease, disability, and cognitive impairments............13

**Figure 1.2.** The model of healthy aging focuses more on social activities, diet, exercise, and productive pursuits than the successful aging model.........................14

**Figure 1.3.** Map of Alaska’s Boroughs and Cities..................................................19

**Figure 1.4.** Map of the Alaskan road system......................................................23

**Figure 1.5.** Map of Anchorage.................................................................25

**Figure 3.1.** Model of the pathways by which sociocultural factors influence nutritional status.................................................................68

**Figure 3.2.** Sample question from the Block Food Frequency Questionnaire (FFQ).....93

**Figure 3.3.** Sample question from the CHAMPS physical activity survey of the questionnaire.................................................................95

**Figure 3.4.** Sample question from the SIS survey of the questionnaire................. 97

**Figure 6.1.** The national prevention strategy to promote healthy aging..............195
Chapter 1: Introduction

This dissertation is about the unique challenges of the sociocultural environment in Anchorage, Alaska for the healthy aging of its population. Since elders are not just a population of biological interest, but are also social and cultural beings navigating their environment, there are several unique challenges to aging healthfully in the urban subarctic. This dissertation presents the dietary and physical activity patterns of a sample of seniors in Anchorage and discusses how these patterns are related to nutritional status. Additionally, participants discuss how and why they make certain choices about diet and physical activity that shape their overall health.

In most countries, including the U.S., the proportion of people over 60 years of age is growing faster than any other age group (WHO 2012). Alaska is one of only 4 states in the country that has experienced dramatic increases in the older adult population; a growth rate of nearly 60% between 2005-2015 (U.S. Department of Health Human Services 2016). This is because Alaska has historically experienced high rates of young adults migrants seeking work who are now choosing to age in place. Older adults present unique public health challenges as they are particularly at risk for overweight and obesity, at least until they reach extreme old age where obesity risk may decrease (Inelmen, et al. 2003). High rates of obesity are due to biological aging processes combined with poor diet and physical activity patterns. Just as the biology of aging influences nutritional status, so too can nutritional status shape the process of healthy aging. This is because nutritional status correlates strongly with functional abilities and quality of life in older adulthood (Fortunato and Drusini 2005).
Although researchers are beginning to understand the biological processes of aging, not as much is known about the sociocultural factors that contribute to cultural variation in aging (Ice 2005; Rowles 1997). Cross-cultural research has shown that the experience of aging is markedly different across the world’s populations because aging is a biological process rooted in sociocultural context (Sokolovsky 2008; Wiley and Allen 2013). Specifically, cultural patterns and social relationships help shape dietary and physical activity patterns, which play a key role in metabolic rates and the process of aging (Poehlman 1996). This dissertation uncovers some of the complex relationships between the sociocultural factors that influence diet and physical activity patterns among a multicultural sample of urban elders and nutritional status in a subarctic, urban environment.

Compared to rural areas, cities often have greater infrastructure and a built environment, contributing to increased availability to amenities such as grocery stores and recreation centers. However, the urban environment poses many of its own challenges for older adults. Most Alaskans spend greater than 40% of their income on housing, in a market that never crashed from the housing bubble in 2008 (Gokey 2014). The built environment, such as the connectivity of safe streets and sidewalks, can negatively affect the health of urban residents (Nykiforuk, et al. 2013; Popkin, et al. 2005). It is well established in the literature that urban residents report low levels of physical activity, a risk factor for cardiovascular disease and mortality for older adults (McGarvey, et al. 1989; Popkin 1999). Large segments of Anchorage do not have sidewalks at all, and those neighborhoods that do may find their streets and sidewalks
unsafe due to criminal activity or because they are covered in ice and snow much of the year, further reducing physical activity.

While urban environments may increase availability of grocery stores, they also increase access to fast food outlets and convenience stores, which tend to be concentrated in lower-income neighborhoods (Hemphill, et al. 2008; Jilcott, et al. 2009). Fast food restaurants are linked to rising rates of overweight, obesity, and other health conditions, especially for minority populations (Gittelsohn, et al. 1998; Unger, et al. 2004). The safety and quality of food available in cities is also greatly dependent on the local environment in which that food was grown (Schell, et al. 2012). Since Alaska has an extremely short growing season and an underdeveloped agricultural system, most of the grocery store items come from a variety of environments all over the world, at great cost (Fried 2015).

Despite such physical environmental and economic challenges in Anchorage, urban health researchers agree that the social environment is one of the most important factors of health in cities (Galea and Vlahov 2005), especially for the healthy aging of older adults (Phelan, et al. 2004; Seeman, et al. 2001; Silverman, et al. 2002). The sociocultural influences on older adults, such as those derived from cultural identity, family, peers, education, the media, and an individual’s own personal beliefs about food, contribute to complex negotiations of food and physical activity patterns. For example, food is often a marker of ethnicity, where food at social events is shared as an expression of individual, family, and group identity (Lowe 2010). Also, possessing social networks for food-sharing is an important nutritional strategy, as these social contacts tend to become a major source of food provisioning in older adulthood (Lee 2002; Quandt, et al. 2002).
Therefore, this dissertation focuses on the important role that other people can play in healthy aging in this urban, subarctic environment, through their influence on the dietary and physical activity practices of older adults.

**Project Overview**

In this dissertation project, I reveal relevant knowledge about the social and cultural lives of older adults; how sociocultural influences on their food and physical activity patterns may contribute to nutritional status throughout the aging experience. Given the challenges older adults experience in urban, subarctic environments for healthy aging, this project delves into the intersections between food access, gender, ethnicity, and the sociocultural environment in Anchorage, Alaska. This anthropological study integrates qualitative and quantitative methods to ask the following research question: What is the relationship between the sociocultural factors that shape diet, physical activity, and nutritional status among Alaskan elders in Anchorage and nutritional status? This question will be answered by addressing the following specific aims:

**Aim 1:** Document the sociocultural influences on diet and physical activity patterns among a small sample of urban elders in Anchorage.

The literature and my previous research in Anchorage indicate that sociocultural factors influence diet and physical activity patterns of older adults in Alaska, including the media, social contacts, cultural identity, participation in local social events, and subsistence activities such as hunting, fishing, gathering, and trapping. To understand the relevance of these and potentially identify other important sociocultural influences on
diet and physical activity among this population of elderly urban Alaskans, I conducted 15 semi-structured interviews. I also engaged in participant observation while living in Anchorage, observing diet and physical activities among older adults in senior recreation centers, community locations, restaurants, and parks, participating in meals, activities, and other civic events. These sources of information allowed me to test my first hypothesis:

\[ H1: \text{Significant influences on diet and physical activity will come from the media, friends, family, cultural identity, participation in cultural events, and subsistence knowledge & skills.} \]

The interviews and participant observation activities also revealed some diet and physical activity patterns as well as how elderly urban Alaskans make diet and physical activity choices, which led to the second research aim:

\[ \text{Aim 2: Document the diet, physical activity, and nutritional status among a larger sample of Anchorage elders.} \]

I measured diet and physical activity patterns in Anchorage by collecting food frequency and physical activity questionnaire data from a sample of 82 older adults. I assessed nutritional status by taking their height and weight measurements to determine body mass index (BMI). I also collected waist circumference measurements to calculate waist-to-height ratio, an estimate of central body fat, an additional indicator of obesity (Gibson 2005). The research on Alaskan diet and physical activity practices as well as elder nutritional status and body composition led me to create my second two hypotheses:
**H2:** Diet and physical activity practices will not meet national recommendations for older adults.

**H3:** Diet and nutritional status will differ adversely from national reference samples.

Lastly, coded data gathered from participant observation and interviews helped to validate a questionnaire on sociocultural factors that was administered to 82 elders in Anchorage to address the third aim of this project:

**Aim 3:** Identify relationships between the sociocultural environment, diet, physical activity, and nutritional status.

This likert-scale questionnaire allowed me to operationalize sociocultural variables for measurement and statistically test their relationship to nutritional status. Since health research suggests that sociodemographics influence such outcomes, I hypothesized that:

**H4:** Sociodemographic characteristics (age, sex, income, ethnicity, residence time) will have an effect on diet and physical activity practices.

I used these nutritional outcomes as the dependent variable in statistical analyses of the relationship between the sociocultural influences on diet and physical activity patterns and nutritional status to hypothesize that:

**H5:** Participants who report strong social relationships (friends, family) will have healthiest nutritional status.
It is with a biocultural framework, utilizing nutritional anthropology, healthy aging perspectives, and the social determinants of health, that I am able to uncover the multiple pathways through which the sociocultural environment influences diet, physical activity patterns, and nutritional status among a sample of Anchorage’s senior population.

**Theoretical Framework**

This dissertation takes an anthropological approach to healthy aging within the sociocultural environment. I utilize a biocultural framework for this dissertation, integrating nutritional anthropology with healthy aging perspectives to recognize the role of the social determinants of health. Nutritional anthropology, or “anthropological nutrition,” is a scope of work that allows researchers to focus on the sociocultural environment as major determinants of dietary choice and change (Kuhnlein and Receveur 1996). Biocultural frameworks merge two established fields of anthropology, cultural and biological, into a new synthesis (Goodman and Leatherman 1998). Biocultural perspectives examine the relationships between human culture and biology, most notably the role culture plays on shaping human biology and contemporary human variation. The gerontological concept of healthy aging, which refers to the retention of social, physical, and mental capacities necessary for the maintenance of well-being through the life course, is also used in this research (Iwarsson, et al. 2007).

*Nutritional Anthropology in Biocultural Perspective*

This dissertation takes a biocultural nutritional approach to the social determinants of healthy aging in order to elucidate the complicated role of dietary and
physical activity practices on nutritional status, health, and aging in this sub-arctic, multi-ethnic population. I focus on nutrition in this work because research indicates that diet plays a larger role than physical activity patterns in the production of nutritional status, such as overweight and obesity (Cook and Schoeller 2011; Dugas, et al. 2011; Wilks, et al. 2011). Food practices are so important to understanding human cultural variation that Barthes (1997) states, “one could say that an entire social environment is present in and signified by food.” Indeed, food is imbued with tremendous meaning, so nutritional anthropologists often focus on the symbolism of foodways as the major determinants of dietary practices (Kuhnlein and Receveur 1996).

Nutritional anthropologists acknowledge that food and eating are not restricted to the biological aspects; food is the center of a complex value system that shapes cultural identity, interpersonal relationships, communication patterns, social organization, and group unity (Counihan 1999; Pelto, et al. 2000; Powdermaker 1960). Anthropologists note that studies containing substantial ethnographic detail are needed to interpret such wide variation in dietary patterns (Mintz 1989). Sidney Mintz, the “father of food anthropology,” wrote extensively about the political-economic role of food in globalization as well as the importance of local and regional cuisines in cultural identity (Messer 2016). Mintz asserted that the Inuit of the far north demonstrate the anthropological assertion that foodways are distinguished not by what they have, but by what people do with what they have. For example, he pointed to the complicated ways in which northern indigenous populations hunt and fish as evidence of the multiple ways in which the environment can become not only where a group of people lives, but also the fundamental basis of who they are (Mintz 2008). Mintz argued that not only does the
study of food advance anthropological theory, but also contributes to the reproduction of
ethnic and local identities by solidifying group membership (Mintz and Du Bois 2002).

Nutritional anthropologist Carole Counihan has also contributed greatly to the
anthropological research on how food creates and sustains notions of cultural identity.
Her work often uses changing culinary practices as a lens to explore broader societal
shifts. For example, by examining the production and consumption of bread in the small
town of Bosa, Counihan demonstrates social and economic change in Sardinia. As wheat
production declined, the purchasing of bakery bread increased resulting in more
individualistic and less communal consumption of bread, with resulting changes in social
relations (Counihan 1984). She utilizes the same method to understand the community of
Antonito, Colorado by examining the tortilla. Food-centered life histories inform a rich
ethnographic work that elucidates how women struggle to preserve their culture through
foodways (Counihan 2004b). This “food voice” perspective is an important conduit to
understand how people experience their culture through cooking and eating, often
through traditional cuisines and shared meals (Counihan 2004a). Therefore, to understand
the complexities in the meaning of food, how and why dietary and physical activity
practices are enacted in this population of Alaskan older adults, I utilize a biocultural
framework within nutritional anthropology approaches.

Biocultural frameworks elucidate the nutritional pathways through which
sociocultural and environmental conditions come to affect population biologies and
health (Brewis and Lee 2010; Dufour 2006), including obesity (Brewis 2011). Biocultural
anthropologists are often concerned with the ability of individuals to negotiate their
sociocultural, political, and economic circumstances, producing variation in health across
and within populations (Crooks, et al. 2007; Dufour 2006; Pike and Williams 2006). For example, Crooks (2000; 2003) revealed that obesity is an indicator of environmental adversity in high-poverty, rural Kentucky where schoolchildren were at risk for overweight and obesity, due in large part to unhealthy snack food sales at school and physical inactivity. Similarly, Moffat and Galloway (2007; 2008) have found that urban children coping with adverse environments in Ontario, Canada exhibit higher rates of overweight and obesity, where the sociocultural environment lacks an emphasis on healthy eating and exercise, when compared to their higher income counterparts. Biocultural studies like these are different from much of the medical literature because they answer questions about human biology that include sociocultural variables in the research design to take a holistic view of the determinants of health (McElroy 1990).

Harriet Kuhnlein, noted for her nutritional anthropological work among circumpolar populations, argues that northern peoples have complicated relationships to the land from where their food comes. As northern peoples are increasingly moving to urban areas, many traditional foods and processing techniques are being lost, creating concern over the retention of indigenous knowledge and foodways (Kuhnlein and Receveur 1996). She explains that the pathways from culture to dietary intake are influenced by food availability, cultural preference, affordability, influences of the media, as well as individual preferences and biological needs (Kuhnlein 2007; Kuhnlein, et al. 2009).

Kuhnlein’s work has detailed the correspondingly high rates of obesity among indigenous groups as they consume less traditional food and engage in fewer traditional activities over time (Kuhnlein and Receveur 2007; Kuhnlein, et al. 2004). Kuhnlein is
also an applied anthropologist, utilizing her biocultural framework to nutritional anthropology in ways that can influence programming and policy in Canada (Chan, et al. 2006; Damman, et al. 2008; Kuhnlein, et al. 2006; Kuhnlein, et al. 2013). This dissertation contributes to such applied biocultural nutritional anthropology literature by elucidating the linkages through which the sociocultural environment affects diet, physical activity patterns, and nutritional status among Alaskan urban older adults.

*Social Determinants of Healthy Aging*

A model of healthy aging allows for the continued functioning of mental, physical, social, and economic systems as the body naturally slows down its processes with increasing age (Hansen-Kyle 2005). A healthy aging framework is an understanding that health and adaptation to the aging process should be acceptable to the individual, rather than as defined from a medical perspective (Bryant, et al. 2001). Older adults aging well must feel that they are able to maintain a sense of personal meaning and value in their lives as they face the challenges and opportunities of aging (Grant 2005). Lastly, a healthy aging framework allows researchers to recognize the importance of adaptation and coping strategies during the aging process. Therefore, the concept of healthy aging should not be confused with *successful aging*.

Successful aging, as conceptualized by Rowe and Kahn (1987), is defined as the avoidance of disease and disability, the maintenance of many varied personal relationships, and high levels of mental and physical functioning. Successful aging theory often neglects the fact that although seniors may be experiencing restrictions and declines in some areas of their lives, they are also continuing to experience development and
growth in other areas of life (Grant 2005). Key to this framework is that successful aging can be brought about through appropriate lifestyle choices. Individuals who fail to age successfully have only themselves to blame, since “successful aging is in our own hands” (Rowe and Kahn 1998:18). Since narratives of personal responsibility are implicit in successful aging (see Figure 1.1, below), elders often reject its definition and wish to define healthy aging on their own terms. For example, Calasanti (2016) has found in interviews with middle-aged Americans that the concept of successful aging is a source of tension. Successful aging is often viewed as something objectively measured that is outside of their control, yet adults blame themselves and each other for aging unsuccessfully. Indeed, Chard et al.’s (2016) work in Baltimore also found that elders experiencing structural violence and inequity often describe successful aging as unattainable. These African Americans in the inner city state that successful aging is defined by biomedical recommendations that fall outside of the social realities of their daily lives.

When older adults are allowed to define healthy aging for themselves, the characteristics they value are often very different from those in the successful aging literature. Work in the circumpolar north suggests that elders take a holistic approach to healthy aging, conceptualizing their attitudes and ability to transmit knowledge and wisdom to the younger generation as critical determinants of aging healthfully (Collings 2001; Fienup-Riordan 2003).
Figure 1.1. The model of successful aging focuses on survival age, good health, behaviors, and the absence of disease, disability, and cognitive impairments.

*Adapted from Rowe & Kahn (1987) and Fuchs, et al. (2013).

Rather than solely the continued retention of good health, older adults value the ability to negotiate their social and physical environments throughout the life course to maintain social well-being, community engagement, and spirituality (Borré 1990; Lewis 2011). A healthy aging framework recognizes the realities of biological aging and allows for such processes as frailty, disability, as well as rapid social change (Martin, et al. 2015). Healthy aging focuses on social activities, productive pursuits, and diet and physical activity patterns (see Figure 1.2, below).
Anthropologist Kristen Borré’s (1991) work among Baffin Island Inuit demonstrates the importance of nutritional knowledge in defining healthy aging. Canadian seniors conceptualize health as continued community engagement through hunting, fishing, and food sharing to provide well-being to others (Borré 1994). Since the complex ways in which elders negotiate their environments often define healthy aging, this framework includes an in-depth understanding of the social aspects of health (Harris 2008). In public health, this concept is often termed the social determinants of health.

The social determinants of health model refers to the fact that social conditions and relationships shape whether individuals age healthfully, providing a lens to investigate health disparities (Bambra, et al. 2010). Research suggests that the social determinants of health are unique in the circumpolar north, where elder populations are socially isolated and experience rapid economic and sociocultural change (Driscoll, et al. 2013). Since the social determinants of health are embedded in healthy aging, coupling this framework with nutritional anthropological theoretical perspectives results in a
biocultural appreciation of how the social environment influences aging patterns in the far north.

This dissertation reveals the lived experiences of elders across these domains of healthy aging as they negotiate diet, physical activity, and nutritional status in a challenging urban, subarctic environment. I recognize that the sociocultural environment is an important influence on biology, because it influences the way that people think about the world and their behaviors. Recognizing issues of food availability and access, I seek a greater understanding of the role of sociocultural influences on human agency, via food and exercise patterns, and nutritional status.

**Defining Culture, Older Adulthood, and Nutritional Status**

The term “culture” is used in this project to refer to pluralistic processes and arrangements of political, social, and economic factors that are held by groups of people (Rosaldo 1993). Although some researchers would rather view culture as an orderly set of consistent beliefs and behaviors that are shared by all members, this has been demonstrated not to be the case. In fact, culture can act as a stressor, especially in urban spaces where social isolation, family conflict, and concerns about health, finances, and the environment are common pressures (Armelagos, et al. 1992; Panter-Brick, et al. 2008; Schell 1997). For example, work with African Americans in the United States gives us a glimpse into constraining features of the sociocultural environment that contribute to suboptimal dietary patterns among elders, such as changing social and physical significance of food and inadequate and/or inappropriate dietary advice from social contacts (Schoenberg 2000). I follow this biocultural understanding of culture as a
constantly changing, and often contested, combination of political, social, economic, and environmental aspects of everyday life. To operationalize culture in this dissertation, I utilize the concept of “sociocultural influences” on diet and physical activity that can produce healthy aging outcomes.

The sociocultural environment refers to the social and cultural context characterized by a community’s values and beliefs. These sociocultural factors influence people’s perception and attitudes related to dietary and physical activity practices (Belon, et al. 2014). The reasons people choose certain foods to meet their dietary needs are multi-faceted and related to a wide range of social, cultural, and personal influences. The sociocultural environment in which people make their food choices consists of the social and cultural context characterized by a community’s relationships, values, and beliefs. These factors, in turn, influence people’s perceptions and attitudes related to diet, physical activity, health, and aging (Belon, et al. 2014). Such common sociocultural influences on diet and physical activity patterns include interpersonal relationships such as peer and family supports and participating in social events, as well as broader environmental factors such as self-identification with a particular culture (Kuhnlein and Receveur 1996). This understanding of the sociocultural environment allows me to uncover the pathways that may lead to healthy aging in this population.

In this dissertation, the terms “older adult,” “elder,” and “senior” are used interchangeably to refer to individuals aged 65 years and over. The term “elder” is used frequently in Alaska because it often connotes a position of respect within a community enjoyed by some older adults. Because there is great diversity in aging, there are no consistent biomarkers to define older adulthood. I utilize the minimum age of 65 years
because it is the most commonly used cut-off in research, allowing for comparison across studies (Durakovic and Misigoj-Durakovic 2004). However, I recognize that this age cut-off is somewhat arbitrary, more a cultural remnant than a true demarcation of the onset of the aging process. The United States government had chosen 65 years of age as the beginning of old age in 1935 to reflect a social transition in which people became eligible for retirement and social security benefits (Roebuck 1979; U.S. Social Security Administration 2014). Regardless of the cut-off age, anthropologists and gerontologists have various theoretical perspectives from which to understand health, aging, and nutritional status.

Nutritional status is a general measure of health and body composition, often defined by anthropometric measurements. The most common measure of nutritional status is body mass index, or BMI, a ratio of height to weight. BMI is easy to calculate and compare across populations, although it does not distinguish between the weight of muscle, bone, other tissues, and fat in the body, resulting in questionable accuracy and utility of the measure (Brewis 2011). Although BMI is an imperfect measure of excess adipose tissue, it remains the most commonly used and accepted measure of nutritional status in research. BMIs range in categories from underweight (below 18.5), normal weight (18.5-24.9), overweight (25-29.9), and obese (30+). Although I recognize the limitations of BMI, I utilize this measure in my assessment of nutritional status so that I can compare the outcomes of this population with other populations and recommendations. In an effort to correct for limitations of BMI, I also measured waist circumference, a more accurate measure of central adiposity and excess body fat, to calculate waist-to-height ratios (Gibson 2005). In this work, I combine nutritional
anthropology with healthy aging perspectives to understand complex biocultural relationships to nutritional status in Anchorage, Alaska.

**Research Site**

Alaska has the longest history of human habitation of any state in the country, contributing to complex settlement patterns that continue to influence the region to this day. The route of human migration from Asia into North America came through Alaska and was probably utilized for several major migrations of people to the region (Perego, et al. 2009). Today, Alaska remains first in the nation for percent of its population comprised of indigenous people (Feldman 2009). Approximately 80,000 native people lived in Alaska at the time of European contact in the mid-1700s. Russia claimed Alaska in 1799, and although they did not extensively colonize the region, Russians did set up missions, churches, fur trading posts, and small settlements. Possibly their most impactful influence was the diseases they brought over, such as smallpox, typhoid, whooping cough, influenza, and measles that dramatically reduced the local population by 50-80% (Langdon 2002).

The United States purchased Alaska from Russia for 2 cents an acre in 1867, but Americans did not settle the state much until the gold rush in 1897. Early American colonists were missionaries, explorers, prospectors, and soldiers and divided Alaska into 20 large boroughs, instead of counties (see Figure 1.3, below). Alaska Native groups were never divided and moved onto reservations like American Indians in the “Lower 48.” American Indians on reservations experience an extra level of nutritional stress related to the “commodity foods” that are available to them on reservations. The federal
government standardized an unhealthy modern diet among American Indians that continues today. American Indians living on reservations have historically had less agency over their dietary patterns, as reservation life restricted the decisions and alternatives available to them. Generations of American Indians existed almost entirely on processed foods, contributing to psychosocial stress and the epigenetic effects of obesity (Wiedman 2012).

Figure 1.3. Map of Alaska’s Boroughs and Cities.


Instead of reservations, Alaska Native groups were divided into corporations with the Alaska Native Claims Settlement Act (ANCSA) of 1971. Anyone with at least one-quarter Alaska Native blood (including Indian, Eskimo, Inuit, and Aleut) born before
December 18, 1971 was enrolled as a shareholder in their regional corporation. Cash and land settlements were awarded to these 12 Native-owned regional corporations, which were expected to run their land and cash settlements like businesses with profits for shareholders. Although this settlement seems like an improvement over the reservation system of the lower 48, this was an assimilation policy that required historically nomadic populations to settle down into villages and run businesses, with varying levels of success (Anders 1989). However, since reservations were never formed in Alaska, commodity foods and the specific stresses of reservation life are largely absent.

Because of the remote location of Alaska to the rest of the continuous United States, coupled with the subarctic environment, the cost of living in Alaska is one of the highest in the country. Residents of Anchorage spent most of their income on housing, at more than 40% of their income. In fact, during the 2008-2010 housing crash when the nation’s housing costs fell, Anchorage’s prices still managed to rise (Fried 2014). Anchorage has less than 3% of its housing available, below the recommended 5% vacancy rate. This shortage makes affordable housing* inaccessible to many Alaskans, especially vulnerable populations like seniors and people with disabilities (Howell 2015).

Rising prices of gasoline, food, insurance, transportation, and healthcare in Alaska are largely determined by national or international trends, since these goods and services often come from “Outside” (a local term that refers to any location outside of the state of Alaska). Beginning in 2015 the Alaska state government began facing its largest fiscal

* The average home in Anchorage costs nearly $350,000 (Gokey 2014).
crisis in 30 years due to historically low oil prices. Since Alaska funds its government almost entirely on oil profits (there are no local or state sales or income taxes), legislators are balancing the budget on the backs of its older adult population by making huge spending cuts to much-needed senior services (Falsey 2015). Additionally, energy costs are unpredictable and Alaska has the most expensive healthcare system in the nation. Dental exams are 44% more expensive and physician’s exams are 61% more expensive in Anchorage than the national average (Fried 2014). Since seniors are likely to require expensive medical care in their lives (Stanton 2006), this creates a situation of competing priorities where funds for groceries are quickly depleted. Seniors are often faced with a dilemma to spend money on staying healthy, staying warm in the winter, and avoiding homelessness. When these are the choices, elders may make the rational decision to pay those obligations first, then use whatever money remains to purchase food and other incidentals.

In the sub-arctic, food prices can be high, especially for items that are not locally or seasonally available, resulting in complications of food access for older adults on limited incomes. Although Alaska is technically part of the continental U.S., it is separated from the nearest state, Washington, by 500 miles, making transportation and shipping a challenging and expensive endeavor. Due to extreme northern location and short growing seasons, most food must be shipped or flown into the region, increasing food prices by 16-232% of the cost of foods available in the contiguous United States (Smith, et al. 2008).

In spite of high food costs in the state, Anchorage has the least expensive groceries among Alaska’s four urban centers including Fairbanks, Kodiak, and
Juneau (Fried 2015). This is because most goods that come in to Alaska arrive first in Anchorage, via air or sea (see Figure 1.3, above). Items then travel on smaller vessels, often “bush planes,” to get to other communities around the state, further driving up costs. These sophisticated shipping routes, however, result in frequent deliveries to Anchorage of a large variety of foods from around the world. Anchorage is both Alaska’s largest urban area and one of the most diverse places in the country (Basu 2015), creating an environment where foods from all over the world are readily available. Because of the diversity in Anchorage, there is demand for a great variety of cultural foods.

The municipality of Anchorage road system connects to the Kenai peninsula to the south and Fairbanks to the north, but it is not possible to drive to most of the state (i.e. western, northern, southeastern, or most of interior Alaska). The state capitol of Juneau is so isolated that residents must fly in and out, contributing to extremely expensive government operations (see Figure 1.4, below). Those roads that do exist in Alaska are vulnerable to the extreme weather such as avalanches, rockslides, and frost heaves. For example, the Denali Highway, with only 23 miles of pavement and 123 miles of gravel, is completely closed in the winter months, making transportation difficult, costly, and weather-dependent.
Issues with access and availability of foods in this far northern location are only part of the picture. Extreme winter weather, snowfall accumulation, and seasonal darkness also affect physical activity levels, especially for older adults. In fact, unintentional falls and injuries are the third leading cause of death for Alaskans (Alaska Department of Health and Social Services 2012). Falling through the ice is also a common occurrence, affecting at least 449 people between 1990-2010, with markedly higher mortality rates for Alaska Native people than for all Alaskans (Fleischer, et al. 2014). It should be no surprise that many older adults avoid leaving their homes whenever possible during the long, dark winter months in Anchorage, resulting in reduced grocery shopping and physical activity and increased isolation and reliance on pre-packaged foods.
Alaska has the 4th highest cost of living in the country, so obtaining food can be difficult on a limited income (Fried 2015). Although study participants had a range of incomes, most have significantly lower household income than the state average; 54% of respondents reported less than $25,000/year. According to Census data, Alaska’s seniors tend to have a much higher annual household income than study participants, approximately $65,000/year (Alaska Department of Labor and Workforce Development 2013). However, the experiences of these study participants can give a glimpse into the life of elderly adults in Anchorage who are vulnerable to food insecurity.

This dissertation case study of Alaskan elders is an ideal contribution to cross-cultural research on healthy aging because Alaska has the fastest growing senior population in the nation. Alaska’s senior population grew by 79% between 2000 and 2013 and now currently makes up 9.2% of the state’s population. The number of Alaskans over the age of 70 is expected to grow by almost 60% in the next 7 years (Alaska Department of Labor and Workforce Development 2014). Anchorage is the largest city in the state, where 301,134 people currently reside. Approximately 41% of Alaska’s total population of 736,399 lives in Anchorage (Alaska Department of Labor and Workforce Development 2014).

Anchorage is now one of the most diverse cities in the nation; the Mountain View neighborhood (see Figure 1.5, below) contains 3 of the top 10 most diverse census tracts in the country (Anchorage Press April 10, 2014; U.S. Census Bureau 2013). Much of that diversity is expressed among Anchorage’s younger population, most notably in Anchorage school enrollments (Alaska Department of Education and Early Development
2014; Lowe 2009) where over 90 languages are spoken by the families of children in the Anchorage School District (Feldman 2009). Broadly, the ethnic composition of Anchorage’s senior population is approximately 77% Euro-American, 10% Asian, 8% Alaska Native/American Indian, 4% African American, and 1% Native Hawaiian/Pacific Islander (Alaska Department of Labor and Workforce Development 2014).

**Figure 1.5. Map of Anchorage.**
This dissertation is based on interviews, questionnaires, and anthropometric data collected from Euro-American, Asian, Alaska Native, and African American Alaskans aged 65 and over. A multi-ethnic sample was chosen because different populations are experiencing the aging process differently with respect to nutritional status, as evidenced by varying rates of obesity. National obesity rates suggest that Alaska Natives/American Indians and African Americans experience higher rates of obesity than Euro-Americans, rates which are all much higher than those for Asians (Alaska Native Tribal Health Consortium 2008; Brown, et al. 2009; CDC 2010a; Lynch, et al. 2010; Office of Minority Health 2011). Nutritional anthropologists are ideally suited to investigate these differences by examining the relationships between biological outcomes, behavior, food, and culture. Such biocultural perspectives allow researchers to view health outcomes as an indicator of the ability to navigate social, cultural, and economic conditions (Brewis 2011; Huss-Ashmore 2000; Ulijaszek 1997). This dissertation integrates nutritional anthropology with healthy aging perspectives (Boyle and Counts 2007) to uncover the pathways linking the sociocultural environment to nutritional status, through diet and physical activity patterns, among urban Alaskan elders.

Description of Chapters

Following this chapter, a review of the literature focuses on the diet, physical activity, and nutritional status of older adults. The second half of chapter 2 is a review of the literature on the environmental influences on diet and physical activity for adults. Because nutritional status and aging are both biological and cultural processes, the complex interactions between biology, cross-cultural variation, and sociocultural
influences on practices must be teased out. These influences include the physical environmental particularities of the circumpolar north as well as the challenges and opportunities provided by the urban environment. Lastly, the literature review chapter concludes with the sociocultural environmental influences on older adults, including discussion of the ways that culture, the media, and social relationships can shape diet, physical activity, and nutritional status.

Chapter 3 details the methods and data analysis procedures followed for this dissertation. I begin with discussion of the model utilized in this research, which details the pathways from the sociocultural environment to nutritional status. This chapter includes an overview of the aims, hypotheses, study design, recruitment protocols, timelines, data collection methods, and a description of the primary recruitment sites. I describe each of the instruments used in this study to operationalize diet, physical activity, and healthy aging via the semi-structured interview guide, the questionnaire, and anthropometric measurements collected. Lastly, chapter 3 describes the data analysis procedures utilized for the results that are presented in chapter 4.

Chapter 4 presents the quantitative results from this mixed-methods study, including sociodemographics, food intake, diet quality, levels of physical activity, nutritional status, and the sociocultural influences for a sample of 82 seniors in Anchorage. This chapter concludes with a discussion of the significant findings of the influence of the media, friends and peers, family members, and cultural identity.

Chapter 5 details the sociocultural context of the aging experience in Anchorage, Alaska utilizing findings from the semi-structured interviews and participant observations. In chapter 5, the participants’ own words lend richness to the complex
interplay between the environment, diet, physical activity, and nutritional status. Participants discussed their dietary and physical activity practices, as well as the social, cultural, and physical environmental factors that shape healthy aging in their daily lives. I close this chapter with the public health implications of these research findings.

In the concluding chapter of this dissertation, I interpret significant findings from this study so that applied researchers may utilize this work to improve access to healthy aging opportunities for residents in Anchorage. The study limitations and suggestions for further research are also detailed in chapter 6. In this concluding chapter, I examine the ways in which this study has potential to contribute to multiple literatures, filling important research gaps in nutritional anthropology, healthy aging, and applied public health. This biocultural dissertation contributes to a gap in local public health research among multi-ethnic populations who are aging in Anchorage. This research is extremely timely, as Alaska is currently under-prepared for the myriad of challenges required to provide for the fastest growing senior population in the nation (Howell and Grasse 2017).
Chapter 2: Relationships of Health, Aging, and Nutritional Status: Situating the Study within the Literature

The ways in which people utilize food in their daily lives is an important lens to understanding the sociocultural practices that influence biological outcomes, such as nutritional status (Pelto, et al. 2000). Likewise, how people engage with their social environment greatly influences their food and physical activity patterns, which interacts with biological factors to contribute to nutritional status (Wilson 2002). Since lifestyle factors such as diet and physical activity practices have a strong influence on healthy aging, it is important to understand the pathways linking the social environment to nutritional status among this fast-growing age group which is at high risk for overweight, obesity, and related metabolic diseases (Inelmen, et al. 2003; WHO 2012; Wiley and Allen 2013). Uncovering such social and cultural environmental influences on diet and physical activity patterns for seniors allows applied researchers and caregivers to address these issues through programs, community interventions, and other supports (Borkan, et al. 1982).

Older adults have historically been an often-overlooked population in the biocultural anthropological literature because they were past the reproductive stage and their health patterns no longer had evolutionary significance (Katz 1978). In the United States, life expectancy has increased in the last century from 52 years in 1914 to 79 years in 2014 (Arias 2016; Olshansky, et al. 2005). Therefore, anthropologists are increasingly recognizing that post-reproductive longevity is an interesting evolutionary phenomenon with varied cross-cultural outcomes. As humans are living longer than ever before, researchers have found that the biological outcomes and social behaviors vary greatly.
across cultural groups, producing enormous variability in healthy aging across older populations (Ice 2005). Not only can aging patterns be considered a public health issue, but older adults are important and productive members of society, often playing a role in childrearing and passing on important cultural knowledge and food practices to the next generation (Counihan 2004b; Ice, et al. 2011; McClanahan 2000; Weibel-Orlando 1997).

Although some previous research has documented diet and physical activity practices (see Ballew, et al. 2006; Bersamin, et al. 2006; Coble and Rhodes 2006; Nobmann, et al. 1992) or nutritional status for adults in the circumpolar north (see Hopping, et al. 2010a; Kuhnlein, et al. 2004; Snodgrass 2013), this dissertation looks into how the social environment influences the diet, physical activity, and nutritional status of seniors in the urban sub-arctic. Identifying how a diverse sample of older adults navigates their social lives is an important component of understanding cross-cultural variation in healthy aging patterns in urban spaces. To do so, I review the nutritional anthropological, gerontological, and applied public health literatures on nutritional status, diet, and physical activity practices for older adults, as well as the environmental influences that tend to impact activity and food consumption in the far north and in urban locations. These literatures set the stage for investigating the relationships between the sociocultural environment and nutritional status among a diverse sample of Anchorage residents in this dissertation.

**Patterns and Practices of Older Adults**

Aging is not only a function of evolutionary biology but is also influenced by the complex interactions between the physical and sociocultural environments which
influence biologies (Ice 2005). Older adults experience biological changes as they age, requiring them to adjust their diet and physical activity patterns (Posner, et al. 1994; Quandt, et al. 1998). Just as the biology of aging influences nutritional status, so too can nutritional status shape the process of healthy aging, where nutritional status outcomes correlate strongly with functional abilities and quality of life in older adulthood (Fortunato and Drusini 2005). Although researchers are beginning to understand the biological processes of aging, little is known about the sociocultural factors that contribute to cross-cultural variation in aging (Ice 2005).

_Aging and Nutritional Status_

As discussed in Chapter 1, nutritional status is a general measure of body composition that can provide some clues to population health (Jelliffe 1966). Nutritional status mediates the process of healthy aging; however, advanced age predisposes individuals to excesses of dynamic tissue such as fat, or deficiencies of static tissues such as muscles and bones, all of which influence nutritional requirements (Fortunato and Drusini 2005). For example, elderly adults experience reductions in resting metabolic rate, fat-free mass, and muscle mass coupled with increasing adipose tissue as part of the biological aging process, which can contribute to obesity in later life (Arking 2006; Haveman-Nies, et al. 1996).

These body composition changes occur even in the absence of changes in body weight or BMI (St-Onge 2005). For example, older adults in Europe were followed for 8 years and displayed decreased height, fat-free mass, and waist-to-hip ratio while they increased in BMI and fat mass, with no changes in body weight (Luhrmann, et al. 2009).
This is because as individuals age, the increase of body fat is “offset” by the loss of lean mass and bone mineral density. However, the increased body fat in older adults tends to accumulate in the abdominal region, where it is strongly associated with diabetes and cardiovascular disease risk (Atlantis, et al. 2008). Likewise, increasing BMI is associated with increased overall energy intake and decreased physical performance and general well-being (Conklin, et al. 2013). Therefore nutritional status correlates with functional ability and quality of life for older adults.

Nutritional status is also strongly influenced by energy balance, the balance between energy intake and energy expenditure. Among older adults, the decline in daily energy requirements is primarily due to the declines in resting metabolic rate and exercise (Poehlman 1996). Lower resting metabolic rates can actually have health benefits for older adults. One study grouped older adults into two health categories and found that those with the lowest resting metabolic rates were associated with the healthiest outcomes, i.e., the absence of physical and cognitive impairments, chronic conditions, and co-morbidities (Schrack, et al. 2014). However, lower resting metabolic rate coupled with significant reductions in physical activity tend to result in an energy imbalance for older adults. If seniors do not make adaptations, such as reducing their energy intake and/or increasing energy expenditure, the chronic energy imbalance can result in adverse nutritional status, such as overweight or obesity (Quandt, et al. 1998).

Overweight and obesity are defined as nutritional outcomes in which an individual has a higher amount of body fat than is healthy or desirable, usually determined by BMI or waist-to-height ratio (WtHR) (Ice, et al. 2012). More than one-third of U.S. adults, and 37% of older adults, are considered obese (Ogden, et al. 2015).
Among older adults, women and men do not display statistically significant differences in obesity rates (Ogden, et al. 2015). However, data suggest that Alaska Natives/American Indians (AI/AN) and African Americans experience higher rates of obesity and waist circumference compared to Euro-Americans, rates which are all much higher than those for Asians (Alaska Native Tribal Health Consortium 2008; Brown, et al. 2009; CDC 2010a; Lynch, et al. 2010; Office of Minority Health 2011). Overweight and obesity are often linked in the research literature to increased risk of metabolic and cardiovascular diseases, and higher mortality rates for adults (Popkin and Gordon-Larsen 2004).

It is important to note that overweight is not always associated with negative health risks, especially for older adults. Among elderly people, being overweight (but not obese) is associated with lower mortality risk than underweight individuals (Flegal, et al. 2004). Overweight may actually be a protective factor in the health of some older adults. As seniors reach extreme old age, nutritional status changes again as seniors become less obese and more susceptible to malnutrition and frailty (Fortunato and Drusini 2005; Inelmen, et al. 2003). NHANES data indicate that individuals over age 80 are half as likely to display obesity as 50-59 year olds (Flegal, et al. 1998). Although overweight might not be as detrimental to the health of older adults as some research may suggest, obesity is still associated with increased mortality among seniors (Janssen and Mark 2007).

In addition to physiological changes, the quality of diet and amount of physical activity among elderly people are influenced by psychological, demographic, economic, and sociocultural factors. Anthropologist Stini (1994) points out that age and physical activity levels interact to create changes in nutritional status and body composition even
when diet is held constant, and vice versa. Understanding diet and physical activity practices and their effect on nutritional status reveals those individuals who are able to age healthfully, providing some insight into the outcomes of behavioral negotiations for nutritional status. Clearly, there are complicated relationships between aging, health, and nutritional status for older adults. This dissertation uncovers the sociocultural strategies for healthy aging and their relationship to nutritional status among Alaskan elders in Anchorage.

Dietary Intake

Gerontologists suggest that adaptation to aging is generated through an amalgamation of seemingly insignificant, but collectively important, processes of daily life such as dietary practices (Harris 2008). The nutritional strategies that people utilize are deeply embedded in specific social and cultural patterns that contribute to nutritional status and overall health (Himmelgreen and Crooks 2005). Indeed, research indicates that adequate nutrition plays a key role in healthy aging and delaying the onset of chronic disease in old age (Everitt, et al. 2006; Fitzgerald, et al. 2013).

Nutritional research indicates reduced variety in older people’s diets, which adversely affects their energy and nutrient intake (Rolls and McDermott 1991; Westenhoefer 2005). In the U.S., less than 18% of adults meet recommendations for fruit consumption and less than 14% meet recommendations for vegetable intake (CDC 2015). A Canadian study shows that only 39% of seniors may be consuming recommended intakes of fruit and vegetables per day (Casteel, et al. 2013). However, these national data mask several different nutritional strategies that are mediated by a number of factors,
including sex, stage within the life course, nutrition and physical activity knowledge, socioeconomic status, and culture (Quandt 2005).

For example, Wu et al. (2009) found that both male and female rural seniors agreed that a well-balanced diet was important for healthy aging; however, they disagreed on what defines a healthy diet. Older men frequently stated that low-fat diets consisting of fish were healthiest, while women stressed the importance of consuming vegetables. Likewise, differences appeared in Li et al.’s (2016) study, where men placed a lower value on the availability of low-fat dairy products, and a higher value on specialty produce, canned vegetables, and low-salt processed meats than senior women. These differing views of what constitutes a healthy diet affect the actual intakes of older adults.

One study in the northeastern U.S. reported that senior men are more likely to eat commercially prepared foods and restaurant meals while women are more likely to conduct their own food shopping and did so more frequently per month than men (Snodgrass, et al. 2016). The literature suggests that increased grocery shopping results in senior women consuming greater amounts of fruits and vegetables than older men. For example, in Alabama older women were statistically more likely to report fruits and vegetables as their favorite foods, such as apples, corn, and broccoli (DiMaria-Ghalili and Amella 2005) and reported better quality diets and higher Healthy Eating Index (HEI) scores (Hsiao, et al. 2013) than older men. A cross-cultural study in North Carolina concluded that African American, Native American, and Euro-American women were more likely than their male counterparts to consume fruits and vegetables such as apples, corn, green beans, tomatoes, cauliflower, collard greens, baked potatoes, and other miscellaneous vegetables (Bell, et al. 2003). In Alaska and Canada, elder women were
also statistically more likely to consume greater amounts of fruits and vegetables than elder men (Alaska Obesity Prevention & Control Program 2014; Rugel and Carpiano 2015).

Studies show that nutritional knowledge and cooking skills also impact food behaviors (McDonald and Webster 1998). Those who have a good understanding of nutritious foods and feel highly skilled eat a more varied diet than those who feel that their knowledge and skills are limited, which may influence their food intake over and above actual resources (Baker and Wardle 2003). For example, a study in Georgia senior centers concluded that increasing dietary knowledge in senior centers improves the fruit and vegetable intake of participants across income groups (Hendrix, et al. 2008).

Dietary intake can also vary by stage within the life course. Research indicates that younger seniors (below age 75) are more likely to consume recommended amounts of fruit and vegetables than older seniors (Rugel and Carpiano 2015). As people age, their biological needs change and these changing dietary requirements are not often known to the individual making their food choices. Some research has shown that healthcare physicians rarely have conversations about healthy aging with older patients including physical activity, nutrition, and body weight recommendations (Bardach, Schoenberg, and Howell 2017; Kravitz, et al. 1993). However, physician recommendations for dietary change are an important driver in increasing nutritional adequacy for seniors (Bardach, Schoenberg, and Howell 2016; Silverman, et al. 2002). Research suggests that increasing older people’s food knowledge, such as through information provision, cooking classes, and access to a good physician may be useful strategies to increase dietary variety (Dean,
et al. 2009). Making the public aware of their changing physiological needs, based on age and sex, is central to dietary recommendations that can lead to healthy aging patterns.

Socioeconomic status may also affect older adult dietary patterns, although the research literature displays mixed results. Research in developed nations tends to support the theory that economic constraints lead to greater intake of inexpensive, but energy-dense and nutrient-poor, foods (Popkin and Gordon-Larsen 2004). For example, low-income males in the U.K. who often reported eating alone had intakes higher in sodium and energy-dense, nutrient-poor foods such as white bread, fat spreads, and sugary soft drinks (Green, et al. 2008). A large European study found that material resources, such as higher monthly income and access to a car correlated to a more varied and healthful diet for seniors (Dean, et al. 2009). Likewise, studies in the Arctic ranging from Alaska, to Canada, to Greenland, to Finland, overwhelmingly conclude that the high-cost of fresh produce and subsistence equipment results in low-quality diet and rising rates of obesity in the circumpolar north (Hopping, et al. 2010b; Jarvenpa 2008; Loring and Gerlach 2009; Mead, et al. 2010; Redwood, et al. 2008).

Despite these studies’ suggestions that low economic resources result in increased intake of unhealthy foods, the research is ambiguous regarding the economic determinants of older adult diet. In Baltimore, significant differences in dietary quality between African American and Euro-American adults could be due to disparities in socioeconomic status, but this effect could not be teased apart from the potential influences of food preference, selection, preparation, and availability (Raffensperger, et al. 2010).
Although several cross-sectional studies may correlate poverty with obesity through increased intake of unhealthy foods in the U.S., anthropologist Hruschka has found the opposite trend among longitudinal studies at the population level. Resource declines, such as national recessions, correspond with declines in BMI or decelerations in BMI growth in developing nations and in the U.S. (Hruschka 2012). A recent meta-analysis of the literature specific to the influence of economic resources on older adult dietary patterns was deemed inconclusive by Conklin and colleagues (2013). Reviewed research studies indicated mixed findings on the actual economic determinants of diet among older adults, since different studies can be found that indicate socioeconomic status had either a negative, a positive, or a neutral effect on elder’s dietary behaviors (Conklin, et al. 2013). Lastly, obesity research in Alaska has found that there are no disparities by poverty status for obesity or dietary intake (Alaska Obesity Prevention & Control Program 2014). The same report indicates that three out of four adults in the poverty status group in Alaska report that cost is a barrier to healthy food consumption, although this is not reflected in the obesity statistics or reported intakes of fruit and vegetables for adults (ibid).

Lastly, as noted in chapter 1, culture plays an important role in dietary intake, as food often signifies constructions of self and connection to social identities. In the U.S., cross-cultural dietary studies often conclude that Euro-Americans have greater dietary quality than African Americans (Hsiao, et al. 2013; Raffensperger, et al. 2010) or Native American / Alaska Native populations (Bell, et al. 2003; Fialkowski, et al. 2010). Research in Alaska has found that intake of local foods is directly linked to cultural identity, speaking a Native language at home, using traditional remedies, and
participating in or attending cultural events (Redwood, et al. 2008). However, some research suggests that these traditional foods may contain more total fat than non-traditional diets (Bell, et al. 1997; Bersamin, et al. 2008). Regardless, dietary research with older adults suggests that seniors’ diets could be improved by providing good-quality foods that are familiar, rather than new products (Dean, et al. 2009). In summary, the ability to choose a diet with sufficient quality and variety to meet daily nutrient needs may be affected by the sociodemographic, physiological, economic, and sociocultural factors that accompany aging.

**Physical Activity**

Although there is a robust anthropological literature on diet and food behaviors, biological anthropologists have historically been less interested in the exercise behaviors of elderly individuals, as they are beyond the reach of adaptive reproductive advantage (Ulijaszek 1996). Most people in postindustrial societies, regardless of age, obtain less exercise and expend less energy in their daily lives than ever in the past (Malina and Little 2008). Such low levels of physical activity can adversely affect weight and health status of older adults (Liu, et al. 2006; Rivas-Marino, et al. 2015). Specifically, moderate and vigorous activities are statistically related to healthier BMI, WtHR, and social well-being among elderly populations (Acree, et al. 2006; Santos, et al. 2012). In a cross-cultural sample, Swartz et al. (2007) found that physical activity levels accounted for a statistically significant amount of variance in BMI in older adults, above and beyond the influence of age and sex.
As individuals age, they tend to expend less energy on physical activities. This decrease in energy expenditure is partially biological, as mentioned above. However, decreased physical activity is also likely due to the retired or semi-retired lifestyle that older adults tend to live. This is because subsistence activities and wage labor, even if relatively sedentary in nature, often involve greater energy expenditure than not working (Panter-Brick 2003). This decrease in physical activity is linked to quality of life in older adults, such as lower physical function, increased likelihood of frailty, and losing physical independence (Barrett, et al. 2016; Lefevre, et al. 2000; Marques, et al. 2014).

The literature on physical activity patterns among elderly populations is not only sparse, but also complex. In fact, Brawley et al. (2003b) even refer to the notion of promoting physical activity among older adults as a “formidable topic.” This is because research studies often contradict each other in terms of the effect of sex, urban/rural residence, and ethnicity on physical activity for older adults. For example, men in the South Pacific were more likely than women to engage in sedentary leisure activities like watching television, movies, or listening to music (Dancause, et al. 2011). However, a study in urban India found that elderly women expended less energy than men (Snodgrass, et al. 2016). Acree et al. (2006) have also concluded from their work in Oklahoma that older women tend to get less exercise than men, but Hopping et al. (2010a) found that Inuit elders of both genders in Canada obtained the same levels of activity.

Urban and rural residence also seems to have variable effect on different populations of elders. A BRFSS study found that rural women over age 40 engaged in less physical activities than urban residents (Wilcox, et al. 2003; Wilcox, et al. 2000)
However, NHANES data suggest that rural adults are only less active than urban residents in high-intensity exercises, and these differences disappeared with a lower-intensity threshold of activity. In fact, this study reported more total physical activity from rural adults than urban residents (Fan, et al. 2014). Cross-cultural research is often contradictory or otherwise unable to tease out the effect of urban vs. rural effect on physical activity.

Ethnicity may also play a role in physical activity for adults. Several studies have concluded that physical activity levels are significantly lower among African American and Native American / Alaska Native people across the lifespan than among Euro-Americans (Coble and Rhodes 2006; Hay and Shephard 1998; Poltavski, et al. 2010; Redwood, et al. 2009a; Redwood, et al. 2009b; Thompson, et al. 2003). However, Hopping et al. (2010a) found that Inuit of Canada achieved higher levels of physical activity than is usually reported for Native American / Alaska Native peoples. Swartz (2007) conducted a cross-cultural study that resulted in lowest levels of physical activity for African Americans, followed by Native American, then Asian Americans. In this study, Euro-Americans (whites) had statistically significantly higher physical activity levels than any other ethnic groups (Swartz, et al. 2007).

The influence of physical activity on BMI is also contentious in the literature. Anthropologists Fortunato and Drusini (2005) found among urban Peruvian seniors that BMI was only weakly associated with different levels of self-reported physical activity, and only among the female participants. However, Swartz et al. (2007) concluded that BMI was strongly associated with activity level, such that low activity resulted in significantly higher BMI in a cross-cultural sample. In yet another contradictory example,
a study among the Canadian Inuit concluded that physical activity was not associated with BMI at all, as high rates of obesity co-occurred along with high levels of physical activity (Hopping, et al. 2010a).

The only place in the physical activity literature for elders that seems to have any agreement is found with the influence of stage in the life course. Anthropological research indicates that a lifestyle of regular physical activity in childhood and adolescence is linked to greater levels of physical activity in adulthood, which can influence healthy aging patterns of individuals and populations (Malina 2001). However, physical activity levels of seniors in the U.S. continue to decrease with increasing age (Snodgrass, et al. 2016; Swartz, et al. 2007). German research supports this finding; that for individuals over age 60, total energy expenditure decreases by 7.5% for men and 6% for women per decade (Holmes, et al. 2008). Part of the reason for these declines in the increasing risk of falls and injury with advancing age (Casteel, et al. 2013). Randomized controlled trials show that instituting an exercise regimen for community-living seniors may have little to no effect on gait, balance, or physical health status (Buchner 1997; Druzbicki, et al. 2016; Freire Junior, et al. 2017), suggesting that physical activity patterns need to already be in place before adults reach advanced age for healthy aging. Likewise, understanding cross-cultural variation in physical activity patterns and their relationship to biological health indicators is vital to enhancing the wellbeing of senior populations.
Environmental Influences on Diet and Physical Activity

There are many environmental influences that contribute to such dietary and physical activity patterns as described above. In this section, I divide the environment into two important categories: the physical environment and the sociocultural environment. Much has been written about the effect of the physical environment on the health of circumpolar populations (Driscoll, et al. 2013; Shephard 1997; Steegmann 2007), but because it is a significant factor in the lived experiences of seniors in Alaska, I review that literature briefly here. Although the initial focus of this dissertation was the role of the sociocultural environment on diet, physical activity patterns, and nutritional status, the broader context in which these patterns are created must be considered. This holistic, biocultural anthropological study of the influences on dietary and physical activity patterns includes attention to the physical environment as it contributes to dietary and physical activity patterns. Since Anchorage is a subarctic, urban location, there are several features of the physical environment that can help untangle the web of interactions that contribute to poor nutritional status outcomes.

The Circumpolar North

The environment can have a significant impact on older adults’ ability to leave their homes and navigate their communities (Rowles, et al. 2016), which in turn affects activity levels and dietary quality (Tucker and Gilliland 2007). Older adults may only be able to safely leave their homes for grocery shopping or physical activity when ideal weather conditions permit. A longitudinal study in the U.S. found that walking behaviors are statistically associated with warmer temperature and low precipitation, especially for
women walking at least 2.5 hours per week (Dunn, et al. 2012). This finding was verified in a recent accelerometry study which confirmed that older adults in urban Canada acquired less activity on days of poor weather (Hoppmann, et al. 2015). Another Canadian study found that adults in more northern regions acquired significantly less physical activity in the winter months compared to summer months (Merchant, et al. 2007). These findings are not surprising since icy streets and sidewalks in winter increase the risk of falls and injury, especially among older adults (Lord, et al. 2007).

Additionally, winter months in the north are accompanied by significantly shorter daylight hours. In Scotland, older adults’ physical activity is correlated to warmer temperatures and longer day length, regardless of age, perceived behavioral control, number of social contacts, or physical functioning (Witham, et al. 2014). Since summer is the shortest season in the circumpolar north, climate and weather patterns remain an obstacle for older adults throughout most of the year.

Weather and climate not only affect physical activity patterns in the circumpolar north, but also diet through food availability and cost. In the sub-arctic, food prices can be high, especially for items that are not locally or seasonally available, resulting in complications of food access for older adults. Although Alaska is technically part of the continental U.S., it is separated from the nearest state of Washington by 500 miles, making transportation and shipping a challenging and expensive endeavor. Due to extreme northern location and short growing seasons, most food must be shipped or flown into the region, increasing food prices by 16-232% of the cost of foods available in the contiguous United States (Smith, et al. 2008). The availability and price of foods available in the urban sub-arctic can have a dramatic effect on residents’ dietary...
practices, since they tend to be on fixed incomes and likely to select low-cost items (Latham and Moffat 2007). Canadian research suggests that the average older adult living alone does not have disposable income and often cannot afford a nutritious diet (Green, et al. 2008; Sharma, et al. 2010).

Weather and climatic conditions can also compound the transportation difficulties that older adults often face, which may restrict where they obtain food or physical activities. Older adults are much more likely to be without a car and dependent on public transit systems or friends and family for transportation than younger adults (Cvitkovich and Wister 2001). A study in Italy linked transportation barriers, such as lacking a car or inaccessible public transportation, to increased risk of malnutrition among elderly participants (Donini, et al. 2013). This finding is consistent with work done in the U.S., where access to a car or public transportation were directly related to the ability to access healthy grocery store options (Sharkey and Horel 2008). Since much of the U.S. lacks the infrastructure for truly functional public transportation, reliance on these systems can be risky for older adults in outlying regions like Alaska (Kay 1997; Spross 2015). If conditions are undesirable or unsafe outdoors, older adults without transportation are also unlikely to walk to grocery stores, affecting their dietary intakes.

All of these environmental concerns merge in the Arctic to suggest to some researchers that the circumpolar north may be an “obesogenic environment.” This term is used to describe environments that promote positive caloric imbalance through various aspects of the social and physical landscape (Chaput, et al. 2011). Such aspects of the environment, as those detailed above, can lead to overconsumption of energy and decreases in energy expenditure that contribute to rising rates of overweight and obesity.
Environmental features often cited in the literature also include easy availability of good-tasting, inexpensive, energy dense foods in large portion sizes and increasing preference for sedentary leisure time and work environments (Hemphill, et al. 2008; Lieberman 2006; Ulijaszek 2007). Indeed, research has found that indigenous northern populations are increasingly participating in sedentary activities and consuming much of their total energy, fat, carbohydrates, and sodium from such Westernized, “market foods” rather than local foods (Ballew, et al. 2006; Bersamin, et al. 2008; deGonzague, et al. 1999; Fialkowski, et al. 2010; Gittelsohn, et al. 1998; Kuhnlein, et al. 1996). Therefore, some researchers conclude from this evidence that the circumpolar north is an environment that promotes overweight and obesity.

However, biological anthropologists like Jonathan C.K. Wells point out that there are complex interactions that contribute to obesity, such that reducing environments down to those that are obesogenic and those that are not, masks the variation that occurs within settings and across human groups (Wells 2012). Alexandra Brewis also argues that as the average size of human bodies increases so does the range of variability within populations, which suggests that some individuals are able to age healthfully despite their environment (Brewis 2012). She has also shown through her biocultural work that nutritional status is strongly influenced by sociocultural context and individual life histories, creating a complicated pathway between the environment and health (Brewis 2003; Brewis 2011). Indeed, even in northern regions like Alaska and Canada, the way that the physical environment comes to influence behavior is socially constructed by the interactions between an individual, aspects of the environment, and by other people (Belon, et al. 2014).
Clearly, Anchorage presents a unique environmental challenge for studying sociocultural pathways to healthy aging among seniors. It cannot be ignored that the physical environment of this urban, sub-arctic location presents many opportunities and barriers for obtaining healthy foods, adequate physical activity, and ideal nutritional status. The physical circumstances contextualize the complexities of this nutritional environment that seniors must negotiate.

Urban Challenges & Opportunities

Biocultural approaches allow anthropologists to understand human-environment interactions in sociocultural context, focusing on the relationships between biology, behavior, and culture in response to environmental stresses, such as those found in urban environments (Schell and Ulijaszek 1999; Ulijaszek 1997). Life in cities can present significant stressors that are not experienced in the same way by rural residents (Schell 1997; Schell and Ulijaszek 1999). For example, urban women over age 40 more frequently reported barriers to physical activity such as high neighborhood crime and pollution, lack of time, and less social support than their rural counterparts (Wilcox, et al. 2000). Urban elders in Baltimore cited neighborhood violence and racial inequities as a barrier to healthy aging (Chard, et al. 2016). Likewise, clinical and anthropological research confirms the suggestion that pollution is significantly higher in urban areas and presents a barrier to outdoor enjoyment and overall health in urban areas (Gallo, et al. 2011; Sanchez-Rodriguez, et al. 2006; Schell and Czerwinski 1998; Schell, et al. 2003).
Another stressor experienced by urban residents can be a lack of social support. Although urban elders may have more access to food programs or low-cost physical activity locations, urban residents in some studies have been found to be more disconnected from their peers and family than closer-knit rural seniors (Holmes, et al. 2008; Walker and Beauchene 1991). In Toronto, older adults living alone in urban locations are at risk of exclusion from civic life and social isolation (Nguyen, et al. 2013). Research in Japan has also concluded that urban seniors are significantly more likely to experience social isolation and related depression than rural elders, especially urban women (Tanaka and Johnson 2010). However, another study suggest that urban residents are more socially integrated and experience better overall health than rural elders (Vogelsang 2016). Since the research may be mixed on the social integration and support among urban elders, this investigation into the sociocultural environment of Anchorage seniors can illustrate important features of healthy aging.

Research also indicates that urban dietary environments are very different than rural areas, especially in Alaska. Urban Anchorage is one of the few places where chain and fast food restaurants exist in the state, making these unhealthy places “an irresistible draw” (Jilcott, et al. 2009). The enticement of fast food to urban adults extends past individual taste preferences and includes convenience and low cost. Having so many unhealthy food options can have an effect on dietary intake in urban settings, even among seniors. Older women state that fast food restaurants are often within walking range, making them difficult to avoid (ibid). Indeed, urban dwellers consume more refined grains (rather than whole grains) and sugar-sweetened beverages than rural residents (Miller, et al. 2012; Schoenberg, et al. 2013).
However, urban residents also have some advantages over rural residents. A large European study also found that material resources more commonly found in urban environments, such as access to grocery stores, a car, and a primary physician, strongly correlated with a more varied and healthful diet for seniors (Dean, et al. 2009). Since urban residents tend to consume more healthful foods like fruits, vegetables, and meat than their rural counterparts, they also tend to have lower BMIs than rural adults (Miller, et al. 2012; Schoenberg, et al. 2013). This is because urban areas provide access to more grocery and specialty food stores than rural Alaska. As discussed in Chapter 1, most produce must be grown and shipped from the Lower 48 where it reaches Anchorage first before being sent on smaller planes to smaller grocers around the state. This means that produce is often very expensive and past peak freshness upon arrival in bush Alaska, making it an unappealing and costly option. Anchorage residents certainly pay more for produce than in the Lower 48, but urban residents have access to a far greater variety of fruits, vegetables, and specialty foods than in remote regions. Anchorage also has a greater variety of gyms, recreation centers, and safe physical activity options than more remote locations (ACVB 2015; Handy, et al. 2002).

Relatedly, there are several cultural considerations for urban life in Alaska that have relevance for dietary and physical activity behaviors. Some research suggests that northern residents in rural environments may place more importance on indigenous identity, food-sharing, traditional skills and physical activities, and family and community influences on diet and physical activity choices than urban adults (Nobmann and Lanier 2001; Wolfe and Walker 1987). Indeed, several studies demonstrate that intake of local foods and engagement in subsistence activities might be higher in rural
than in urban locations in Alaska (Alaska Native Tribal Health Consortium 2008; Ballew, et al. 2006; Bersamin, et al. 2007; Nobmann and Lanier 2001; Redwood, et al. 2008). However, there are few equivalent studies conducted among multi-ethnic elders in urban Alaska for comparison. Additionally, previous research may make assumptions based on the idea that traditional values get abandoned in cities, where food and physical activity opportunities are vastly different, more plentiful, and readily available (Meg 2009). However, anthropologist Hannah Voorhees argues that this discourse surrounding Alaska Natives suggests that they “belong” in rural areas, while whites retain access to urban spaces. This emplacement of native populations as inherently rural is an over-determination of what it means to be indigenous in the modern world, a view that overlooks complex relationships between people and their environments (Voorhees 2010). This is likely why there is so little research into the sociocultural environment of Alaskans in urban spaces, especially with regard to healthy aging patterns. Since anthropologists are problematizing the concept of circumpolar emplacement and obesogenic environments, applied researchers are more frequently turning to the social determinants of healthy aging to explain rising rates of obesity in the circumpolar north.

*The Sociocultural Environment*

Lastly, an important aspect of healthy aging is the sociocultural environment. Elders develop strategies to negotiate their social environment with effects on nutritional status and health, such as relying on supportive social and food-sharing networks and utilizing formal support networks like food and nutrition programs (Quandt, et al. 2001; Schoenberg 2000; Theophano and Curtis 1991; Winter-Falk, et al. 1996). An
understanding of sociocultural influences on diet and physical activity can paint a complex picture of the ways that humans interact with their environments and the resulting health outcomes (Armelagos 1987; Thomas 1997). An individual’s food and physical activity patterns are shaped by the social influences in their environment, and they, in turn, shape the sociocultural environment in which they live. People are both products and producers of social systems as they negotiate their environments.

Although anthropologists have been investigating the social aspects of health for decades, an analysis of such social determinants has also recently been adopted by public health researchers (World Health Organization 2008). As discussed in Chapter 1, this dissertation utilizes the concept of social determinants of health to recognize that the wider set of conditions in which people work, live, and age are important influences that shape daily life and health outcomes. Such factors include the physical environment, discussed above, and sociocultural environmental aspects that influence healthy aging, such as cultural identity, the media, and social supports.

Culture

Anthropologists have long understood that the cultural meaning of foodways can be powerful determinants of nutrition and health (Lewin 1943; Mead 1964), especially for older adults (Howell and Loeb 1969). The influence of culture on the domain of food may be especially significant to the experience of aging, as older adults are perceived to be resistant to changing diets that threaten other spheres of meaning in daily life (Peters and Rappaport 1988). Since much of this work on healthy aging has been sporadic and disciplinarily fragmented, a biocultural perspective on nutrition and physical activity is
necessary to integrate the cultural influences on older adult behaviors. The study of cultural foodways is one method of understanding how people respond to their changing life circumstances as they age.

Since all human populations have culture, it is important to recognize the culture of modern food patterns in the U.S. Armelagos (1987) states that the overconsumption of meat and sugar may be due to a Euro-American culture that promotes the “maladaptive use of these substances” regardless of optimal nutritional requirements. For example, much of the research on immigrant diet concludes that “the longer you stay, the bigger you get” (Himmelgreen, et al. 2004) as new Americans adapt to Euro-American cultural patterns of increased consumption of processed food, soda, television-watching, and decreases in physical activity resulting in weight gain (Satia-Abouta 2003). Greater length of time spent living in the U.S. is also linked to reduced intake of rice and rice dishes, a culturally important food among Korean immigrants (Yang, et al. 2007). Such altered dietary patterns are also linked to greater prevalence of digestive diseases among this population of Korean-Americans.

The pathways of these nutritional status changes are often through increases in the pace of life and socioeconomic status, which cause changes in family interactions and social integration. New Americans often indicate that these altered food and physical activity patterns are necessary for their new lives in the United States (Fitzgerald, et al. 2006). For example, female immigrants indicate that they have to go to work in the United States, often for the first time, which leaves less time for cooking wholesome meals and requires quick, easy, often unhealthy meals instead (Gray, et al. 2005; Himmelgreen, et al. 2009). Additionally, qualitative research among Latino adults reveals
the struggle immigrants often face between maintaining ethnic identity through foodways, and the requests of their children to incorporate more American foods in their diets (Himmelgreen, et al. 2009). Hispanic elders who have been living in urban U.S. for an average of 25 years also place great importance on their cultural foods, which they still prefer over American foods (Kicklighter and Duchon 2002).

Gray et al.’s (2005) research among Hispanic immigrants in the southern United States also shows their struggle to adjust to new foods and lifestyles. New Americans usually enter the country with very different established eating patterns. Immigrants who had lived in fear of insufficient food resources back home may arrive to the U.S. “with a great desire to eat” (Gray, et al. 2005). People with a history of, or current experiences with, food insecurity often change their dietary intake in new cultural environments where food is more plentiful, resulting in coping strategies that can adversely affect health outcomes (Hadley and Crooks 2012; Ulijaszek and Lofink 2006). Such dietary and physical activity habits are difficult to change, especially for older adults, when these new expectations challenge established cultural values, behavioral patterns, and preferences (Silverman, et al. 2002). Immigrant and refugee populations in the United States who had past experiences with food insecurity often display altered post-migration eating patterns such as overeating and food hoarding, and increased body weight (Buscemi, et al. 2011; Franzen and Smith 2009; Hadley, et al. 2007).

However, the cultural influence of obesity, dietary intake, and physical activity levels among immigrant populations is not as clear as it may seem from a brief look at the research. There is also evidence to suggest that greater levels of acculturation in the U.S. can result in healthier consumption and physical activity patterns. For example, Van
Rompay and colleagues (2012) have found among adults in Massachusetts from Puerto Rico that greater length of time in the United States and English language usage (proxy measures for acculturation) resulted in higher levels of physical activity, fruit and vegetable consumption, perceived health, better carbohydrate quality, and less central obesity than immigrants who were “less acculturated.” Length of time in the U.S. positively correlated to increased fruit consumption for adult women from Korea (Yang, et al. 2007) and for children of African refugees (Patil, et al. 2009). Asian American immigrants who had lived in the U.S. longer engaged in more leisure-time physical activity than new arrivals (Kandula and Lauderdale 2005; Lee, et al. 2000). Likewise, Asian Americans who spoke English in the home were more likely to meet CDC recommended levels of physical activity than those who did not (Kandula and Lauderdale 2005).

Research shows that such healthy influences of the Euro-American dietary culture can result in a perception among minority populations that healthful eating equates to giving up a part of their cultural heritage and conforming to the dominant culture (James 2004). Older African Americans may continue consumption of traditional “soul foods” that they know to be unhealthy, such as those cooked in fat, in an effort to maintain tradition and avoid conforming to the dominant Euro-American culture (Raffensperger, et al. 2010). Clearly, there are complex and often contradictory findings in the literature about the effect of Euro-American culture on diet, physical activity, and nutritional status in the U.S.

Vallianatos and Raine’s (2007) work suggests that as Arabic and South Asian women struggle to maintain ties to their culture living in Canada, they often stressed the
importance of traditional cuisines and shared meals to maintain and propagate ethnic identities (2008). Anthropologist Jarvenpa (2008) argues that such cultural ties to food are especially important in the circumpolar north, where emerging wage labor markets and global political-economic forces are rapidly changing the way indigenous populations experience food. Populations in the far north are integrating traditional subsistence knowledge and skills into contemporary contexts via their food culture (ibid).

Indigenous populations have a long history of colonialism to contend with, where missionaries, boarding schools, and public health programs have long indicated the importance of Euro-American practices. Subsistence activities play a role in creating cultural differences for circumpolar peoples, where traditional skills and knowledge solidify personal notions of indigenous identity, which can have a profound effect on consumption and physical activity (Jarvenpa 2008; Searles 2002). Traditional skills and harvesting activities are closely associated with social connections and food-sharing practices, all of which are also correlated with greater recognition of cultural identity (Ohmagari and Berkes 1997; Smith 2007).

Alaska Natives in Anchorage may experience social isolation and detachment from familiar subsistence activities and food-sharing networks in urban spaces (Johnson, et al. 2009; Lowe 2010). Higher prevalence of overweight and obesity among Native American populations may also be associated with psychosocial stress from threats to cultural identity and sovereignty (Forsius 1980; Schell and Gallo 2012). Rather than simply recommending increased engagement in traditional subsistence activities and local food consumption, intervention efforts with American Indian and Alaska Native populations have begun to identify cultural influences on diet and physical activities to
explain how nutritional status is created in order to provide culturally relevant obesity prevention programs (Curran, et al. 2005; Hopping, et al. 2010b; Sharma 2010).

The cultural pathways to nutritional status among immigrant populations are similar to those experienced by indigenous Americans. Cultural identity, participation in cultural events, and subsistence knowledge all merge to create a complicated cultural environment for older adults. In addition, seniors are influenced by external factors, such as the media, friends, peers, and family, which may be important determinants in the dietary and physical activity patterns exhibited by older adults.

The Media

The media are cultural phenomena, both a reflection of cultural norms as well as a driver of culture change (Rothenbuhler and Coman 2005). As such, the media can be a powerful force acting on the dietary and physical activity patterns of the young and old, alike. From influencing notions of body image to selling fast foods, media such as radio, television, movies, and various forms of print and digital media, seem to be inescapable in the U.S. (Brewis 2011). In urban places, books, magazines, newsletters, newspapers, television, and the internet can be important sources of nutritional information for adults, including seniors (Beaudoin, et al. 2007). Indeed, the U.S. food system is the economy’s largest advertiser and research shows that the media can directly influence consumer beliefs, in both positive and negative ways (Nestle 2013).

Media can positively influence healthy behaviors for adults in a number of ways. A qualitative study found that older adults striving for a more healthy diet accessed books and print materials to obtain nutrition information (Beverly, et al. 2008). A large
telephone survey in the U.S. found that approximately 37% of older adults also utilized social media to find and share health information. Younger seniors had greater electronic health literacy than the oldest seniors, and females utilized social media more frequently for health information (Tennant, et al. 2015).

Such use of the media to access health information can positively affect adults’ dietary behaviors. Researchers state that the success of the *Apache Healthy Stores* program in the American Southwest was largely due to community messaging through radio, newspaper, television cartoons, and in-store signage (Gittelsohn and Rowan 2011). This study demonstrated that food consumption and food-related behavior changes due to a mass-media campaign were likely to reduce risk of obesity and other diet-related chronic diseases in adults.

At the same time, the media can promote unhealthy behaviors through heavy advertising of unhealthy food and sedentary leisure-time activities (Winson 2004; Yeh, et al. 2008). The effect of advertising unhealthy foods and physical activities on children and youth is well documented (Nestle, et al. 1998), but the association is less clear with older adults. Not only is this an understudied topic, but available data are outdated and have produced unclear findings. For example, a recent review of the literature found that studies on adults mostly utilized university students or staff members, or American households, methods which tend to exclude older adults (Mills, et al. 2013). The research suggests that women may exhibit several unhealthy eating behaviors linked to television advertising, such as increased consumption of cookies and soda (Falciglia and Gussow 1980; Koordeman, et al. 2010); however other studies have found no link between television advertising and cookie consumption (Wonderlich-Tierney, et al. 2013) or
overall intakes among adults (Bellisle, et al. 2009). Still yet another study found advertising influenced the unhealthy snacking behaviors of adult men, not women, contradicting other published findings in the literature (Harris, et al. 2009). These mixed results may be due to the fact that older adults are likely to be influenced by persuasive advertisements that promise to help them realize emotionally meaningful goals, such as those that relate to balancing feelings or sensing that one is needed by others (Fung and Carstensen 2003), which is not usually the focus of most food advertising.

Turning now toward the effects of sedentary television viewing behaviors, the research indicates a significant relationship exists between television watching and increased BMI in youth (Marshall, et al. 2004). For example, Crooks (2000) found that overweight children engage in more video and computer playing than those with a healthy weight, and that boys spent more time than girls viewing computer and television screens. For older adults in the U.S. and U.K., much of their day is spent engaged in such sedentary activities, where approximately 80% of their waking time (or 8-12 hours a day) are inactive (Davis, et al. 2011; Matthews, et al. 2008). Available data suggests that there is a relationship between such sedentary behaviors as reading and television viewing and adverse health outcomes in older adults (Proper, et al. 2011; Rezende, et al. 2014).

A study in Japan found that seniors averaged 840 minutes of television viewing per week, and that elders who spent more time watching television were more likely to be overweight or obese, independent of meeting physical activity guidelines (Inoue, et al. 2012). Studies in Australia (Gardiner, et al. 2011) and among Hispanic elders in Massachusetts (Gao, et al. 2007) have found that a higher prevalence of metabolic syndrome was associated with prolonged television viewing, also independent of physical
activity or energy intake. Seniors in the highest television viewing category were also more likely to be living with a spouse and to obtain less overall physical activity (Gao, et al. 2007).

Alaska Native minority populations in the U.S. may also experience acculturative forces from the media that can adversely affect diet and physical activity patterns (Bersamin, et al. 2007; Walters 1999). Research shows that public health messaging about healthy foods and exercise patterns may be insufficient in influencing an individual’s eating patterns because food is part of people’s social and self-identity throughout their lives (Guiterrez 2000; Holtzman 2006). Indeed, the success of the Cherokee Choices healthy lifestyle intervention in North Carolina was due to the combination of culturally appropriate programming and mass-media campaign (Bachar, et al. 2006).

Although much research has demonstrated the effect of the media on youth diet and physical activity patterns, little conclusive work has been done to demonstrate how the media affects the patterns of older adults. Clearly, the media employ positive and negative messages, both of which are influential in shaping nutrition knowledge and attitudes. This dissertation will fill a research gap on investigating the strength of the relationship between the media and older adults’ diet, physical activity, and nutritional status in the urban sub-arctic.

Social Influences

The research that most holistically captures factors contributing to older adult diet, physical activity, and nutritional status reveals that people are embedded in networks
of relationships that vary in structure and content, including family, friends, and other peers. The social environment is an important, yet complicated, factor in dietary and physical activity patterns. Social influences may be more important in physical activity and dietary decision-making than economic influences (Gittelsohn, et al. 2006). However, analysis on this relationship is complex, as some work indicates social networks influence healthy behaviors (Thompson, et al. 2003) while other work suggests friends and family can contribute to poor dietary and physical activity habits, especially in low-income neighborhoods.

Spousal support has a strong influence on nutritional and exercise strategies for seniors. A qualitative study found that couples who supported each other in their dietary choices and intake appeared to have more knowledge, understanding, and commitment to healthy consumption practices (Beverly, et al. 2008). However, one study found that seniors living with a spouse obtained the most television viewing and the least physical activity, resulting in the highest risk of metabolic syndrome (Gao, et al. 2007). Older adults are also at risk of experiencing shifting nutritional strategies as they move throughout the life course, such as with changing family dynamics. The loss of a spouse or moving in with relatives can result in changing roles and social stressors in older adulthood, often resulting in meal skipping, increased snacking, and reduced dietary quality (Aneshensel, et al. 1993).

Research has shown that friends, peers, and neighbors are an important source of dietary influence and provisioning for elders. However, these social relationships have complex and varied influence on nutritional strategies. Some research indicates that older adults with larger and stronger social networks have a more varied diet (Dean, et al.)
2009). For example, Silverman and colleagues found that when these dense social connections comprised a greater percentage of family members, then they positively influenced dietary intake for women (Silverman, et al. 2002). Social support has been associated with increased older adult physical activity in previous research literature, including support from family members, friends, coworkers, and other exercise participants (King 1997; Young and King 1995); however, more recent meta-analyses of the literature indicate there may not be a strong relationship between social support and physical activity (Ewald 2016).

Older women tend to receive a greater variety of food gifts from friends and family, including greater amounts of fresh produce than senior men (Quandt, et al. 2001). Women are also significantly more likely than men to receive emotional and informational social supports that increased their likelihood of meeting nutritional recommendations in older adulthood (Rugel and Carpiano 2015). Lastly, women are more likely to utilize community nutrition programs, which can have a positive effect on nutritional intake (Silverman, et al. 2002). A study in urban India found that elderly women expended less energy than men, but that women were positively influenced by social supports in their exercise (Snodgrass, et al. 2016). This ambiguity in the literature presents an ideal opportunity to research the relationship between the sociocultural influences on physical activity, diet, and nutritional status in this northern, urban population.

Possessing social networks for food sharing is important for older adults, especially Alaska Native elders. These social contacts tend to become a major source of food provisioning in older adulthood (Lee 2002; Okada 2010; Quandt, et al. 2001). Food
sharing and family and community values continue to play an important role in dietary and physical activity patterns for urban immigrants and Alaska Native residents but they struggle to “live in two worlds,” to negotiate traditional cultural influences that often conflict with their urban living and work situation (Fogel-Chance 1993; Smith, et al. 2008; Sprott 1994).

Although it may be assumed that dense social connections would result in healthy practices, research among older adults actually suggests that dense networks can contribute to adverse nutritional status, because extensive friendship networks do not always result in greater variety of nutrients in the diet (Brunt, et al. 1999). Strong attachments to family and friends in the U.S. can be associated with greater risk of obesity, because significant shifts toward healthier dietary and physical activity patterns would require older adults to restructure their existing relationships (Christakis and Fowler 2007; Silverman, et al. 2002). In an intergenerational qualitative study in Kentucky, researchers discovered that the social groups of adults contributed to a culture of unhealthy eating whereby individuals who tried to eat healthfully were excluded from social functions or persuaded to eat the same high-fat foods as everyone else “just this once.” The researchers concluded that changes in social connections and community structures would be necessary to improve nutritional status (Howell and Schoenberg 2012; Schoenberg, et al. 2013). However, even research among relatively isolated, home-bound older adults in urban areas reveals high rates of obesity (Millen, et al. 2000).

Older adults with Type-II diabetes reported greater conflict between spouses over food, where older adults with diabetes said they resented spousal control over their diet, which led some individuals to stash and hide food around the house. Despite this
unwelcome “nagging” from spouses, married couples with support in this study had more 
healthful eating patterns than those that lacked support (Beverly, et al. 2008). Indeed, 
seniors who live alone are also more likely to eat their meals alone, which is linked to 
meal-skipping and frequent snacking, both patterns which are associated with increased 
BMI (Fulkerson, et al. 2014; Leblanc, et al. 2015). Men are also more likely to skip 
meals; they reported energy intakes below recommendations when they ate alone and 
were more likely to be categorized as nutritionally high-risk (Hendrix, et al. 2008).

Of course, social support is usually linked to better health outcomes. Spousal 
support is positively associated with healthier dietary and physical activity patterns, in the 
context of disease management for older adults (Beverly, et al. 2008). The positive 
associations between physical activity and greater quality of life measures, such as 
perceptions of well-being, social engagement and connectedness, and emotional support 
for older adults are also well-documented (Dean, et al. 2009; Rennemark, et al. 2009). A 
multi-ethnic sample of older adults in the U.S. reveals that food sharing is an important 
way that elders maintain reciprocity and social relations, which can create a greater sense 
of community and reduce food insecurity (Quandt, et al. 2001), both of which contribute 
to better health outcomes (Hadley and Crooks 2012). While research suggests that peers 
could potentially have either a positive effect or a neutral-to-negative effect on the dietary 
and physical activity practices for older adults, there is a gap in the literature 
documenting the direction and strength of sociocultural influences for elders in urban 
Alaska.
Conclusions

The combined physical and sociocultural environments may contribute to high rates of obesity in Anchorage, Alaska. This nutritional anthropological study holistically examines relationships between older adults and their environments to reveal that seniors in Anchorage generally recognize their limitations and employ several strategies to overcome barriers. Anthropologists recognize that the interactions of biology, behavior, economic status, and social relations can affect the biocultural responses of vulnerable populations. Important mechanisms that older adults may exercise as a way to adapt to their environments can be guided by a sociocultural milieu that does not always align with outcomes of biological well-being (Thomas 1997). However, utilizing a healthy aging framework for this study allows me to untangle some of the complex constraints to reveal healthy aging opportunities that exist in Anchorage under the surface. These spaces of opportunity then allow public health interventions to take advantage of these multiple strategies to increase healthy aging.

The physical environment in Anchorage produces several challenges that are exacerbated in later life. The climatic and weather patterns can create dangerous conditions in which it may be unsafe for elders to leave their homes. The lack of appropriate or acceptable transportation options also restricts the movements of older adults. The high cost of living, including groceries, housing, and healthcare create a situation of competing priorities for older adults. Recognizing these limitations allows researchers to probe into the ways that seniors display adaptability to such an extreme, sub-arctic environment. Although this dissertation focuses on the sociocultural
environments of older adults, biocultural anthropological research reveals that the environment and interpersonal relationships are both important factors that shape nutritional status (Leatherman 2005). These spaces of opportunity then allow public health interventions to take advantage of these multiple strategies to increase healthy aging.

In this chapter, I have identified nutritional status patterns for seniors as well as the research on their dietary and physical activity practices. Many factors influence these patterns, such as the physical and sociocultural environment. For example, extreme weather, transportation troubles, and high cost of living as major obstacles to overcome in order to help improve nutritional status outcomes among elders in Anchorage. Research suggests that older adults can be supported in their communities with regular and reliable access to social connections and accessible transportation, which alleviates both the concerns of extreme weather and lack of a car or driver’s license. The research has also demonstrated in this chapter that finding ways to lower the cost of healthy foods or meal provisioning can result in dietary benefits for low-income seniors. Some older adults utilize various nutritional strategies to access lower cost foods, such as meal sharing and seeking sale items. However, research suggests that older adults who are isolated in the community, living alone, and have low incomes are more susceptible to low dietary quality and adverse nutritional status.

Assessment of nutritional status and body composition for older adults may thus be critical to public health planning, by indicating the need for interventions such as nutritional programs and institutionalization (WHO 1995). Programs aimed at supporting healthy aging in the city would benefit from considering the results of this dissertation,
which acknowledges more than just what people should be doing differently, but also accounts for the varying sociocultural and environmental conditions in which these decisions are made (Crooks 1999). Acknowledging that cultural identity, the media, and social contacts all merge to create a complicated sociocultural environment for older adults, allows me to investigate the relationships between such factors and diet and physical activity patterns in Anchorage. Coupling a nutritional anthropological framework with a healthy aging perspective allows me to investigate these multiple, complex relationships that create nutritional status outcomes, and to find the opportunities that exist to allow elders to age healthfully.
Chapter 3: Methods and Data Analysis

In order to document diet, physical activity, and nutritional status as well as identify the role of various sociocultural influences on healthy aging among older adults in Anchorage, I engaged in several qualitative and quantitative data collection methods. This mixed-methods approach included participant observation, semi-structured interviews, a structured questionnaire, and anthropometric measurements to help identify the relationships between the sociocultural factors that shape diet, physical activity, and nutritional status among Alaskan elders in Anchorage. This mixed-methods approach allows for a better understanding of the influences on dietary and physical activity patterns, which may influence nutritional status among elders in Anchorage, Alaska.

Since much health research in the region focuses on the influence of the economic or physical environment on nutrition (Driscoll, et al. 2013), there is a need to investigate the ways social relationships shape diet, physical activity patterns, and nutritional status (Glass, et al. 2006). There is a rich body of research on Alaska Native nutritional patterns in rural areas; however, a more generalized study of aging among a multi-ethnic sample in an urban location is largely lacking in the literature. Social connections and supports are important for healthy aging (Seeman, et al. 2001), which is often affected by factors such as age, sex, and income, so these sociocultural influences are also important factors shaping nutritional status. For example, the influence of family on grocery shopping practices, meal preparation, and leisure activities for older adults can be quite strong, in some cases entirely determining what an elder eats and what they do with their time during the day (Schoenberg 1998). Figure 3.1 (below) depicts the pathways by which the
sociocultural environment may influence nutritional status, through diet and physical activity practices, potentially affected by age, sex, income, ethnicity, and length of time spent living in Anchorage.

Figure 3.1. Model of the pathways by which sociocultural factors influence nutritional status.

The model depicts the ways in which the sociocultural environment (media, friends, family, cultural identity, cultural events, subsistence knowledge & skills) influences diet (average daily servings of food groups, HEI scores) and physical activity practices (weekly activities, weekly moderate-intensity activities, weekly caloric expenditure, weekly caloric expenditure in moderate-intensity activities). These pathways co-vary by age, gender, income, ethnicity, and length of time spent living in Anchorage. The resulting diet and physical activity patterns contribute to nutritional status, as measured by BMI and WtHR.
The independent variables in the model are the sociocultural influences derived from initial participant observations and interviews, the research literature, and pre-dissertation field work in the summer of 2012. These data sources suggest that older adults in Anchorage might be influenced in their dietary and physical activity patterns through various facets of the social environment, namely through the media, friends, family, cultural identity, participation in cultural events, and subsistence knowledge and skills (Bersamin, et al. 2007; Brewis 2011; Quandt, et al. 2001; Searles 2002; Silverman, et al. 2002; Smith, et al. 2008).

The co-variates in the model (Figure 3.1, above) are factors that might affect the dependent variables, such as by influencing the strength of the relationship between independent and dependent variables. Research on nutritional status indicates that several common sociodemographic characteristics tend to shape the nutritional status of adults (Fortunato and Drusini 2005; Hsiao, et al. 2012; Yang, et al. 2007). Therefore, age, sex, income, ethnicity, and length of time spent living in Anchorage are measured and tested for their effect on diet and physical activity patterns in this model.

The mediating variables are also in the center of the model (Figure 3.1, above) because they explain the relationship between the independent and dependent variables. In this dissertation, the mediating variables are diet and physical activity patterns, as measured by average daily serving intake of various food groups, Healthy Eating Index (HEI) scores, average number of weekly activities, average number of weekly moderate-intensity activities, average weekly caloric expenditure, and average weekly caloric expenditure in moderate-intensity activities. The dependent variables in this model are
nutritional status, as measured by BMI and WtHR. All measured constructs and variables are operationalized and justified from the literature (see below). But first I turn to the aims, hypotheses, and methods used in this study.

A holistic study of the sociocultural environment was necessary to address the three research aims: (Aim 1) document the sociocultural influences on diet and physical activity patterns among a small sample of urban elders in Anchorage; (Aim 2) document the diet, physical activity, and nutritional status among a larger sample of Anchorage elders; and (Aim 3) identify relationships between the sociocultural environment, diet, physical activity, and nutritional status in this sample.

Within these three research aims, I tested five hypotheses: (H1) significant influences on diet and physical activity will come from the media, friends, family, cultural identity, participation in cultural events, and subsistence knowledge & skills; (H2) diet and physical activity practices will differ adversely from national recommendations for older adults; (H3) diet and nutritional status will differ adversely from national reference samples; (H4) sociodemographic characteristics (age, sex, income, ethnicity, residence time) will have an effect on diet and physical activity practices; and (H5) participants who report strong social relationships (friends, family) will have healthiest nutritional status.

**Study Design**

Qualitative and quantitative data collection strategies with a cross-cultural sample of older adults can help to ascertain the multi-faceted role of social connections on diet and exercise patterns that may predict nutritional status (Robinson, et al. 2015). Diet
quality and energy balance (intake vs. expenditure) are important factors for maintaining a healthy nutritional status during the aging process (Popkin, et al. 2005; Swanson, et al. 2011; Ulijaszek 1996). Therefore, the influences on food and physical activity may be related to nutritional status, which can illustrate the effect that social relationships and cultural considerations have on healthy aging. To achieve the three research aims in this dissertation, I utilized a mixed-methods study design including participant observation, semi-structured interviews, anthropometric measurements, and a questionnaire with sections on demographics, diet (Block FFQ), physical activity (CHAMPS), and sociocultural influences (SIS). Table 3.1 (below) depicts the methods used in this dissertation to meet the three research aims and test the five hypotheses, along with the number of participants engaged in each component of the research.

**Table 3.1. Aims, hypotheses, methods, and sample sizes for study.**

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<th>Aims</th>
<th>Hypotheses</th>
<th>Methods (N)</th>
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| 1. Document the sociocultural influences on diet and physical activity patterns among a small sample of urban elders in Anchorage. | H1: Significant influences on diet and physical activity will come from the media, friends, family, cultural identity, participation in cultural events, and subsistence knowledge & skills. | • Participant observation  
• Interviews (N=15)  
• Questionnaire (N = 82) |
| 2. Document the diet, physical activity, and nutritional status among a larger sample of Anchorage elders. | H2: Diet and physical activity practices will not meet national recommendations for older adults.  
H3: Diet and nutritional status will differ adversely from national reference samples. | • Questionnaire  
• Anthropometrics (N = 82) |
Participant observation and semi-structured interviews with 15 elders in Anchorage served to identify sociocultural influences on diet and physical activity patterns (H1). The structured questionnaire documented such food and physical activity patterns among the sample of 82 older adults to test whether they differed significantly from recommended guidelines (H2). The anthropometric measurements documented nutritional status in the community, allowing me to test the sample diet and nutritional status against the national reference population (H3). The questionnaire also provided sociodemographic characteristics, which may affect the relationship of the independent variables to nutritional status (H4). Lastly, the questionnaire asked participants to rank the degree to which each sociocultural influence had an effect on their own personal practices, which allowed me to evaluate the strength of the relationship between the sociocultural environment and healthy aging (H5).

These data collection methods were essential for providing a comprehensive understanding of older adult nutritional experiences in Anchorage. Utilizing both qualitative and quantitative data in a single project enables researchers to examine complex phenomena in detail (Creswell 2003). Mixed methods approaches are especially useful in identifying the various sociocultural, economic, and environmental dimensions of health issues (Gravlee 2011). For nutritional anthropological research, qualitative
methods such as participant observation and semi-structured interviews can provide context and clarity to the quantitative food frequency and physical activity data, which often do not tell the whole story of nutrition in the community (Dressler, et al. 2008; Ice, et al. 2011; Okada 2010; Schell, et al. 2007). Additionally, qualitative methods are an important data collection strategy for working with older adults (Rowles and Schoenberg 2002).

This eight-month mixed-methods study ran from December 1, 2013 – July 31, 2014. Table 3.2 (below) illustrates the timeline of the four major data collection activities.

### Table 3.2. Data collection methods and timelines.

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Participant observation data were recorded in the form of handwritten field notes for the entire duration of the study. Beginning in community centers, senior housing communities, and medical centers, I engaged in participant observation for the first two months in the field (see below). These initial experiences, as well as meetings with several community-based researchers, assisted with making initial contacts within the
elder community. In February 2014, I began recruiting for the semi-structured interviews among 15 key informants in the municipality of Anchorage.

Utilizing these initial interviews, participant observations from the first two months, previous research, and the literature, I finalized the sociocultural influences survey (SIS) in February 2014. Once the questions for the SIS were finalized, I began collecting quantitative questionnaire and anthropometric data from a separate sample of 82 research participants aged 65 years and over. The semi-structured interviews with 15 seniors and the questionnaire/anthropometric data from 82 elders resulted in a total sample of 97 research participants.

Institutional Reviews

Research permissions and oversight were obtained from two institutions, the University of Alaska Anchorage (UAA) Institutional Review Board and the Alaska Area (tribal) Institutional Review Board (IRB). The University of Kentucky’s Office of Research Integrity, my home university, signed an Independent Ethics Committee Authorization Agreement deferring all IRB approvals, permissions, and continuing oversight to be made by the UAA IRB, because of the remote location of my work. All study protocols and materials were also reviewed and approved by the Alaska Area IRB, because the study included American Indian / Alaska Native participants.

Informed consent was obtained from all research participants by orally reviewing the approved, three-page informed consent document with participants. Participants who spoke English as a second language were encouraged to bring a trusted relative or friend
to their appointment with the researcher to help them understand the study during the informed consent process. Those potential participants who did not appear to understand English well enough during the consent process and did not have someone close to them that could translate were not enrolled in the study (this happened with two Korean women). For those participants who understood the study and consented, signed copies of the informed consent were obtained and participants were given a copy to take home with them, for their records.

Since monetary remuneration demonstrates gratitude and a commitment to ongoing relationships between researchers and participants (Mduluza, et al. 2013), all research participants were compensated for their time. Previous research and discussion with other local researchers had established that cash or gifts valued at approximately $20 per hour for health research conducted in Alaska is appropriate (Slattery, et al. 2007). The following is an in-depth description of the recruitment and methods used in this project.

**Recruitment**

Participants recruited into the study were either *key informants* (semi-structured interviews, N=15) or *general participants* (anthropometrics and questionnaire, N=82), for a total sample size of 97 seniors. Initial, or “seed,” participants were recruited from four specific sites around Anchorage based on their demographic characteristics (Arcury and Quandt 1999) such as age (aged 65 years or older) and ethnicity (Alaska Native, Asian, African-American, or Euro-American), a strategy that reflects the population parameters of interest and approximates the results of probability sampling (Bernard 2006).
Recruitment of seed participants was based primarily in two community centers and two senior living complexes in Anchorage. This site-based approach utilized local gatekeepers and staff within these four sites to aid in recruitment from their membership and resident populations through word-of-mouth and local media (fliers) in these sites. These sampling strategies yielded a participant population of 82 seniors from all over Anchorage who completed the quantitative questionnaires and anthropometric measurements.

I primarily recruited participants via fliers (see Appendix A) and word-of-mouth from four different locations around Anchorage to obtain a sample of elders with a diverse range of activities and dietary patterns. Although I could have easily recruited all study participants from a single community center, it is possible that elders attending community centers do not accurately represent seniors in the broader community (Harada, et al. 2001). Therefore, I chose one community center with a fitness program and one without. I also chose two senior living communities, one with a fitness program and one without. “Fitness programs” in these two locations consisted of access to gym equipment that was available for use as well as a schedule of group fitness classes available throughout the week.

This convenience sampling strategy did not yield a study population that exactly matched the sociodemographic characteristics of the older adult population of Anchorage. This is because word-of-mouth can result in a homophily bias, where initial study participants tend to refer other participants of the same racial, ethnic, and socioeconomic groups (Heckathorn 1997). However, initial seed participants were chosen
from diverse backgrounds and minority groups were purposefully sampled to minimize the homophily effect.

Convenience sampling can also be biased by volunteerism, which tends to select the most cooperative participants. Since two of the four main recruitment locations were senior centers, I likely recruited older adults that get out of the home and volunteer more often. To alleviate that potential bias, I also recruited from two senior living complexes. However, utilizing senior living complexes resulted in recruiting low-income participants living alone or with only one other person (both are requirements set by these complexes), which did not represent the broader senior population in the city. Although this population of elders provides this study with important information on the aging and nutritional experiences of the city’s most vulnerable seniors, it may introduce some bias into the findings.

**Description of Recruitment Sites**

For the bulk of the recruitment, I worked collaboratively with staff at four locations, two community centers and two senior living communities in Anchorage, in exchange for my volunteer time. All elders recruited into the study were considered “community-dwelling” seniors, meaning that none were institutionalized or living in assisted living homes. Everyone selected for the study lived freely in the community, either in their own home or apartment, or with relatives. Community-dwelling older adults were chosen for this study because they exercise more agency over their meals and physical activities, whereas institutionalized adults can be much more restricted in their
dietary and physical activity patterns. Most recruitment was conducted in four locations, two community centers and two senior living complexes.

Community Centers

The Dena Center† is a community and senior services center where I volunteered with the newsletter and organizing social events. The Dena Center had a small office location in the heart of the city that provided local resources and information, a food pantry, a clothing donation shop, and a small grant-funded bus service that would take senior members around the city free of charge. Because of these services and its location, this community center served primarily low-income seniors.

The Dena Center also had an internship program for older adults seeking re-entry into the workforce. After completing a training program, seniors were placed in volunteer positions throughout the community to gain work experience and skills so that they could find gainful employment. I volunteered at Dena once a week throughout the duration of this study. The Dena center did not have a fitness program or wellness initiative and had little foot-traffic through its doors. My work at this center was mostly outreach through phone calls and home visits to bring out some of the city’s homebound seniors to attend quarterly social events, such as a Thanksgiving dinner or ice cream socials. My work at the Dena Center resulted in recruitment of individuals who would not have otherwise had access to participate in research studies.

† Names of all community centers, living complexes, and research participants have been changed to protect their anonymity.
The other community center differed from Dena because it was a large, bustling center. Although social events were also common, the Sitka Center was a larger facility boasting art rooms, meeting spaces, a cafeteria, a gym, and group fitness classes and cross-country ski paths that seniors frequently utilized on the grounds. I volunteered at Sitka twice a week doing a variety of tasks including supervising the gym, assisting with teaching dance classes, and working as wait staff at luncheons and special events. I also tabled a booth for the Sitka Center at a local health fair and represented the center in a local charity walk alongside its membership. I also became the center’s youngest member so that I could spend time there when I was not volunteering. Because there was more foot traffic through the Sitka Center than at the Dena Center, I recruited more participants into the study from Sitka.

However, not everyone recruited from Sitka was a particularly active senior. Although some attended fitness classes, others utilized the center purely to play board games, engage in discussion groups, or play pool. The Sitka Center membership required a fee, so participants recruited here likely had more expendable income than Dena Center members. In addition to these two community centers, I also recruited participants from the 3rd Annual We Are All Elders in Training Summit, grocery stores, bus stops, a community choral group, and two senior living complexes in Anchorage.

**Senior Living Complexes**

At one senior living complex, Quenaga Creek, the service coordinator was pleased to support this research project because it aligned with their healthy aging initiatives. Quenaga is located in a quiet neighborhood with sidewalks and bus service,
making it an accessible location. Quenaga also boasted community garden spaces that were highly coveted by the residents, who accessed such spaces through an annual lottery. They had established a wellness center on the grounds that was being underutilized, which provided me with office space for data collection. The wellness space contained an inner office with a waiting room, so I could hold office hours on-site, collecting data with one participant in a private space while another participant could wait for their turn to participate in the project. This space was not a fitness center, and I held weekly office hours at this location until the resident population, approximately 250 seniors, had been exhausted of people willing to participate.

I obtained similar permissions at a second senior complex, Sunrise Estates, where I also taught a free yoga class for the residents. Here, outdoor exercise was a little more difficult for seniors because of the hills and various terrains that spanned the complex. Seniors sometimes complained that they had trouble just getting from one building to another. However, this complex has heated sidewalks that melt snow and ice before they become a problem, a unique and useful feature in this northern location. I was welcomed by the resident engagement team and provided with an office space for data collection. Because this living complex was larger and more spread out than Quenaga Creek, it was crucial that I volunteer in addition to holding office hours so that people got to know me. Sunrise Estates had a brand new fitness facility where I started a senior yoga program that continues at the time of this writing, with new volunteer teachers. This senior complex was extremely diverse because they gave leasing preference to minority elders in Anchorage. Being active and present at these two living complexes was important to
gathering a population of seniors that would have been otherwise inaccessible to me just by recruiting through community centers and at civic events.

In all four locations, seniors and staff were made aware that I was conducting doctoral research. Most people that I encountered were more than willing to participate in my project, often stating that it made them feel good to help me get a degree. Since I was often seen helping out and volunteering, even some of the more reluctant individuals began to trust me enough to participate in the study. Seniors were also generally pleased that I was interested in “studying them” (older adults) in Anchorage.

**Qualitative Data Collection & Analysis**

Participants selected from the community engaged in either qualitative or quantitative data collection strategies. Qualitative methods are an effective approach to explore the relationships between individuals and their sociocultural environment, by revealing how people experience and perceive the way that health is shaped by their environment (Belon, et al. 2014). Qualitative data can also reveal grounded, rich, and previously underexplored insights about a community. There are two main qualitative methods employed in this study, participant observation and semi-structured interviews (N=15). Observations were recorded for the entire duration of the study and served as the main source of local information to finalize the influences in the survey questionnaire, along with the key informant interviews.
Participant Observation

Participant observation allows researchers ongoing and sustained contact with research participants for direct observation and information about their behaviors, allowing them to see how, and ask why, people are practicing certain activities in public and private spaces (Preissle and Grant 2004). Participant observation is also useful to triangulate data collected via other means, such as self-report instruments and semi-structured interviews (LeCompte and Schensul 1999). Observations allowed me to answer questions such as: what types of foods are eaten, when, and with whom? How are older people physically active throughout the day and do people choose intentional activities for purposeful exercise? What function do traditional foods or activities play in this urban community? What is the role of peer influences and diet and physical activity patterns? Do people only eat specific foods or engage in specific activities in certain circumstances, such as when they are with family or attending community events? Does there seem to be concern with choosing healthy foods or dieting in this population?

I was better able to grasp some of these issues by documenting behaviors observed in senior and other community centers, restaurants, and parks, participating in meals, activities, and other community events in Anchorage. Participant observation allowed me to gather important initial data on diet and physical activity practices and their social and cultural impacts. Of course, there are limitations to conducting observations in public, rather than private spaces. Because I was so active in public spaces for recruiting purposes, there are daily dietary and physical activity practices as well as important social interactions between seniors that I did not observe. However,
these public observations, along with semi-structured interviews, allowed me to confirm the utility of the structured questionnaires I chose to use, to finalize the sociocultural influences instrument, and to provide context about the public lives of urban Anchorage elders.

*Semi-Structured Interviews*

After conducting observations in the community for the first two months of the project, I selected 15 individuals for interviews as key informants based on a variety of characteristics, including age, sex, ethnicity, nutritional status, willingness to participate in an interview, dietary and physical activity patterns, and their ability to inform me about other seniors’ general food and physical activity patterns. These characteristics varied by participant; for example, I did not only interview prominent or out-spoken individuals, but also approached less active members of the community for interviews. Similarly, I sought out a variety of key informants based on nutritional status and social connections, including both people who had lots of friends and family as well as those who had few. I selected individuals along a continuum of these characteristics so that I could capture the variety of experiences among Anchorage’s senior population.

Semi-structured interviews are based on written guides of topics and questions that are flexible enough to allow for open-ended responses, discussion, and conversation to occur between participants and researchers (Bernard 2006). Through my networks and existing relationships at senior living complexes and community centers, I conducted semi-structured interviews with 15 participants from a list of questions and topics, built from the literature and my participant observation, to guide the interviews (see Appendix
The interviews documented dietary and physical activity practices and the influence of various sociocultural factors on these behaviors among elders in Anchorage. Interviews were recorded, transcribed, and coded thematically in NVivo v.9 software (QSR International 2011) to provide context for the study and to confirm that I had gathered relevant foods and societal considerations to include in the questionnaire. These interview data were used, along with field observations, to finalize the SIS section of the questionnaire.

*Qualitative Data Analysis*

Semi-structured interviews lasted between 28 and 101 minutes. All interviews were audio-recorded and transcribed in their entirety and thematically coded using NVivo. Field notes from participant observation and interview transcripts were coded for themes relating to the influences on diet and physical activity behaviors. Text segments consisted of a sentence or a paragraph that was affixed to a code using both deductive and inductive analysis, meaning that codes were both theoretically-driven and came organically from the data. For example, I knew before I started this work that there were certain sociocultural factors that I was looking for, so codes on friends, family, and the media’s influence on food and physical activity patterns were predetermined by the public health and nutritional anthropology literature, as an initial deductive step in coding field notes (Pelto and Pelto 1978). Inductive analysis is used to create new themes from the data that may not have been anticipated, like the extent of elders’ transportation problems in navigating the city, as this has an effect on an older adult’s ability to socialize and shop.
Coding involved a careful analysis of field notes and interview data and affixing low-inference codes to text segments (Card 2015). Low-inference codes are those that are discrete from each other and do not require high levels of value judgments to assign text segments to codes. For example, a code for “vegetable consumption” and a code for “occupation” require a low-level of inference because they are distinct categories that would not often be confused. Deductive and inductive open-coding were used to identify themes and to create a codebook (Ryan and Bernard 2003).

Qualitative analysis also included the use of the constant comparison method, which involved refining low-inference codes into more specific sub-codes. As codes were categorized and re-categorized, the data were constantly being compared to other codes and text segments, such that the codes and sub-codes become refined over time. This method allows researchers to code and analyze the data at the same time; refining concepts, identifying their properties, and exploring their relationships (Taylor and Bogdan 1984).

Using low-inference coding and the constant comparison method during codebook creation increased the likelihood that the coding process was reliable (LeCompte and Schensul 1999). Reliability of qualitative data coding and codebooks can also be obtained by demonstrating consistency between individual coders, or inter-coder reliability (Weber 1990), on a sample of 10% of the interviews (Neuendorf 2002).

Another researcher trained in qualitative data analysis, who had also conducted her own qualitative research on the dietary and physical activity patterns of older adults, assisted me with this task. She began by reading over two interviews along with the initial codebook I developed. She presented me with several questions about specific codes,
how to use them, and how they might be different from others, resulting in a second draft of the codebook.

Next, we independently coded the first interview using the newly refined codebook. After the first interview was coded and compared, we refined the codebook a second time and independently coded a third interview. We compared our codes and refined the codebook a third and final time, achieving 82% agreement, indicating sufficient inter-coder reliability (Bernard 2006). I solely coded and analyzed the remaining 12 interviews using this codebook. Ensuring reliable qualitative data through low-inference coding, the constant comparison method, and 82% inter-coder reliability suggested that these qualitative results were appropriate for use in finalizing the questionnaire. The qualitative codes and themes suggested that I had captured all of the relevant sociocultural influences on diet and physical activity patterns in the quantitative instruments.

**Quantitative Data Collection & Analysis**

Once the questionnaire was finalized from observation and semi-structured interview data, I began recruiting a sample of 82 participants to complete the quantitative data phase of the project. For the quantitative data collected, PASS v. 11 software (NCSS 2011) indicated a sample size of 82 participants achieves 90% power to detect an $r^2$ of 0.03 attributed to the six independent variables (the sociocultural influences on the questionnaire) using an f-test with a significance level of 0.05 (Cohen 1988). An $r^2$ of 0.03 is a conservative estimate, since previous biocultural research suggests cultural factors may account for between 0.026 and .055 of variance of caloric intake (Dressler, et
al. 2004). This suggested that my sample size, although small, would be sufficient to test for the strength of six independent variables on nutritional status.

Recruitment for these participants was different than for the 15 interviewees (described above). Rather than seeking out certain types of individuals, I needed a larger sample size of volunteers. I recruited primarily via snowball sampling at my four primary recruitment sites and through community flyers. Snowball sampling was chosen because previous research that included Alaska Native people has indicated that local Native advisory committees favor convenience sampling over randomized sampling strategies (Smith, et al. 2008). Because Alaska Native people were included in this study, I needed a sampling strategy that would be culturally appropriate and acceptable to the local Alaska Native tribal groups. These 82 sample seniors participated in anthropometric measurements followed by the orally administered questionnaire.

**Anthropometrics**

I collected anthropometric measurements immediately preceding the orally administered questionnaire, and each participant was measured once. Anthropometric data (height, weight, waist circumference) were collected using standardized procedures (Lohman, et al. 1988). Height was measured to the nearest 0.01 centimeter using a SECA stadiometer and weight was measured to the nearest 0.1 kilogram with a SECA digital column scale. Waist circumference was measured by the researcher with a measuring tape at the superior iliac crest to the nearest millimeter (Gibson 2005). All anthropometric measurements (height, weight, waist circumference) were entered into the data file for each participant. From these three anthropometric measurements, two indices were
calculated to estimate nutritional status: body mass index (BMI) and waist-to-height ratio (WtHR).

Nutritional status is a measure of height, weight, and body fat accumulation that indicates if diet and physical activity levels are sufficient for optimal health (Dufour 1991). Body mass index (BMI), is an easily obtained, standardized, internationally recognized measure of population health (WHO 2000). However, BMI can overestimate overweight and obesity in particularly muscular individuals (Frisancho 2008). Although BMI may be an imperfect measure of overweight and obesity for some individuals, it is considered a reliable indicator of body composition for older adults (CDC 2016). Body mass index is expressed as kilograms of weight per square meter of body height. Since all measurements were collected in metric units, I used a Microsoft Excel formula to calculate BMIs then imported these values into a data file using SPSS v. 22 (IBM 2013) as follows:

\[
\text{BMI} = \frac{\text{weight (kg)}}{\text{height}^2 (m)}
\]

Based on BMI, individuals were classified into nutritional status categories according to the CDC (2010b) as shown in Table 3.3 (below).
Since BMI is only an approximation of body fatness, I also measured waist circumference as an indicator of central adiposity that is highly correlated to increased risk for obesity and chronic illnesses (Caballero 2007; Gibson 2005). Measures of abdominal adiposity are calculated as a waist-to-height ratio (WtHR), which is used to triangulate height and weight data, since it may be a better measure of nutritional status and health than BMI alone (Browning, et al. 2010; Lee, et al. 2008). Since height and waist circumference are simple measurements that can be rapidly and precisely measured in the field, WtHR is an ideal, validated indicator of nutritional status (Ashwell and Hsieh 2005; Savva, et al. 2000). I calculated WtHR with a formula in Microsoft Excel and imported the data into the data file as follows:

\[
WtHR = \frac{\text{waist circumference (cm)}}{\text{height (cm)}}
\]

A total of 82 older adults participated in the anthropometric component of the study. Participants met individually with the researcher for data collection. Measurements were taken in privacy, often in an individual’s home or my office. After measurements
were taken, these same 82 individuals also completed an orally administered questionnaire with the researcher.

*The Questionnaire*

The quantitative questionnaire is one of the most essential data collection tools used in this study to address all three research aims, by providing information on significant social and cultural influences (Aim 1), documenting nutritional status, diet, and physical activity practices (Aim 2), and determining the relationship between the sociocultural influences and nutritional status (Aim 3). The questionnaire was orally administered as a structured interview to 82 participants immediately following anthropometric measurements to collect information in four main areas: sociodemographics, food frequency, physical activity, and sociocultural factors influencing diet and physical activity practices.

*Sociodemographic Section*

The first section included questions on sex, age, annual household income, ethnicity, number of years spent living in Anchorage, and number of household members. These data were included to test for any co-varying effects of age, sex, income, ethnicity, and residence pattern on dietary intake, physical activity, sociocultural factors, or nutritional status in the analysis. Following standard conventions in the anthropometric literature (National Center for Health Statistics 2012), participants’ ages were condensed into three groups for analysis: individuals up to age 69, aged between 70-79 years, and those 80+ years old. Ethnicity was recorded according to four broad racial groups used by
the U.S. Census bureau for analysis (Euro-American/white, African American/Black, American Indian/Alaska Native, and Asian) and commonly used in the public health literature (Adams, et al. 2003; Bell, et al. 1997; Schoenberg and Gilbert 1998; Seccombe 1989). Annual household income was recorded into four categories: up to $25,000 per year, between $25,000-$44,999 per year, between $45,000-$99,999 per year, or $100,000 per year and above (Friedlander, et al. 2013; Smith 2008). Length of time spent living in Anchorage was reported in number of years, which I condensed into three time periods (10 years or less, 11-20 years, or 21+ years). I also condensed the number of people living in the household into two groups (living alone or living with at least one other person) for analyses, since the gerontological literature suggests living alone is associated with increased nutritional risk (Sharkey and Schoenberg 2002; Walker and Beauchene 1991).

*Food Frequency Questionnaire*

The second section of the structured instrument was a food frequency questionnaire (FFQ), a comprehensive list of specific food items that recorded usual intakes over a defined time period (Cade, et al. 2004; Gibson 2005). Because seasonality may affect food consumption, usual intakes from an FFQ are more desirable than 24-hour recalls for this study (Kuhnlein, et al. 1996). Food frequency questionnaires are a rapid, low-cost method that allow researchers to categorize specific foods into food groups, such as fruits, vegetables, and those high in sugars and fats to identify overall dietary patterns for a group of people (Ulijaszek and Strickland 1993). FFQs are easy to administer under field conditions with high response rates and may be as accurate as...
other methods (e.g. 24-hour recalls, weighed food inventories) with respect to consumption of main food groups (Lockie, et al. 1988; Resnicow, et al. 2000).

For this study, I used the Block Food Frequency Questionnaire, a 110-item questionnaire designed to estimate customary intake from a wide array of nutrients and food groups (Block 1998). The Block FFQ is administered with a picture sheet to aid in accuracy of individual portion sizes reported, ranging from “never” to “every day” (see Figure 3.1, below). The Block FFQ was chosen because the food list was developed from the CDC’s National Health and Nutrition Examination Survey (NHANES) dietary recall data, making data easily comparable to national intakes and recommended guidelines (see Appendix C for full instrument). This instrument is considered reliable and validated for use with adults (Block, et al. 1990; Boucher, et al. 2006), people with chronic illness and seniors (Houston, et al. 2008; Kalantar-Zadeh, et al. 2002; Mares-Perlman, et al. 1993), and multi-ethnic and minority populations (Block, et al. 1992; Coates and Monteilh 1997; Coates, et al. 1991), making this a suitable instrument for this study (see Figure 3.1, below).
The company that created the Block FFQ, NutritionQuest, had previously developed an Alaskan Foods Supplement in collaboration with a researcher from the University of Alaska. Previous research indicated that this list of local Alaskan foods was appropriate to administer to elders in Anchorage, regardless of ethnicity for this research. This is because local Alaskan foods like berries and seafood are readily available and a major source of nutrition for everyone living in the region (Alaska Food Policy Council 2014). All food items from the FFQ were categorized into the six food groups used by the CDC and USDA: vegetables, fruits, grains, proteins, dairy, and fat/sugars. Average intakes were also calculated in SPSS for each food item to estimate the daily servings of each food group for analysis and comparison with national recommendations.

Dietary patterns were also assessed by calculating a healthy eating index score for the sample. The Healthy Eating Index score (HEI) is a measure of diet quality developed by the USDA and used in the National Health and Nutrition Examination Survey.
(NHANES) that demonstrates whether the sample meets federal dietary guidelines (Guenther, et al. 2013). The HEI measure, updated in 2012 to follow the most recent dietary recommendations, was calculated for this sample based on standard published scoring where the sum of 10 dietary components are weighted equally (Center for Nutrition Policy and Promotion 2015; Guenther, et al. 2013). Each component of the HEI has a possible minimum score of 0 and maximum score of 10. The total maximum HEI score is 100, where a higher score indicates greater dietary quality, closer to the recommended ranges and amounts of different food groups. The HEI score allows comparison of dietary quality of the sample to the national reference population of older adults.

*Physical Activity Survey*

The third section of the questionnaire is the 41-item Community Healthy Activities Model Program for Seniors (CHAMPS) physical activity survey. The instrument covers activities undertaken for exercise purposes during the course of the day, and physically active recreational activities during a typical week in the past four weeks. The CHAMPS is an appropriate instrument because it was designed specifically for seniors, is considered reliable (Stewart, et al. 2001), and has been validated for use among diverse elder populations, including community-dwelling seniors, retirement community residents (Harada, et al. 2001), African-Americans (Resnicow, et al. 2003), Euro-American, and Asian American populations (King, et al. 2000). This instrument allowed me to code physical activity frequency and energy expenditure to determine the
distribution of the sample engaged in light, moderate, and vigorous physical activity for comparison with reference populations and national recommendations.

Physical activity measures are often reported in the nutritional literature as two separate constructs: frequency of activity performed and energy expenditure (Haveman-Nies, et al. 1996). This is because physical activity frequency measures the occurrence of exercise-related activities, while energy expenditure (EE) measures the calories burned as a result of performing those physical activities (Hills, et al. 2014). Activity frequency from the CHAMPS responses were reported using six categories ranging from “less than one hour per week” to “nine or more hours per week” (see Figure 3.2, below, or Appendix C for the full instrument). These data were classified into mean weekly frequency of activities for analysis following published standards (UCSF Institute for Health & Aging 2003).

Figure 3.3. Sample question from the CHAMPS physical activity survey of the questionnaire.

<table>
<thead>
<tr>
<th>In a typical week during the past 4 weeks did you…</th>
<th>How many TOTAL hours a week did you usually do it?</th>
<th>Less than 1 hour</th>
<th>1-2 ½ hours</th>
<th>3-4 ½ hours</th>
<th>5-6 ½ hours</th>
<th>7-8 ½ hours</th>
<th>9 or more hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>33. Swim gently? YES How many TIMES a week? ___</td>
<td>➔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NO</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

95
To calculate energy expenditure, each CHAMPS activity is assigned a Metabolic Equivalent value (MET), following procedures from Stewart and colleagues (2001) and Ainsworth et al.’s (2000) physical activity compendium. A MET is a measure that expresses the energy cost of physical activities and is used as an index of the intensity of activities. For example, the MET value of sleeping is 0.9 and fast running is 23. Appendix D shows all physical activities in this study categorized by their MET value and physical activity level, such as light, moderate, or vigorous. For activities that were not specifically listed (e.g. water exercises), I assign a weight by interpolating a value based on other similar activities (e.g. the water exercises MET value was drawn from water aerobics in the compendium) based on published standards (UCSF Institute for Health & Aging 2003). These MET values were used to calculate energy expenditure for each activity, expressed in kilocalories. Energy expenditure per week in exercise-related activities was calculated using the Revised Codebook for CHAMPS Physical Activity Measures (UCSF Institute for Health & Aging 2003).

Sociocultural Influences Survey

The fourth and final section of the questionnaire is a sociocultural influences survey (SIS) created from early participant observation, the literature, semi-structured interviews, and my previous research in Anchorage in 2012. This final section of the questionnaire contained six likert-scale questions that allowed participants to rank how important various influences are on their dietary and physical activity patterns. Likert-scale items are a common means of operationalizing and measuring the relationship
between variables (Creswell 2003), including lifestyle behaviors and cultural influences (Bindon 2007). For example, researchers on the Pathways project have created sociocultural scales to measure the effect of various aspects of ethnic identity on diet and physical activity patterns among American Indians of the Southwest and Plains regions (Stevens, et al. 1999).

This final section of the questionnaire allows participants to select how much they agree or disagree that each social and cultural variable affects their diet and physical activity patterns on a scale of 1-5, where a score of one means “this factor has no influence on my choices” ranging up to five which means “this factor is the most important influence on my choices” (see Figure 3.3, below, or Appendix B for the full instrument). A likert-scale instrument allows me to quantify these sociocultural factors and test their strength on nutritional status (Dressler 2005; Georges, et al. 1992).

**Figure 3.4. Sample question from the SIS survey of the questionnaire.**

<table>
<thead>
<tr>
<th>Question: How much do the following factors influence your dietary and physical activity</th>
<th>Has no role in my choices</th>
<th>Has very little role in my choices</th>
<th>Has some role in my choices</th>
<th>Has strong role in my choices</th>
<th>Is most important role in my choices</th>
</tr>
</thead>
<tbody>
<tr>
<td>The media (television, movies, advertisements)</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
</tbody>
</table>

From these responses, I calculated descriptive statistics to characterize the study sample’s ranking of the strength of various influences on dietary and physical activity patterns. Responses on the 5-point scale were condensed into two categories to report
frequencies, “has no to very little role in my choices” and “has some to most important role in my choices.” Two response categories were utilized because participants exhibited a central tendency bias, avoiding extreme responses. The most common research strategy to minimize this form of respondent ambiguity is to collapse a 5-point Likert scale into only two categories, rather than three or four (Allen and Seaman 2007; Williams 2013). Using dichotomous categories is the best strategy for capturing trends in such data where participants may have had some difficulty in selecting their responses (Grimbeek, et al. 2005).

The six sociocultural influences were chosen from the observations and interviews, the research literature, and my previous work in Anchorage. Since older adults receive information about diet and exercise through a variety of means, the SIS began with a question about the influence of the media. As a major reflection of culture in American society (Brewis 2011), advertising, movies, and television have been shown to be significant pathways to nutritional information and exercise patterns for older adults (Brawley, et al. 2003b; Nestle, et al. 1998; Reger, et al. 2002; Yeh, et al. 2008).

Social aspects of healthy aging, such as strong relationships with friends and family, are the focus of this research. Since social relationships have been shown to be significant factors in the wellbeing of older adults (McClintock, et al. 2016; Phelan, et al. 2004; Quandt, et al. 2001; Seeman, et al. 2001), it was essential to capture the ways in which these social factors may influence nutritional and physical activity patterns in Anchorage. For this project, measuring social influences was operationalized into two constructs on the SIS: the role of friends and the role of family on dietary and physical
activity decisions. This allowed me to ask individuals to rate the strength of their own social connections in a way that made sense to the participants, and to test their effects on diet, physical activity patterns, and nutritional status.

Research suggests the importance of cultural and ethnic identity increases with age for some populations, as older adults begin to engage in more meaningful roles of knowledge transmission to younger generations (Fry, et al. 1997; Lewis 2014). Since cultural identity can be spread throughout many aspects of an older adult’s life (Belza, et al. 2004; Peters and Rappaport 1988), the role of culture on physical activity and dietary patterns is an important concept for this project. Cultural identity can influence older adults through their food choices and exercise patterns (Redwood, et al. 2008), as well as the social activities they choose to participate in, which often involve cultural activities and/or food (Schoenberg, et al. 2013). Therefore, two separate constructs were created to measure the influence of culture on older adults: the role of cultural identity and participation in cultural events.

The multi-cultural community of Anchorage, although urban, has a significant subsistence component that permeates life not only through food and nutritional practices but in recreation, language and communication, and aspects of individual identities (Loring and Gerlach 2009; Voorhees 2010). Although there is a significant Alaska Native population living in Anchorage, older adults also consist of Euro-American homesteaders, migrants from the southern states, and recent immigrants from Asian nations. All of these groups brought to Anchorage with them notions of cultural foods and important subsistence practices. People of all cultural backgrounds take advantage of
the abundance of local fish, caribou, moose, bear, and forest greens, regardless of cultural identity (Alaska Food Policy Council 2014; Caulfield 2002). Therefore, it was important to capture the importance of participating in these two constructs, cultural events and the use of subsistence skills, for all participants in this study. It is through self-reporting these six constructs that I was able to operationalize the sociocultural environment and test the strength of these relationships to diet, physical activity, and nutritional status in Anchorage, Alaska.

**Quantitative Data Analysis**

All anthropometric and questionnaire data were entered into the SPSS dataset. Frequencies, means, and standard deviations were calculated and reported for the sample overall, as well as by sex, age, income, ethnicity, residence time in Anchorage for nutritional status, dietary intake, and physical activity practices. Frequencies and percentages were calculated for the six sociocultural influences by demographic characteristics. Frequency of response rankings were also calculated for the SIS data by sex, age, ethnicity, income, and length of time spent living in Anchorage.

T-tests were used to test for differences between the sample and recommended guidelines for diet and physical activity practices (H2). T-tests were also used to test for differences between the sample and the national reference population for nutritional status and dietary intake (H3). ANOVA was utilized to test for the effect of sociodemographic characteristics on diet and physical activity (H4), as well as the sociocultural influences on nutritional status (H5). Chi-square tests indicated if the SIS results were influenced by any sociodemographic characteristics (H5). Table 3.4 (below)
describes analyses that were conducted based on the type of data collected for each hypothesis tested.

Table 3.4. Research hypotheses and analytical techniques.

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Analytical Techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1: Significant influences on diet and physical activity will come from the media, friends, family, cultural identity, participation in cultural events, and subsistence knowledge &amp; skills.</td>
<td>• Literature review&lt;br&gt;• Thematic coding of observation notes&lt;br&gt;• Thematic coding of semi-structured interviews&lt;br&gt;• Descriptive statistics of sociocultural influences survey (SIS) results</td>
</tr>
<tr>
<td>H2: Diet and physical activity practices will not meet national recommendations for older adults.</td>
<td>• FFQ frequency table of food group intakes&lt;br&gt;• Frequency table of physical activity&lt;br&gt;• T-tests of sample means compared to recommended guidelines</td>
</tr>
<tr>
<td>H3: Diet and nutritional status will differ adversely from national reference populations and recommendations.</td>
<td>• Descriptive statistics of anthropometric measures&lt;br&gt;• T-tests of sample dietary means compared to national reference sample&lt;br&gt;• T-tests of sample anthropometrics and BMI compared to national references sample</td>
</tr>
<tr>
<td>H4: Sociodemographic characteristics (age, sex, income, ethnicity, residence time) will have an effect on diet and physical activity practices.</td>
<td>• ANOVA for dietary intake and physical activity by sociodemographic characteristics&lt;br&gt;• Chi-square and Kruskal-Wallis tests for SIS by sociodemographics&lt;br&gt;• Mann-Whitney test for SIS on dietary intakes and physical activity</td>
</tr>
<tr>
<td>H5: Participants who report strong social relationships (friends, family) will have healthiest nutritional status.</td>
<td>• ANOVA for SIS results by nutritional status (BMI and WtHR)&lt;br&gt;• Independent samples T-tests &amp; ANCOVA for SIS results by BMI and WtHR</td>
</tr>
</tbody>
</table>

An alpha level of 0.05 was used to identify statistically significant results, and all tests were two-sided. These statistical tests allowed me to test each of the five research hypotheses. This dissertation is based on the understanding that sociocultural influences
are pathways to nutritional status; that social contacts and cultural practices help
determine dietary and physical activity patterns which can shape nutritional status. These
pathways allowed me to identify those influences that contribute to various nutritional
status outcomes, which can be useful information for healthy aging efforts and programs
in the urban sub-arctic.
Chapter 4: Diet, Physical Activity, and Nutritional Status in Anchorage

In this chapter, I assess the diet, physical activity practices, and nutritional status of this sample of older adults in Anchorage. I determine the roles of sex, age, income, ethnicity, and sociocultural influences on these patterns and nutritional status to address my research question: what is the relationship between the sociocultural factors that shape diet, physical activity patterns, and nutritional status among Alaskan elders in Anchorage? Such anthropometric, dietary, and physical activity patterns can shed light on the range of nutritional status among seniors in Anchorage and the role of sociocultural influences that help to shape those patterns.

Increasing body weight is considered to be a “normal” part of aging by many older adults in the United States (Bardach, Schoenberg & Howell 2016; Sutin, et al. 2013). Indeed, many biological changes contribute to weight gain among older adults, which can have a limited protective effect for seniors (McClintock, et al. 2016). However, excessive weight gain, high BMI, and an unhealthy WtHR can all contribute to adverse health outcomes. Since nutritional status results from a variety of influences throughout the aging process, researchers need a better understanding of the current dietary and physical activity practices in a wide range of seniors from various population groups around the world. Diversity in nutritional status and the aging experience also demonstrates that economic, political, and sociocultural forces are influencing aging populations differently in various locations. In order to better understand healthy aging experiences in the urban sub-arctic, this dissertation provides information on the diet and
physical activity practices of Anchorage as well as the sociocultural influences that can contribute greatly to population variation in health and nutritional status.

Sample Characteristics

This analytic sample consists of 82 older adults currently living in Anchorage, Alaska. Study participants completed several sociodemographic questions on the questionnaire, providing data on age, sex, ethnicity, number of people in the household, annual household income, and length of time spent in Anchorage as well as anthropometric measurements, food frequency, and physical activity estimates. Table 4.1 (below) provides the demographic breakdown of the sample. Sixty percent of the sample was aged between 65 and 74 years old, with a mean age of 74 (SD = 8). The majority of participants were female (63%). The sample consisted of 61% Euro-American (white), 15% American Indian / Alaska Native (AI / AN), 15% Asian, and 10% African American (Black) participants. Fifty-four percent of the sample reported total household income below $25,000 per year, whereas 23% earned between $25,000 - $44,999 and 15% earned $45,000 – $99,999 annually. Less than one-tenth reported earning more than $100,000 per year. On average, participants have been living in Anchorage for 31 years (SD = 19) and most lived alone (63%).
Table 4.1. Description of Anchorage Sample (N = 82).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>30</td>
<td>37%</td>
</tr>
<tr>
<td>Female</td>
<td>52</td>
<td>63%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 69 years</td>
<td>31</td>
<td>37.8%</td>
</tr>
<tr>
<td>70 – 79 years</td>
<td>26</td>
<td>31.7%</td>
</tr>
<tr>
<td>80+ years</td>
<td>25</td>
<td>30.5%</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Euro-American</td>
<td>50</td>
<td>61%</td>
</tr>
<tr>
<td>American Indian/Alaska Native (AI/AN)</td>
<td>12</td>
<td>15%</td>
</tr>
<tr>
<td>Asian</td>
<td>12</td>
<td>15%</td>
</tr>
<tr>
<td>African-American</td>
<td>8</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; $25,000</td>
<td>44</td>
<td>54%</td>
</tr>
<tr>
<td>$25,000 - $44,999</td>
<td>19</td>
<td>23%</td>
</tr>
<tr>
<td>$45,000 – $99,999</td>
<td>12</td>
<td>15%</td>
</tr>
<tr>
<td>≥$100,000</td>
<td>7</td>
<td>9%</td>
</tr>
<tr>
<td><strong>Length of Residence in Anchorage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 10 years</td>
<td>16</td>
<td>19.5%</td>
</tr>
<tr>
<td>11 – 20 years</td>
<td>17</td>
<td>20.7%</td>
</tr>
<tr>
<td>≥ 21 years</td>
<td>49</td>
<td>59.8%</td>
</tr>
<tr>
<td><strong>Number of people residing in household</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>52</td>
<td>63%</td>
</tr>
<tr>
<td>2+</td>
<td>30</td>
<td>37%</td>
</tr>
</tbody>
</table>

Table 4.2 (below) provides anthropometrics (height, weight, BMI, WtHR) and weight status (based on BMI categories) for the overall sample, and then separated by sex, age, ethnicity, income, the number of years spent living in Anchorage, and the number of people in the household. The table also shows statistically significant differences from t-tests for the three dichotomous variables: sex, age, and number of people in the household (to simplify data tables, ANOVA presented separately further below in Table 4.3). Weight status in Table 4.2 is based on the following BMI categories: healthy weight (18.5 – 24.9), overweight (25 – 29.9), obese (30+), since no individuals were underweight. This Anchorage sample consisted of 82% of participants with a BMI
above 25 (overweight / obese) and 90% of the sample had an unhealthy WtHR (ratio that is greater than 50%). Only 8 individuals had healthy WtHR, and all were female.

Table 4.2. Anthropometrics and nutritional status of the sample overall, and separated by sex, age, ethnicity, income, length of residence in Anchorage (ANC), and number of people in the household (HH), and results of t-tests (sex, age, and number of people in the HH only).

<table>
<thead>
<tr>
<th>Anthropometrics</th>
<th>Weight Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>162.21(10.07)</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>33.2(12.15)</td>
</tr>
<tr>
<td>WtHR</td>
<td>0.62(0.09)</td>
</tr>
<tr>
<td>Healthy</td>
<td>18.3%</td>
</tr>
<tr>
<td>Overweight</td>
<td>36.6%</td>
</tr>
<tr>
<td>Obese</td>
<td>45.1%</td>
</tr>
<tr>
<td>Overall</td>
<td>82</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>30</td>
</tr>
<tr>
<td>Female</td>
<td>52</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>Under 69 years</td>
<td>31</td>
</tr>
<tr>
<td>70 – 79 years</td>
<td>26</td>
</tr>
<tr>
<td>80+ years</td>
<td>25</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>Euro-American</td>
<td>50</td>
</tr>
<tr>
<td>AI / AN</td>
<td>12</td>
</tr>
<tr>
<td>Asian</td>
<td>12</td>
</tr>
<tr>
<td>African-American</td>
<td>8</td>
</tr>
<tr>
<td>Income</td>
<td></td>
</tr>
<tr>
<td>&lt; $25,000</td>
<td>44</td>
</tr>
<tr>
<td>$25,000-44,999</td>
<td>19</td>
</tr>
<tr>
<td>$45,000-99,999</td>
<td>12</td>
</tr>
<tr>
<td>&gt; $100,000</td>
<td>7</td>
</tr>
<tr>
<td>Years in ANC</td>
<td></td>
</tr>
<tr>
<td>&lt; 10 years</td>
<td>16</td>
</tr>
<tr>
<td>11 – 20 years</td>
<td>17</td>
</tr>
<tr>
<td>≥ 21 years</td>
<td>49</td>
</tr>
<tr>
<td># of people in HH</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2+</td>
</tr>
</tbody>
</table>

*Significant difference in height between men and women (t(80) = 7.12, p = 0.000).
†Significant difference in weight between men and women (t(80) = 3.22, p = 0.002).
‡Significant difference in height by number of people residing in household (t(80) = -2.8, p = 0.006).
§Significant difference in weight by number of people residing in household (t(80) = -2.08, p = 0.04).

Table 4.2 (above) indicates that height and weight varied both by sex and the number of people in the household. As expected from the literature, men were taller and heavier than females. Additionally, people living with one or more persons in their home were also likely to be taller and heavier than elders who lived alone.
ANOVA indicates significant differences in age groups (Table 4.3, below). Individuals aged up to 69 years old had significantly greater BMI (35) than individuals aged 70-79 years (28.09), which then goes back up to 30 in the 80+ age group. This difference is meaningful because in the middle age group, the average BMI is on the border between the overweight and obese categories, an ideal point for intervention.

There is an inverted-U curve in BMI associated with length of time spent living in Anchorage among this sample (Table 4.2, above). Mean BMI is 25 for individuals living in Anchorage for 10 years or less, then increases substantially to 38.8 for individuals in the 11-20 year range, then decreases to 30.8 for individuals living in Anchorage for 21 or more years and is statistically significant (see table 4.3, below).

Table 4.3. ANOVA for nutritional status differences by age, ethnicity, income, number of years in Anchorage (ANC), and number of people living in the household (HH).

<table>
<thead>
<tr>
<th>Does sample nutritional status vary by:</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>f-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By age</td>
<td>733.41</td>
<td>2</td>
<td>366.7</td>
<td>3.29</td>
<td>0.043*</td>
</tr>
<tr>
<td>ethnicity</td>
<td>254.68</td>
<td>3</td>
<td>84.89</td>
<td>0.71</td>
<td>0.548</td>
</tr>
<tr>
<td>income</td>
<td>260.73</td>
<td>3</td>
<td>86.91</td>
<td>0.73</td>
<td>0.537</td>
</tr>
<tr>
<td># years in ANC</td>
<td>1558.9</td>
<td>2</td>
<td>779.45</td>
<td>7.71</td>
<td>0.001*</td>
</tr>
<tr>
<td># people in HH</td>
<td>0.048</td>
<td>1</td>
<td>0.048</td>
<td>0.08</td>
<td>0.775</td>
</tr>
<tr>
<td>WtHR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By age</td>
<td>0.043</td>
<td>2</td>
<td>0.022</td>
<td>2.58</td>
<td>0.082</td>
</tr>
<tr>
<td>ethnicity</td>
<td>0.032</td>
<td>3</td>
<td>0.011</td>
<td>1.24</td>
<td>0.299</td>
</tr>
<tr>
<td>income</td>
<td>0.047</td>
<td>3</td>
<td>0.016</td>
<td>1.84</td>
<td>0.148</td>
</tr>
<tr>
<td># years in ANC</td>
<td>0.114</td>
<td>2</td>
<td>0.057</td>
<td>7.58</td>
<td>0.001*</td>
</tr>
<tr>
<td># people in HH</td>
<td>0.000</td>
<td>1</td>
<td>0.000</td>
<td>0.003</td>
<td>0.956</td>
</tr>
</tbody>
</table>

*Indicates statistically significant value at the <0.05 level.

Although WtHR does not vary significantly by age, a statistical association appears for length of time spent living in Anchorage, as it does for BMI (Table 4.3.
Among the \( \leq 10 \) year residents, the mean WtHR is 0.55, increasing to 0.65 for the 11-20 year group, where it remains for the 21+ group (0.63) (Table 4.2, above). ANOVA does not indicate statistically significant findings by ethnicity or income level (See Table 4.3, above).

Although these Anchorage residents have high rates of overweight, obesity, and unhealthy WtHR, when compared to the CDC’s national reference population (National Center for Health Statistics 2012) significant differences between the sample and the reference population only appear in two measures (Table 4.4, below). Females under age 69 in the sample are significantly shorter (158.2 cm) than the CDC reference population (161.6 cm) according to independent samples t-test. The second significant outcome is for waist circumference among 70-79 year old females in the sample (92.2 cm) compared to the reference population (99.8 cm). Waist circumference was compared because there are no national reference data for WtHR. No other significant differences from the CDC reference population in nutritional status are indicated (Table 4.4, below).

**Table 4.4. Means and standard deviations (in parentheses) for height, weight, BMI, and waist circumference compared to CDC reference population of older adults, by age and sex (N=82).**

<table>
<thead>
<tr>
<th>Age</th>
<th>N</th>
<th>Height (cm)</th>
<th>Weight (kg)</th>
<th>BMI</th>
<th>Waist (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>( \leq 69 )</td>
<td>14</td>
<td>17</td>
<td>171.9 (9.21)</td>
<td>158.2 (5.08)*</td>
<td>100.4 (26.4)</td>
</tr>
<tr>
<td>70 - 79</td>
<td>7</td>
<td>19</td>
<td>171.36 (6.48)</td>
<td>158.5 (7.64)</td>
<td>83.5 (9.26)</td>
</tr>
<tr>
<td>80+</td>
<td>9</td>
<td>16</td>
<td>167.5 (9.65)</td>
<td>155.5 (9.17)</td>
<td>86.79 (25.24)</td>
</tr>
</tbody>
</table>

*Indicates significantly shorter height for sample women \( t = -2.77, df = 16, p = 0.014 \).

**Indicates significantly smaller waist circumference for sample women \( t = -2.22, df = 18, p = 0.04 \).
In summary, although this sample of Anchorage seniors displays high rates of overweight, obesity, and unhealthy WtHR, this sample also has very similar anthropometric characteristics to the national reference population. The analysis revealed few significant associations with BMI or WtHR measures within the sample, with the exception of age and length of time spent living in Anchorage. Much of the literature suggests that income, sex, and ethnicity can all play a role in nutritional status (Donini, et al. 2013; Fortunato and Drusini 2005; Gracey 2000; Ice, et al. 2011; Sharkey and Schoenberg 2002); however, this Anchorage sample may show that not all aging adults are biologically affected by such influences in the same ways. To explain these anthropometric patterns, I turn now to an analysis of dietary patterns and the sociocultural influences on nutritional status for this sample.

**Dietary Patterns**

Dietary intakes are estimated from responses to the Block FFQ and Alaskan Food Supplement instruments (see Chapter 3). Energy and macronutrient intakes are estimated for the sample and separated by sex, for comparison to national recommendations. All food items from the FFQ are also categorized into the 6 food groups used by the CDC and USDA: vegetables, fruits, grains, proteins, dairy, and fat/sugars. Likewise, average intakes are calculated for each food item to estimate the daily servings of each food group for analysis. I analyze dietary intake by sample characteristics to determine if any variation in diet exists by age, sex, length of time living in Anchorage, or ethnicity in this sample. Next, I compare the sample dietary patterns to the USDA recommendations for senior consumption by analyzing average daily serving intakes across 6 food groups and
Healthy Eating Index (HEI) scores by sociodemographic characteristics. Dietary quality was assessed by calculating an HEI score for the sample.

Overall, research participants differ significantly from recommended energy and macronutrient intakes (U.S. Department of Agriculture and U.S. Department of Health and Human Services 2015). Following standard conventions for nutrition analysis with older adults (Schatzkin, et al. 2001), individuals reporting less than 600 calories (N=7) or greater than 3500 calories per day (N=2) were excluded as outliers from the macronutrient calculations (see Table 4.5, below). Although men were reportedly within recommendations for protein, they over-consumed carbohydrates, fats, and sweets. Sample women significantly over-consumed protein, carbohydrates, and fats. Both men and women were below recommendations for daily fiber. Men and women met recommendations for percent of daily caloric intake from protein but consumed statistically more of their daily calories from fat than is recommended for seniors (Table 4.5, below).

Table 4.5. Means, standard deviations, and results of t-tests for macronutrients among sample participants compared to recommendations for older adults, separated by sex (N = 73).

<table>
<thead>
<tr>
<th>Macronutrient</th>
<th>Sample Mean</th>
<th>Standard Deviation</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended macronutrient intakes for males</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total calories (kcal)</td>
<td>1800</td>
<td>1581.11</td>
<td>-1.74</td>
<td>0.093</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>56</td>
<td>62.15</td>
<td>1.10</td>
<td>0.282</td>
</tr>
<tr>
<td>Carbohydrates (g)</td>
<td>130</td>
<td>162.93</td>
<td>2.48</td>
<td>0.020*</td>
</tr>
<tr>
<td>Dietary fiber (g)</td>
<td>28</td>
<td>16.3</td>
<td>-6.22</td>
<td>0.000*</td>
</tr>
<tr>
<td>Kcal from fat (%)</td>
<td>20-35</td>
<td>43.18</td>
<td>7.61</td>
<td>0.000*</td>
</tr>
<tr>
<td>Kcal from protein (%)</td>
<td>10-35</td>
<td>14.27</td>
<td>-1.67</td>
<td>0.107</td>
</tr>
<tr>
<td>Kcal from carbohydrates (%)</td>
<td>45-65</td>
<td>43.99</td>
<td>-3.57</td>
<td>0.000*</td>
</tr>
<tr>
<td>Kcal from sweets (%)</td>
<td>&lt;10</td>
<td>12.4</td>
<td>2.16</td>
<td>0.040*</td>
</tr>
</tbody>
</table>
Once foods are classified into food groups, the most commonly consumed food items in this Anchorage sample of older adults are grains followed by fats/sugars (Table 4.6, below). T-tests indicate a significant difference only in consumption of the fat/sugar food group by sex, so that men consume more average daily servings than women in this Anchorage sample (see Table 4.6, below). However, consumption of all other food categories and HEI scores does not vary statistically based on sex or number of people living in the household. Additionally, ANOVA reveals no significant differences for consumption patterns or HEI based on age, income, length of time living in Anchorage, or ethnicity.

Table 4.6. Mean daily servings, standard deviation (in parentheses), and results of t-tests for various food groups for the sample overall, and separated by age, sex, ethnicity, income, length of time in Anchorage (ANC), and number of people residing in the household (HH).

<table>
<thead>
<tr>
<th>Sex</th>
<th>N</th>
<th>Vegetables</th>
<th>Fruit</th>
<th>Grains</th>
<th>Protein</th>
<th>Dairy</th>
<th>Fats/sugars</th>
<th>HEI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>82</td>
<td>3.45 (3.5)</td>
<td>1.41 (1.09)</td>
<td>4.42 (4.78)</td>
<td>2.42 (1.61)</td>
<td>1.36 (1.49)</td>
<td>2.93 (1.75)</td>
<td>57  (13.69)</td>
</tr>
<tr>
<td>Male</td>
<td>30</td>
<td>3.83 (4.04)</td>
<td>1.30 (1.0)</td>
<td>5.37 (3.61)</td>
<td>1.82 (1.59)</td>
<td>1.71 (1.88)</td>
<td>3.61 (1.82)*</td>
<td>54.37 (15.16)</td>
</tr>
<tr>
<td>Female</td>
<td>52</td>
<td>3.23 (3.18)</td>
<td>1.48 (1.15)</td>
<td>3.87 (2.54)</td>
<td>1.59 (1.64)</td>
<td>1.17 (1.19)</td>
<td>2.54 (1.59)</td>
<td>58.63 (12.66)</td>
</tr>
</tbody>
</table>
Table 4.7 (below) displays the United States Department of Agriculture dietary recommendations for seniors (USDA 2015) compared to sample intakes. When taken as a whole, this sample of Anchorage seniors does not meet dietary guidelines for any food group, but rather is low on daily consumption of vegetables, fruit, grains, protein, and dairy products. Anchorage seniors in this study also over-consume in the fat/sugar group, according to t-tests comparing sample servings to USDA recommendations (Table 4.7, below). Since some food group recommendations are given in ranges, the test variable used for those calculations was the lowest amount recommended. For vegetables, the test
value was 4, the protein test value was 3, and the dairy test value was 2 (Table 4.7, below).

### Table 4.7. Mean daily consumption of food categories for sample participants compared with USDA recommendations, and sample HEI scores compared with CDC reference population (standard deviations in parentheses).

<table>
<thead>
<tr>
<th>Food categories</th>
<th>Recommended # of daily servings</th>
<th>Sample Mean (SD)</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>4-5</td>
<td>3.45 (3.5)</td>
<td>-13.84</td>
<td>0.000*</td>
</tr>
<tr>
<td>Fruit</td>
<td>4</td>
<td>1.41 (1.09)</td>
<td>-26.74</td>
<td>0.000*</td>
</tr>
<tr>
<td>Grains</td>
<td>5</td>
<td>4.42 (4.78)</td>
<td>-19.19</td>
<td>0.000*</td>
</tr>
<tr>
<td>Protein</td>
<td>3-4</td>
<td>2.42 (1.61)</td>
<td>-3.23</td>
<td>0.002*</td>
</tr>
<tr>
<td>Dairy</td>
<td>2-3</td>
<td>1.36 (1.49)</td>
<td>-2.31</td>
<td>0.023*</td>
</tr>
<tr>
<td>Fats/sugars</td>
<td>2</td>
<td>2.93 (1.75)</td>
<td>7.94</td>
<td>0.000*</td>
</tr>
<tr>
<td><strong>HEI score</strong></td>
<td></td>
<td><strong>Reference population mean</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>68.29</td>
<td>57 (13.7)</td>
<td>-7.42</td>
<td>0.000*</td>
</tr>
<tr>
<td>&lt; 70 yrs</td>
<td>62</td>
<td>55.97 (14.89)</td>
<td>-2.25</td>
<td>0.032*</td>
</tr>
<tr>
<td>70+ yrs</td>
<td>66</td>
<td>57.75 (13.02)</td>
<td>-4.53</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

*Indicates statistically significant value at the <0.05 level.

Table 4.7 (above) also shows HEI scores for the reference population compared to sample participants, which range from a minimum score of 23 (very poor diet) up to a maximum HEI of 84 (high-quality diet) and averaged 57. The CDC categorizes older adults (age 65 and over) into two age groups for HEI calculations with a cutpoint at 70 years of age (Center for Nutrition Policy and Promotion 2015). T-tests indicate that the CDC reference population for all older adults, and for individuals aged up to 70 years old as well as individuals over age 70, had HEI scores statistically higher than the sample. Since a higher score indicates healthier eating habits, the reference population has statistically better dietary quality than the sample, regardless of age.
In summary, the dietary patterns for this sample of Anchorage older adults reveal poorer dietary quality than recommended by the USDA. Average daily intakes are below recommendations for vegetables, fruits, grains, protein, and dairy, and above recommendations for fats and sugars. Additionally, men consume more fats/sugars than sample women. These findings are described in further detail in chapter 5, where interview participants detailed their dietary preferences and the challenges to healthy eating. To get a glimpse of the contributing factors into healthy aging in Anchorage, anthropometrics and dietary patterns are interpreted in conjunction with physical activity practices.

Physical Activity Patterns

All physical activities reported on the CHAMPS are categorized into light, moderate, or vigorous physical activities based on their corresponding MET values, and compared to CDC recommendations for older adult physical activity. These Anchorage data were then compared to national references and recommendations to determine if they differ significantly in this far northern location.

Since the CHAMPS allowed participants to self-report exercise-related activities, the instrument does not fully capture sedentary activities like television watching. However, the Block FFQ instrument contained a question about the amount of time spent watching television or videos. Table 4.8 (below) shows that approximately 35% of the sample report watching more than 4 hours of television per day, with the sample averaging 3 ½ hours per day. Forty-six percent of the sample averages 2-3 hours of TV per day and 14% report less than 6 hours spent watching television per week.
Table 4.8. Hours spent watching television among sample participants (N = 82).

<table>
<thead>
<tr>
<th>How many hours do you watch television or video, on average?</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>3</td>
<td>3.7%</td>
</tr>
<tr>
<td>1-6 hours / week</td>
<td>9</td>
<td>11%</td>
</tr>
<tr>
<td>1 hour / day</td>
<td>3</td>
<td>3.7%</td>
</tr>
<tr>
<td>2 hours / day</td>
<td>15</td>
<td>18.3%</td>
</tr>
<tr>
<td>3 hours / day</td>
<td>23</td>
<td>28%</td>
</tr>
<tr>
<td>4+ hours / day</td>
<td>29</td>
<td>35.4%</td>
</tr>
</tbody>
</table>

Sample Mean (SD) 3.62 (1.46)

The most common activities are reading, visiting with friends or family, and doing light housework (see Table 4.9, below). Analyses indicate that very few seniors in this Anchorage sample engage in vigorous exercise-related activities (N=6), so most physical activities analyzed below in this dissertation from the CHAMPS are separated as moderate intensity activities, and all activities combined.

Table 4.9. Most commonly reported CHAMPS activities for sample (N=82).

<table>
<thead>
<tr>
<th>Activities</th>
<th>N</th>
<th>Percent (%)</th>
<th>MET value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading</td>
<td>73</td>
<td>89%</td>
<td>1</td>
</tr>
<tr>
<td>Visiting with friends or family</td>
<td>68</td>
<td>82.9%</td>
<td>1.5</td>
</tr>
<tr>
<td>Doing light work around the house (such as sweeping or vacuuming)</td>
<td>64</td>
<td>78.1%</td>
<td>2.5</td>
</tr>
<tr>
<td>Walking to do errands (such as to/from a store)</td>
<td>61</td>
<td>74.4%</td>
<td>2.5</td>
</tr>
<tr>
<td>Using a computer</td>
<td>52</td>
<td>63.4%</td>
<td>1.5</td>
</tr>
<tr>
<td>Walking leisurely for exercise or pleasure</td>
<td>49</td>
<td>59.8%</td>
<td>2.5</td>
</tr>
<tr>
<td>Going to the senior center</td>
<td>47</td>
<td>57.3%</td>
<td>1.5</td>
</tr>
<tr>
<td>Doing stretching or flexibility exercises (do not count yoga or Tai Chi)</td>
<td>46</td>
<td>56.1%</td>
<td>2.0</td>
</tr>
<tr>
<td>Attending church or take part in church activities</td>
<td>43</td>
<td>52.4%</td>
<td>1.5</td>
</tr>
<tr>
<td>Doing volunteer work</td>
<td>34</td>
<td>41.46%</td>
<td>2.5</td>
</tr>
</tbody>
</table>
Independent sample t-tests indicate that sex, age, and number of people living in the household are statistically significant factors in reported physical activity. Individuals significantly more likely to engage in vigorous activity are those under age 70 or those who lived with more than one person in the household. However, only 6 individuals in the study reported any vigorous activity. Additionally, residing in a home with at least one other individual is significantly associated with increased frequency of moderate activities compared to individuals who lived alone (Table 4.10, below).

Table 4.10. Mean weekly frequency (standard deviations in parentheses) for exercise-related activities among Anchorage residents overall, and by age, sex, income, length of time in Anchorage, ethnicity, and number of people in the household (HH), and results of t-tests (sex, age, number of people in HH only).

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Frequency of all activities</th>
<th>Frequency of light activities</th>
<th>Frequency of moderate activities</th>
<th>Frequency of vigorous activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>82</td>
<td>18.61 (11.6)</td>
<td>11.94 (6.8)</td>
<td>6 (5.77)</td>
<td>0.34 (1.3)</td>
</tr>
<tr>
<td>Male</td>
<td>30</td>
<td>20.07 (9.78)</td>
<td>11.93 (6.9)</td>
<td>7.63 (5.45)</td>
<td>0.5 (1.4)</td>
</tr>
<tr>
<td>Female</td>
<td>52</td>
<td>17.77 (11.74)</td>
<td>11.94 (6.8)</td>
<td>5.58 (5.87)</td>
<td>0.25 (1.3)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 69</td>
<td>31</td>
<td>22.29 (12.24)</td>
<td>13.19 (6.6)</td>
<td>8.19 (6.81)</td>
<td>0.9 (2.0)</td>
</tr>
<tr>
<td>70 – 79</td>
<td>26</td>
<td>18.38 (10.72)</td>
<td>12 (7.4)</td>
<td>6.38 (5.21)</td>
<td>0</td>
</tr>
<tr>
<td>Over 80</td>
<td>25</td>
<td>14.28 (8.28)</td>
<td>10.32 (6.5)</td>
<td>3.96 (3.96)</td>
<td>0</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Euro-American</td>
<td>49</td>
<td>20.74 (11.11)</td>
<td>13 (7)</td>
<td>7.16 (5.71)</td>
<td>0.52 (1.65)</td>
</tr>
<tr>
<td>Asian</td>
<td>12</td>
<td>19.58 (12.8)</td>
<td>12 (7.1)</td>
<td>7.58 (7.14)</td>
<td>0</td>
</tr>
<tr>
<td>AI / AN</td>
<td>12</td>
<td>12.92 (7.62)</td>
<td>9.08 (5.6)</td>
<td>3.67 (4.52)</td>
<td>0.17 (0.6)</td>
</tr>
<tr>
<td>African-American</td>
<td>8</td>
<td>12.38 (8.21)</td>
<td>9.13 (6)</td>
<td>3.35 (3.73)</td>
<td>0</td>
</tr>
<tr>
<td><strong>Annual Income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; $25,000</td>
<td>44</td>
<td>17.34 (8.74)</td>
<td>12.11 (6.7)</td>
<td>5.18 (4.09)</td>
<td>0.05 (0.3)</td>
</tr>
<tr>
<td>$25,000-$44,999</td>
<td>19</td>
<td>19.74 (15.28)</td>
<td>12.47 (8.4)</td>
<td>6.95 (7.93)</td>
<td>0.32 (1.4)</td>
</tr>
<tr>
<td>$45,000-$99,999</td>
<td>12</td>
<td>19.83 (10.83)</td>
<td>11.33 (6.2)</td>
<td>7.5 (5.25)</td>
<td>1</td>
</tr>
<tr>
<td>$100,000+</td>
<td>7</td>
<td>21.43 (12.63)</td>
<td>10.43 (5.2)</td>
<td>9.86 (7.84)</td>
<td>1.14 (2.6)</td>
</tr>
</tbody>
</table>
Analyses also indicate that sex is a significant factor in energy expended per week in physical activity (measured in kilocalories), such that males expend more energy in moderate activities and in all combined activities, than females (Table 4.11, below). However, as noted above in Table 4.10, sex is not a significant factor in the frequency of moderate or all physical activities per week. This means that although the frequency of activities per week does not vary significantly by sex, men are engaged in activities that tend to burn more energy than women (such as strength training rather than gentle swimming). Individuals under age 70 burn significantly more energy in vigorous activities than older individuals, despite extremely small sample size (N=6). Residing in a home with at least one other individual is also significantly associated with higher energy expenditure in moderate activities and vigorous activities than individuals who live alone (see Table 4.11, below).
Table 4.11. Mean weekly energy expenditure in calories (standard deviations in parentheses) for exercise-related activities among Anchorage residents overall, and by age, sex, income, length of time in Anchorage, ethnicity, and number of people in the household (HH), and results of t-tests (sex, age, number of people in HH only).

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Energy expenditure of all activities</th>
<th>Energy expenditure of light activities</th>
<th>Energy expenditure of moderate activities</th>
<th>Energy expenditure of vigorous activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
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<tr>
<td><strong>Overall</strong></td>
<td>82</td>
<td>3955</td>
<td>2020</td>
<td>1809</td>
<td>201</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3271)</td>
<td>(1597)</td>
<td>(2271)</td>
<td>(810)</td>
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<tr>
<td><strong>Male</strong></td>
<td>30</td>
<td>4998</td>
<td>2100</td>
<td>2713</td>
<td>324</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3855)*</td>
<td>(1757)</td>
<td>(2885)**</td>
<td>(1021)</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>52</td>
<td>3353</td>
<td>1974</td>
<td>1287</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2744)</td>
<td>(1514)</td>
<td>(1643)</td>
<td>(660)</td>
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<td><strong>Sex</strong></td>
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<td></td>
</tr>
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<tr>
<td>Female</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Under 69</strong></td>
<td>31</td>
<td>2481</td>
<td>2336</td>
<td>2769</td>
<td>531***</td>
</tr>
<tr>
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<td>(1734)</td>
<td>(3091)</td>
<td>(1262)</td>
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<tr>
<td><strong>70 – 79</strong></td>
<td>26</td>
<td>3204</td>
<td>1778</td>
<td>1426</td>
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<tr>
<td></td>
<td></td>
<td>(2268)</td>
<td>(1543)</td>
<td>(1480)</td>
<td>(0)</td>
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<tr>
<td><strong>Over 80</strong></td>
<td>25</td>
<td>2845</td>
<td>1881</td>
<td>10167</td>
<td>0</td>
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<td>(1973)</td>
<td>(1469)</td>
<td>(1084)</td>
<td>(0)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
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</tr>
<tr>
<td>Euro-American</td>
<td>49</td>
<td>4636.7</td>
<td>2214</td>
<td>2200</td>
<td>311</td>
</tr>
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<td>(1678)</td>
<td>(2556)</td>
<td>(1019)</td>
</tr>
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<td>2149</td>
<td>1613</td>
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<td>(1363)</td>
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<td>1425</td>
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<td>African-American</td>
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<td>1509</td>
<td>844</td>
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<td></td>
<td></td>
<td>(2346)</td>
<td>(1246)</td>
<td>(993)</td>
<td>(0)</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
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<td>&lt; $25,000</td>
<td>44</td>
<td>3225</td>
<td>1509</td>
<td>1290</td>
<td>0</td>
</tr>
<tr>
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<td></td>
<td>(2531)</td>
<td>(1246)</td>
<td>(1473)</td>
<td>(0)</td>
</tr>
<tr>
<td>$25,000-$44,999</td>
<td>19</td>
<td>4038</td>
<td>2132</td>
<td>1763</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3372)</td>
<td>(2075)</td>
<td>(2369)</td>
<td>(685)</td>
</tr>
<tr>
<td>$45,000-$99,999</td>
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<td>5236</td>
<td>2040</td>
<td>2702</td>
<td>494</td>
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<td></td>
<td></td>
<td>(3893)</td>
<td>(1387)</td>
<td>(2363)</td>
<td>(1113)</td>
</tr>
<tr>
<td>$100,000+</td>
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<td>6124</td>
<td>2161</td>
<td>3662</td>
<td>896</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4888)</td>
<td>(1056)</td>
<td>(4407)</td>
<td>(1988)</td>
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<td><strong>Annual Income</strong></td>
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<td></td>
</tr>
<tr>
<td>&lt; 10 yrs</td>
<td>16</td>
<td>2418</td>
<td>1538</td>
<td>962</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1818)</td>
<td>(1272)</td>
<td>(877)</td>
<td>(0)</td>
</tr>
<tr>
<td>11-20</td>
<td>17</td>
<td>5030</td>
<td>2548</td>
<td>2333</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3637)</td>
<td>(2111)</td>
<td>(2211)</td>
<td>(422)</td>
</tr>
<tr>
<td>21+ yrs</td>
<td>49</td>
<td>4084</td>
<td>1995</td>
<td>1903</td>
<td>284</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3375)</td>
<td>(1462)</td>
<td>(2547)</td>
<td>(1014)</td>
</tr>
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<td><strong>Length of Time in</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Anchorage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>52</td>
<td>3486</td>
<td>1936</td>
<td>1488</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2711)</td>
<td>(1559)</td>
<td>(1668)</td>
<td>(462)</td>
</tr>
<tr>
<td>2+</td>
<td>30</td>
<td>4769</td>
<td>2166</td>
<td>2365*</td>
<td>376*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3984)</td>
<td>(1679)</td>
<td>(3001)</td>
<td>(1187)</td>
</tr>
</tbody>
</table>

*Significant difference in EE for all activities by sex t(80) = 2.25, p = 0.03.
**Significant difference in EE for moderate activities by sex t(80) = 2.86, p = 0.005.
***Significant difference in EE for vigorous activities by age t(55) = 2.14, p = 0.000.
Significant difference in EE for moderate activities by # people in HH t(80) = -1.71, p = 0.008.
*Significant difference in EE for vigorous activities by # people in HH t(80) = -1.3, p = 0.004.

ANOVA in Table 4.12 (below) show that the youngest seniors are engaging in more moderate activities than older individuals, and expending significantly more energy.
doing so. Likewise, when all activities are combined, the younger participants engage in more weekly activities than the older individuals. When combining all activities, there is an inverted-U curve indicating that the youngest age group (≤ 69 years) expends approximately the same amount of energy per week as the oldest age group (80+); however, the middle age group (70-79 years) expends significantly more energy than the other two age groups. In other words, although the youngest age group engages in significantly more weekly activities than the oldest age group, they do not expend significantly more weekly energy because they are engaging in a large number of low-intensity activities (such as reading).

Table 4.12. ANOVA for physical activity by age, ethnicity, income, number of years in Anchorage (ANC), and number of people residing in the household (HH) (N=82).

<table>
<thead>
<tr>
<th>Does sample physical activity vary by:</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>f-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of all activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By age</td>
<td>889.93</td>
<td>2</td>
<td>444.97</td>
<td>3.90</td>
<td>0.024*</td>
</tr>
<tr>
<td>ethnicity</td>
<td>938.18</td>
<td>3</td>
<td>312.73</td>
<td>2.72</td>
<td>0.050*</td>
</tr>
<tr>
<td>income</td>
<td>168.56</td>
<td>3</td>
<td>56.19</td>
<td>0.45</td>
<td>0.720</td>
</tr>
<tr>
<td># years in ANC</td>
<td>146.31</td>
<td>2</td>
<td>73.16</td>
<td>0.59</td>
<td>0.555</td>
</tr>
<tr>
<td># people in HH</td>
<td>146.03</td>
<td>1</td>
<td>146.03</td>
<td>1.19</td>
<td>0.277</td>
</tr>
<tr>
<td>Energy expenditure of all activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By age</td>
<td>117710594</td>
<td>2</td>
<td>58855297</td>
<td>6.21</td>
<td>0.003*</td>
</tr>
<tr>
<td>ethnicity</td>
<td>74776426</td>
<td>3</td>
<td>24925475</td>
<td>2.46</td>
<td>0.069</td>
</tr>
<tr>
<td>income</td>
<td>76158998</td>
<td>3</td>
<td>25386333</td>
<td>2.51</td>
<td>0.065</td>
</tr>
<tr>
<td># years in ANC</td>
<td>58258205</td>
<td>2</td>
<td>29129102</td>
<td>2.85</td>
<td>0.064</td>
</tr>
<tr>
<td># people in HH</td>
<td>31309605</td>
<td>1</td>
<td>31309605</td>
<td>2.99</td>
<td>0.087</td>
</tr>
<tr>
<td>Frequency of moderate activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By age</td>
<td>248.16</td>
<td>2</td>
<td>124.08</td>
<td>4.00</td>
<td>0.022*</td>
</tr>
<tr>
<td>ethnicity</td>
<td>214.31</td>
<td>3</td>
<td>71.44</td>
<td>2.25</td>
<td>0.090</td>
</tr>
<tr>
<td>income</td>
<td>168.76</td>
<td>3</td>
<td>56.25</td>
<td>1.74</td>
<td>0.166</td>
</tr>
<tr>
<td># years in ANC</td>
<td>36.07</td>
<td>2</td>
<td>18.03</td>
<td>0.54</td>
<td>0.587</td>
</tr>
<tr>
<td># people in HH</td>
<td>84.61</td>
<td>1</td>
<td>84.61</td>
<td>2.59</td>
<td>0.111</td>
</tr>
<tr>
<td>Energy expenditure of moderate activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By age</td>
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<td>2</td>
<td>24027571</td>
<td>5.13</td>
<td>0.008*</td>
</tr>
<tr>
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<td>3</td>
<td>7710790</td>
<td>1.52</td>
<td>0.215</td>
</tr>
<tr>
<td>income</td>
<td>45489922</td>
<td>3</td>
<td>15163307</td>
<td>3.18</td>
<td>0.029*</td>
</tr>
<tr>
<td># years in ANC</td>
<td>16569861</td>
<td>2</td>
<td>8284930</td>
<td>1.63</td>
<td>0.202</td>
</tr>
<tr>
<td># people in HH</td>
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<td>1</td>
<td>14649581</td>
<td>2.91</td>
<td>0.092</td>
</tr>
</tbody>
</table>

*Indicates statistically significant value at the <0.05 level.
The data in Table 4.12 (above) also reveal one statistically significant association in physical activity by ethnicity. The weekly frequency of all activities performed is statistically lower for American Indian / Alaska Native participants when compared to Euro-American or Asian participants. There are no significant differences for frequency of moderate activities, moderate caloric expenditure, or all caloric expenditure by ethnicity or number of people residing in the household.

Income is not a significant factor on the number of weekly moderate activities or all combined activities performed; however, there is a statistical association between energy expenditure on moderate activities and income. The table shows that although frequency of weekly activities may not be significantly different, the highest income groups tend to engage in activities that burn more energy than the lowest income group. Length of time living in Anchorage is not statistically related to any physical activity measures.

The CDC recommends at least 150 minutes of moderate intensity activity every week in addition to muscle-strengthening activities twice a week, or 75 minutes of vigorous-intensity activity in addition to muscle-strengthening activities twice a week, or a mix of moderate and vigorous-intensity activities in addition to muscle-strengthening activities twice a week for seniors (Centers for Disease Control and Prevention 2014). Only one participant meets these recommendations for physical activity (1.2% of the sample); however, approximately 35% of the national reference population of seniors meet recommended guidelines (CDC 2014). Therefore, this Anchorage sample is significantly below the national reference sample and does not meet recommendations for physical activity. These findings are described further in chapter 5, where interview
participants explain their views, preferences, and challenges to obtaining physical activity in Anchorage.

**Sociocultural Influences**

The last section of the questionnaire included 6 sociocultural survey questions, derived from the literature and my previous research at the field site. Table 4.13 (below) indicates that at least half of all participants recognize the role of family members, cultural identity, and participation in cultural events on their dietary and physical activity patterns. However, fewer participants indicate that the media, friends, or subsistence practices have any effect on their dietary and physical activity patterns.

**Table 4.13. Frequency of sociocultural influences survey (SIS) responses (N = 82).**

<table>
<thead>
<tr>
<th>Sociocultural Influences</th>
<th>Has no role in my choices</th>
<th>Has very little role in my choices</th>
<th>Has some role in my choices</th>
<th>Has strong role in my choices</th>
<th>Is most important role in my choices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>The media</td>
<td>22</td>
<td>26.8%</td>
<td>24</td>
<td>29.3%</td>
<td>22</td>
</tr>
<tr>
<td>Friends</td>
<td>22</td>
<td>26.8%</td>
<td>23</td>
<td>28%</td>
<td>24</td>
</tr>
<tr>
<td>Family</td>
<td>16</td>
<td>19.5%</td>
<td>14</td>
<td>17.1%</td>
<td>19</td>
</tr>
<tr>
<td>Cultural identity</td>
<td>27</td>
<td>32.9%</td>
<td>14</td>
<td>17.1%</td>
<td>16</td>
</tr>
<tr>
<td>Participating in cultural events</td>
<td>19</td>
<td>23.2%</td>
<td>21</td>
<td>25.6%</td>
<td>23</td>
</tr>
<tr>
<td>Subsistence knowledge/skills</td>
<td>67</td>
<td>81.7%</td>
<td>6</td>
<td>7.3%</td>
<td>3</td>
</tr>
</tbody>
</table>

Responses on the 5-point scale are condensed into two categories (following Allen and Seaman 2007; Grimbeek, et al. 2005); has no to very little role in my choices (low) and has some to most important role in my choices (high) in order to test for
differences by sex, age, ethnicity, income, length of time in Anchorage, and number of people in the household (Table 4.14, below). Chi-square tests of difference for sex reveal no significant findings for any of the six sociocultural variables; however, differences are found for age, ethnicity, length of time living in Anchorage, and number of people in the household.

Table 4.14. Frequency of rankings (percentage and Ns, in parentheses) and results of chi-square test for sociocultural influences of the sample overall, and by sex, age, ethnicity, income, length of time in Anchorage (ANC), and number of people in the household (HH).

<table>
<thead>
<tr>
<th></th>
<th>The Media</th>
<th>Friends</th>
<th>Family</th>
<th>Cultural Identity</th>
<th>Cultural Events</th>
<th>Subsistence Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (N)</td>
<td>High</td>
<td>Low (N)</td>
<td>High</td>
<td>Low (N)</td>
<td>High</td>
</tr>
<tr>
<td>Overall</td>
<td>82</td>
<td>56.1%</td>
<td>43.9%</td>
<td>(46)</td>
<td>45.1% (36)</td>
<td>63.4% (52)</td>
</tr>
<tr>
<td>Male</td>
<td>30</td>
<td>56.7%</td>
<td>43.3%</td>
<td>(17)</td>
<td>60.0% (12)</td>
<td>40.0% (12)</td>
</tr>
<tr>
<td>Female</td>
<td>52</td>
<td>55.8%</td>
<td>44.2%</td>
<td>(29)</td>
<td>51.9% (23)</td>
<td>48.1% (25)</td>
</tr>
<tr>
<td>Age Under 69</td>
<td>31</td>
<td>61.3%</td>
<td>38.7%</td>
<td>(19)</td>
<td>32.3% (10)</td>
<td>67.7% (21)</td>
</tr>
<tr>
<td>70 – 79</td>
<td>26</td>
<td>69.2%</td>
<td>30.8%</td>
<td>(18)</td>
<td>69.2% (18)</td>
<td>30.8% (18)</td>
</tr>
<tr>
<td>Over 80</td>
<td>25</td>
<td>36.0%</td>
<td>65.0%</td>
<td>(9)</td>
<td>68% (17)</td>
<td>32% (8)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Euro-American</td>
<td>50</td>
<td>58.0%</td>
<td>42.0%</td>
<td>(29)</td>
<td>54% (27)</td>
<td>46% (23)</td>
</tr>
<tr>
<td>Asian</td>
<td>12</td>
<td>58.3%</td>
<td>41.7%</td>
<td>(7)</td>
<td>41.7% (5)</td>
<td>58.2% (7)</td>
</tr>
<tr>
<td>AI / AN</td>
<td>12</td>
<td>33.3%</td>
<td>66.7%</td>
<td>(4)</td>
<td>66.7% (4)</td>
<td>33.3% (4)</td>
</tr>
<tr>
<td>African-American</td>
<td>8</td>
<td>75.0%</td>
<td>25.0%</td>
<td>(6)</td>
<td>62.5% (5)</td>
<td>37.5% (3)</td>
</tr>
<tr>
<td>Annual Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; $25,000</td>
<td>44</td>
<td>54.5%</td>
<td>45.5%</td>
<td>(24)</td>
<td>59.1% (26)</td>
<td>40.9% (18)</td>
</tr>
<tr>
<td>$25,000-$44,999</td>
<td>19</td>
<td>63.2%</td>
<td>36.8%</td>
<td>(12)</td>
<td>57.9% (11)</td>
<td>42.1% (8)</td>
</tr>
<tr>
<td>$45,000-$99,999</td>
<td>12</td>
<td>50.0%</td>
<td>50.0%</td>
<td>(6)</td>
<td>33.3% (4)</td>
<td>66.7% (4)</td>
</tr>
<tr>
<td>$100,000+</td>
<td>7</td>
<td>57.1%</td>
<td>42.9%</td>
<td>(4)</td>
<td>57.1% (4)</td>
<td>42.9% (3)</td>
</tr>
</tbody>
</table>

122
**Significant differences from chi-square tests by age (Table 4.14, above) show that seniors in the oldest age group (80+ years old) report a stronger role of the media on their dietary and physical activity patterns than seniors below age 80. Additionally, there is a stronger relationship between the influence of friends on younger elders (below age 70) as opposed to seniors over age 70 for diet and physical activity. However, the remaining sociocultural influences do not vary significantly by age.

Ethnicity is only a significant factor in the measure of cultural identity. Participants who were Alaska Native are statistically more likely to report high influence of their cultural identity on their dietary and physical activity patterns than other ethnic groups. This finding also becomes apparent in chapter 5, where American Indian / Alaska Native interview participants discuss the importance of acquiring culturally significant foods, and the many challenges they face in Anchorage. The media, friends, family, participation in cultural events, and subsistence knowledge and skills do not vary significantly by ethnic groups. There are also no significant differences for any of the sociocultural influences by income.

123
However, sample participants who have lived in Anchorage the longest (21+ years) report significantly stronger influences of friends on their diet and physical activity practices than participants who have lived in Anchorage for less than 20 years. Additionally, elders living with at least one other person in their homes are also statistically more likely to report a higher influence of their family members on diet and physical activity patterns. This result is not surprising since the other person living in the home with them is often a family member, usually spouse or children. Interview participants in chapter 5 give a glimpse into the complicated interactions between older adults, friends, peers, and their family members’ that can influence dietary and physical activity patterns.

Mann-Whitney U nonparametric tests were used to determine if there are significant differences between groups of an independent variable on a continuous dependent variable. Mann-Whitney tests are used to test each of the SIS variables condensed into two response options (little to no influence vs. some to most important influence). Significant results from the tests reveal associations between the media influence and greater energy expenditure in all activities and in moderate activities (see Table 4.14, below). Likewise, the influence of friends is also related to energy expenditure in all activities. The Mann-Whitney test resulted in significant findings for the influence of family on fruit consumption, as well as the influence of participating in cultural events on the consumption of fats/sweets. This finding is validated in chapter 5, where interview participants discuss the pressures of eating socially. Table 4.15 (below) displays median scores and the results of the Mann-Whitney tests for each of the six SIS variables.
Table 4.15. Mann-Whitney U test results and median scores for nutritional status, physical activity, HEI, and average daily servings of food groups for the six sociocultural variables.

<table>
<thead>
<tr>
<th></th>
<th>The Media</th>
<th>Friends</th>
<th>Family</th>
<th>Cultural Identity</th>
<th>Cultural Events</th>
<th>Subsistence Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>BMI</td>
<td>29.16</td>
<td>27.44</td>
<td>27.99</td>
<td>30.15</td>
<td>30.2</td>
<td>27.35</td>
</tr>
<tr>
<td>WtHR</td>
<td>0.61</td>
<td>0.62</td>
<td>0.61</td>
<td>0.62</td>
<td>0.62</td>
<td>0.62</td>
</tr>
<tr>
<td>Freq all activities</td>
<td>16</td>
<td>18</td>
<td>14</td>
<td>18</td>
<td>16</td>
<td>17.5</td>
</tr>
<tr>
<td>EE all activities</td>
<td>3495</td>
<td>3845</td>
<td>2566</td>
<td>42047</td>
<td>2418</td>
<td>3845</td>
</tr>
<tr>
<td>Freq moderate</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>EE moderate</td>
<td>678.9</td>
<td>1530**</td>
<td>1004</td>
<td>1151</td>
<td>890.3</td>
<td>1162</td>
</tr>
<tr>
<td>HEI</td>
<td>53.5</td>
<td>57</td>
<td>54</td>
<td>57</td>
<td>57</td>
<td>56</td>
</tr>
<tr>
<td>daily vegetables</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>daily fruit</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>daily grains</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>daily protein</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>daily dairy</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>daily fats/sweets</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

*Significant differences for energy expenditure in all activities by influence of the media (U = 615, n = 36, z = -1.99, p = 0.047).
**Significant differences for energy expenditure in all activities by influence of friends (U = 575, n = 52, z = -2.4, p = 0.016).
∞Significant differences for energy expenditure in all activities by influence of media (U = 615.5, n = 36, z = -1.993, p = 0.046).
¥ Significant differences for average daily intake of fruit by influence of family (U = 565.5, n = 52, z = -2.323, p = 0.020).
ΩSignificant differences for average daily intake of fats/sweets by influence of cultural events (U = 639, n = 42, z = -1.998, p = 0.046).

To summarize Table 4.15 (above), greater influences from the media and friends result in increased energy expenditure, greater influence from family is related to increased fruit intake, and greater participation in cultural events is associated with increased intake of fats/sweets. No associations were found for cultural identity or subsistence knowledge and skills in the nonparametric tests. Likewise, none of the SIS
variables were statistically related to BMI or WtHR, HEI score, or intake of vegetables, grains, protein, or dairy. However, interview participants report several ways that the media, friends, family, cultural identity, participation in social events, and subsistence skills can influence their daily lives in Anchorage.

Conclusions

The results of the quantitative data in this chapter reinforce some of the findings in the research literature on the social determinants of healthy aging. People aged 65-69, those living in a household with at least one other person, and individuals who had lived in Anchorage for more than a decade all have significantly heavier body weight than their counterparts. The nutritional status indicators used in this dissertation, BMI and WtHR, vary within the sample such that younger age and greater length of time spent living in Anchorage results in overweight and obese BMI as well as “unhealthy” WtHR. Despite these results, the sample anthropometrics did not vary significantly from the national reference population.

Sample participants display suboptimal diet and physical activity patterns that may be contributing to adverse nutritional status for these older adults of Anchorage. Overall consumption is significantly lower than recommended for vegetables, fruits, grains, proteins, and dairy. Women are over-consuming carbohydrates, protein, and fats/sweets, while men also over-consume in the fats/sweets category. Additionally, the sample has significantly lower dietary quality, as measured by HEI, than the national reference population.
Although the sample does not meet physical activity recommendations, some variation within the sample exists based on sociodemographic characteristics. Energy expenditure is highest for men, younger individuals, and those living with others in their household. Engagement with more exercise-related activities is also associated with younger age and the influence of others in the household. However, American Indian / Alaska Native participants are significantly less likely to engage in physical activities than other ethnic groups. Although social and cultural influences may shape some dietary and physical activity patterns, they do not have significant relationships with diet or nutritional status by T-tests and ANOVA.

Some research hypotheses are rejected as a result of these data analyses. Although significant influences on diet and physical activity come from the media, friends, family, cultural identity, and participation in cultural events for different segments of this sample, subsistence knowledge and skills are not significant influences on diet and physical activity patterns for these Anchorage seniors overall (H1). Likewise, I hypothesized that strong social influences from friends and family would result in healthiest nutritional status, but none of the SIS variables in this study were statistically related to BMI or WtHR (H5).

However, three research hypotheses cannot be rejected by these data. The analyses indicate that diet and physical activity practices in this sample do not meet national recommendations (H2) and that diet differs adversely from national reference samples (H3). Lastly, sociodemographic characteristics (such as age, sex, income, ethnicity, length of time living in Anchorage, and number of people in the household) did have an effect on various diet and physical activity practices (H4). To delve further into
the complexities of the relationships among diet, physical activity, nutritional status, and the sociocultural environment, I turn now to the findings from the qualitative data.
Chapter 5: Media, Friends, Family, and Identity: The Sociocultural Context of Aging in Anchorage

In this chapter, I explore the findings from the qualitative data, participant observation and semi-structured interviews, lending further context to the quantitative results of the previous chapter. In chapter 4, I demonstrated the sociocultural factors that were statistically associated with dietary and physical activity patterns. However, those quantitative findings only provide part of the picture. Because healthy aging encompasses more than just physical and functional health, but also social and psychological well-being (Phelan, et al. 2004), more diet and physical activity influences are considered in this chapter. Healthy aging is also influenced by features of the physical and socioeconomic environment, as some participants pointed out.

The bulk of the findings in this chapter come from the participants’ own words. The 15 semi-structured interview participants consisted of six men and nine women, aged 57-87 years (see Table 5.1, below). Participants reported their ethnicity as Euro-American (N=6), African American (N=2), Asian (N=3), or American Indian/Alaska Native (N=4). Only two participants were born in Anchorage, but all had lived in Anchorage for more than 10 years. Most participants were retired (N=10) and lived alone (N=8). Harold, Gilbert, Milton, Nolee, Cornelia, Edna, and Blanche were relatively active in the community and were recruited from community centers. Sergei, Fatima, Josephine, Ada, and Kenjii were more isolated seniors recruited from senior living complexes via posted fliers, and were chosen to speak about the challenges older adults face accessing the community. Lastly, Kyung, Henrietta, and Lanny were recruited from an elder’s conference held in Anchorage because they have wide social networks and respected
status in the community. These individuals were able to speak more generally about the issues facing Alaskan seniors, not just from their own experiences.

Table 5.1. Description of Semi-Structured Interview Participants (N=15).

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age</th>
<th>Pseudonym</th>
<th>Ethnicity</th>
<th>Location of Birth</th>
<th>Years Living in Anchorage</th>
<th># People in HH</th>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>65</td>
<td>Harold</td>
<td>African American</td>
<td>Oakland, CA</td>
<td>39</td>
<td>2</td>
<td>retired – former military</td>
</tr>
<tr>
<td>M</td>
<td>65</td>
<td>Sergei</td>
<td>Alaska Native</td>
<td>Anchorage, AK</td>
<td>66</td>
<td>2</td>
<td>retired - former realtor</td>
</tr>
<tr>
<td>M</td>
<td>67</td>
<td>Kyung</td>
<td>Asian</td>
<td>Seoul, Korea</td>
<td>35</td>
<td>2*</td>
<td>current graphic designer</td>
</tr>
<tr>
<td>M</td>
<td>69</td>
<td>Kenjii</td>
<td>Asian</td>
<td>Honolulu, HI</td>
<td>17</td>
<td>1</td>
<td>retired - former construction</td>
</tr>
<tr>
<td>M</td>
<td>72</td>
<td>Gilbert</td>
<td>Euro-American</td>
<td>Indianapolis, IN</td>
<td>49</td>
<td>1</td>
<td>retired - former teacher</td>
</tr>
<tr>
<td>M</td>
<td>87</td>
<td>Milton</td>
<td>Euro-American</td>
<td>Baltimore, MD</td>
<td>56</td>
<td>1</td>
<td>retired - former electrical engineer</td>
</tr>
<tr>
<td>F</td>
<td>65</td>
<td>Fatima</td>
<td>Euro-American</td>
<td>Norman, OK</td>
<td>21</td>
<td>1</td>
<td>retired - former school counselor</td>
</tr>
<tr>
<td>F</td>
<td>66</td>
<td>Nolee</td>
<td>Alaska Native</td>
<td>Seward, AK</td>
<td>43</td>
<td>2</td>
<td>current receptionist/instructor</td>
</tr>
<tr>
<td>F</td>
<td>57</td>
<td>Lanny</td>
<td>Asian</td>
<td>Apia, Samoa</td>
<td>29</td>
<td>6*</td>
<td>current director of non-profit</td>
</tr>
<tr>
<td>F</td>
<td>71</td>
<td>Cornelia</td>
<td>African American</td>
<td>Boston, MA</td>
<td>42</td>
<td>2*</td>
<td>current receptionist</td>
</tr>
<tr>
<td>F</td>
<td>72</td>
<td>Edna</td>
<td>Euro-American</td>
<td>Chicago, IL</td>
<td>49</td>
<td>2*</td>
<td>retired – former Wal-Mart greeter</td>
</tr>
<tr>
<td>F</td>
<td>75</td>
<td>Henrietta</td>
<td>Alaska Native</td>
<td>northern AK village</td>
<td>18</td>
<td>1</td>
<td>retired - former rural health aide</td>
</tr>
<tr>
<td>F</td>
<td>81</td>
<td>Josephine</td>
<td>Euro-American</td>
<td>Trenton, NJ</td>
<td>53</td>
<td>1</td>
<td>retired - former grocer</td>
</tr>
<tr>
<td>F</td>
<td>82</td>
<td>Ada</td>
<td>Alaska Native</td>
<td>Anchorage, AK</td>
<td>61</td>
<td>1</td>
<td>retired - former banker</td>
</tr>
<tr>
<td>F</td>
<td>82</td>
<td>Blanche</td>
<td>Euro-American</td>
<td>Falls City, WA</td>
<td>12</td>
<td>1</td>
<td>current volunteer</td>
</tr>
</tbody>
</table>

* Indicates participants who live with spouses.
Four participants were married and three participants lived with a non-relative roommate. No interview participants were included in the quantitative sample of 82 respondents, so anthropometric measurements, FFQ, CHAMPS, or SIS data were not collected for these individuals (see semi-structured interview guide, Appendix B.) Below I outline the dietary and physical activity practices reported by participants, followed by a discussion of the influences on these patterns.

**Dietary Practices**

Elders reported in semi-structured interviews such dietary practices as the consumption of local Alaskan foods, trying to eat with other people, favored childhood foods, dieting behaviors, and “guilty pleasure” foods consumed. A majority of participants (N = 8) across all ethnic groups reported in interviews that local Alaskan foods were an important part of their diet, such as fresh-caught seafood (halibut, salmon, cod, shrimp, scallops, crab, oysters, seal), dried or smoked fish, moose, caribou, geese, berries, agutak, beach greens, and seaweed. All four Alaska Native participants, as well as several non-Native individuals, stated that these foods were important to them and their families, and had several ways to procure such items. Notee, Sergei, and Henrietta described subsistence practices such as berry picking, fishing (seine netting, fish wheels, and dipnetting), and foraging for beach greens. Participants also relied on relatives for hunting and trapping of game animals. These interview findings are consistent with the FFQ data, in that 88% of participants reported sometimes eating local Alaskan foods. Most commonly consumed Alaskan foods being salmon (N = 74), halibut (N = 72), berries (N = 62), moose (N = 35), dried fish (N = 34), and caribou (N = 31).
There were several practices described that showed most participants relied on friends and relatives to supply a portion of their diet. Several examples are shared below, but the social aspects of eating included food provisioning from family members, systems of exchange to procure regional foods, cooking for spouses or roommates to be sure they are eating well, planning breakfast or lunch groups so that they can get out of the house, and teaching offspring and in-laws how to cook Alaskan foods properly. This finding is also consistent across the FFQ data, where only 5 individuals (6% of the sample) reported that friends and family had no role in their dietary or physical activity choices.

Gilbert relayed a lengthy account of the time his eldest son’s wife tried cooking halibut, but since she lived in Washington D.C. “she just didn’t, doesn’t know how to cook fish.” Luckily, he was able to save the meal by using the overcooked halibut in a seafood chowder. Gilbert and most other interview participants (N = 12) stated that they dislike cooking for themselves, that it is difficult to cook for just one person, and often resort to microwavable meals. As the rest of this chapter will show, older adults in Anchorage look forward to sharing meals with others.

The ways in which respondents prepared shared meals varied considerably. The female participants (who also tended to report more concern for their body weight) reported attempts to prepare vegetable-based meals for themselves and others, although admitted it could be a challenge to coax other seniors into eating these healthy meals. For example, Edna stated that she needed to cook separate meals for her husband, as he was “too skinny” and wanted foods like “pork chops and potatoes” while she made a fruit and vegetable smoothie for herself. Cornelia indicated that her husband requested comfort food that she had always made for their family, like chicken and dumplings. She adjusted
her daily diet accordingly, only eating soups and salads for lunch to counterbalance these high-calorie dinners that she shared with her husband. Few of the male participants said that they cook for others on a regular basis, but those who did (N = 3) suggested that they primarily cooked meat and fish-based meals. On the other hand, Nolee and her female roommate were both enrolled in Weight Watchers, and they supported each other in healthy meal preparation. These interview findings largely reflect the larger sample of FFQ participants, where 55 participants (67% of sample) reported having been on a diet at some point in their life but only 19 of them (23% of sample) were male.

Indeed, several participants indicated that they have had to alter their dietary intake as they have gotten older, as they are no longer able to enjoy some of their favorite childhood foods such as donuts (“I can’t have those donuts now, Good lord, oh I do like those old-fashioned donuts, though”), French toast, whole milk, chocolate cake, apple dumplings, and Native American fry bread. Four participants expressed a specific longing for bacon, but indicated that they cannot consume it anymore due to health concerns. They stated that “greasy breakfasts” with bacon and eggs, sauerkraut made with bacon grease and brown sugar, Korean (thick) bacon, and green beans cooked in bacon grease were childhood foods that they miss. Generally older adults in Anchorage indicated that they do not cook those foods that they enjoyed as children, stating that their parents were the only ones who could properly cook these items. However, several childhood favorites are still consumed, especially those that participants considered healthy like fried tomatoes, corn on the cob, vegetables with rice, liver and onions, homemade soups and stews, and kimchi.
Participants who stated they could no longer consume certain foods did so with some regret, wishing they could continue eating the foods that they had been able to in the past. Individuals who were actively dieting or trying to lose weight (N = 9) had all been directed to do so by their doctors, and most, especially Edna and Nolee, indicated that it was a great struggle. Not only were favored foods considered unhealthy and off-limits, but participants said that healthy foods were more expensive and difficult to procure and prepare. Most respondents said that the high cost of fresh fruits and vegetables in Anchorage was a significant barrier to improving their diet, as these items often go bad quickly “after they get off the barge.” Three participants also did not do their own grocery shopping, and felt their diet was at the whim of the person who conducted this task for them, which could also be a significant concern for the larger sample population.

All participants admitted to consuming guilty pleasure or junk foods on occasion. Such foods included cookies, pastries, ice cream sundaes, cake, pie, nachos, hot dogs and potato chips, cheesecakes, chocolate, chips and salsa, Doritos, fast food, Vienna sausages, Spam, cheese, and soda. Although most participants reported consumption of chips (N = 11), Milton was the only one who reported a majority of his diet consisted of such junk foods, “I love sweets. Yeah, I eat a lot of sweets, There’s no doubt about it.” All respondents knew that they should moderate their intake of these foods, but they did so with varying levels of success. Edna reported that food can be a bit of a struggle for her. She said,

“I try not for it to be, but it can be, yeah. Once you go to Weight Watchers, you get the ideas and I was doing really well on that and I was
tracking everything which I’m not doing anymore, but I am trying to watch what I eat.”

Although Milton admitted to a generally poor diet, he also indicated that this was a constant battle for him, stating, “I’m trying to stay on somewhat of a vegetarian diet [for my diabetes] so I don’t have as many bacon and eggs as I used to. But if you cut out steak and hamburger it seems like it’s almost impossible not to eat chicken. Then you get sick of it.” Lanny agreed, indicating that her high blood pressure required a restricted diet and she “needs to work on that more, you know.”

Interviewed participants in Anchorage relayed several dietary practices that were important to them, including eating with other people, food preparation techniques, favored childhood foods, dieting behaviors, and “guilty pleasure” foods consumed. Because most interviewed participants were likely overweight or obese (they were not measured), most talked about the ways that they have altered their diet as they have aged. In addition to reporting what their typical diet looks like, participants also talked about their daily activities and other ways in which they try to stay active or participate in the community, which constitutes the other important aspect of the diet-activity relationship.

**Physical Activity Practices**

Older adults stated in their interviews that they engage in a range of activities each week. Those that engaged in exercise-related activities (N = 5) said they did so because it strengthens bones, brain, and muscle; increases balance and overall health; and to lose weight. The reported exercise-related activities ranged from walking (N = 5), bicycling (N = 4), strength training at the gym (N = 4), dancing (N = 2), yoga or tai chi
(N = 2), and sports (N = 1). These proportions are lower than expressed by the larger sample, where 72% of participants (N = 23) engaged in at least one of the aforementioned activities on the CHAMPS survey. Of the five interview participants who reported exercise, only Edna believed she was getting recommended amounts of physical activity. This is consistent with the larger sample, where only one individual reported recommended levels of physical activity. Edna was much more motivated than most to obtain exercise, not only to help with the healing of her knee replacements, but because she enjoyed it so much. Although she had originally been coaxed to attend the community center fitness classes by a friend, once Edna started she said,

“It was the best thing I did and I started working out. I stopped once for a few weeks and it was just so uncomfortable to be at home in the wintertime. I get up and want to do something, and there wasn’t anything else here [at home] to do. So once I started going down to the [Sitka] center, you had all that light and all those people and exercise.”

Nearly all interview participants also reported typical activities that were not exercise-related in nature, but still resulted in some physical activity. These activities ranged from walking to complete errands (N = 12), work/volunteering (N = 6), gardening and outdoor chores (N = 5), and light housework (N = 2). All participants engaged in some sedentary activities, including reading (N = 7), crafting (N = 5), using the computer (N = 4), watching movies/TV (N = 4), playing cards (N = 2), and listening to music (N = 1). Again, these findings are consistent with the larger survey sample, where most participants reported engagement in sedentary activities (see Table 4.9).

More than half of the interview participants indicated that they do not try to get any physical activity. The most common reasons were limited mobility/poor health (N = 7), inclement weather (N = 4), and lacking a workout partner (N = 3). Four seniors
utilized wheelchairs or relied heavily on walkers, and many had degenerative conditions or otherwise considered themselves not healthy enough to engage in purposeful exercise. Ada said that because she does not have trouble with her weight, her only activity is to go outside several times per day to smoke cigarettes. Exercise was just not a priority for her because of her limited lung function and because she thought physical activity was only for people trying to lose weight.

Respondents agreed that the long winters in Alaska do not always allow for safe, outdoor physical activity for seniors most of the year. Since joining a fitness facility usually comes with a cost and requires transportation, most participants did not have access to indoor workout facilities. Four participants had free access to a fitness facility in their senior living complex, but only one individual felt motivated enough to utilize these facilities. The other respondents indicated that they did not wish to obtain physical activity or that their limited mobility was a barrier to the facility. No respondents reported engaging in mall walking for exercise, although Anchorage had several such places where adults go walking in the winter months. Edna said that she would “get distracted” if she tried walking at the mall, and would not try to do so without a partner anyway.

Edna and five other participants indicated that it was important to have someone accompany or otherwise support them in their efforts to increase physical activity, although two respondents reported not having such support. Edna said that she enjoys exercising at the senior center because other people make the activities more fun. Milton and Gilbert did not state what would get them to be more active, but when I asked about a fitness buddy they both stated, “yeah” that would probably work. Cornelia indicated that her husband would not participate in exercise on his own and he was also resistant when
she suggests it, stating, “My husband doesn’t like being told what to do about anything and he especially doesn’t like being told by me because he knows if he doesn’t do it, there’s going to be hell to pay.”

In summary, most research participants reported engaging in typical activities that were not exercise-related. Five participants exercised regularly and most got some physical activity running errands, cleaning the house, or volunteering. However, a substantial portion of the sample (N = 8) reporting avoiding physical activity in preference to engaging in sedentary activities for a variety of reasons. Interviewees also reported a number of sociocultural, economic, and environmental influences on their physical activity and dietary patterns, discussed below.

**Influences on Diet and Physical Activity**

In addition to describing their typical diet and physical activity practices, this sample of Anchorage seniors discussed the factors that influence their behaviors. Ten major themes emerged from the qualitative data related to the influences on elder nutritional status, diet, and physical activities: the media, friends and peers, family, social opportunities, ethnicity and subsistence practices, the physical environment, transportation issues, economic concerns, weight loss/body weight concerns, and general health challenges. Some of the themes that arise were expected by previous research and the literature, but a few new concepts emerged from the interviews and observations in Anchorage.
The Media

Study participants who reported a stronger influence of the media on their dietary and physical activity patterns also reported increased energy expenditure in physical activities (see chapter 4). Sample participants averaged 3 ½ hours of television watching per day and 14% (N = 12) reported watching less than 6 hours per week. Some research has shown that increased consumption of the media tends to be associated with decreased physical activity as it is a sedentary pursuit, especially in children (Crooks 2000; Marshall, et al. 2004). Additionally, commercial advertising of fast foods in the media can act as a powerful barrier to healthy eating among adults (Schoenberg, et al. 2013; Yeh, et al. 2008). However, there is some research to suggest that specific media messaging can be an effective catalyst for increasing physical activity and healthy eating behaviors among seniors (Beaudoin, et al. 2007; Reger, et al. 2002). Interview participant Kyung agrees that the media has a strong role to play in determining individual actions and behaviors. Born into Communism, Kyung says that “propaganda” is necessary to ensure a “revolution of the diet.” He indicated that American capitalism gives rise to “thousands of different coffees” and other such unnecessary items that lead to poor dietary patterns.

The finding that influential media seems to be correlated with higher physical activity for this sample of older adults may be a result of the types of media they are consuming. Study participants who considered the media to have some to most important role in their dietary and physical activity choices tend to have higher weekly energy expenditure for all activities and moderate intensity activities compared to those who
considered media to have no to very little role in their choices. Interviews and participant observation data for this study indicated that health programming on television, such as “Dr. Oz” and “The Doctors,” as well as health and senior magazines, may have a positive impact on this population. Although Dr. Oz is a particularly controversial television host, his shows often focus on quick and easy remedies touted to slow aspects of aging and disease progression (Senior Planet 2013, January 3), such as dietary and physical activity behaviors, which appealed to some female participants in this study.

Women like Josephine and Fatima claim to have always been interested in food or healthy lifestyles and found that watching health TV shows was just one aspect of their lifestyle. Josephine described to me how she is trying to eat more healthfully lately, such as trying to incorporate more nuts and seeds into her diet. She said she had trouble remembering to buy them in the store, as “they’re supposed to be so good and because I try to listen to Dr. Oz but I haven’t been successful yet with those chia seeds.” I asked her to tell me more about Dr. Oz, to which she replied that she “makes notes” of advice that she thinks applies to her while she watches the show. Josephine added, “I do think he has wonderful ideas and some women are really, have great improvements.” Josephine believes that taking advice from television doctors is part of her generally healthy lifestyle, indicating that her, “basic life has been a pretty healthy life. I mean, it’s not like [health is] something that I just got interested in late in life.” For example, Josephine also reported that she “never eats processed foods.”

Fatima spoke at great length with me about food. She held several food service and preparation jobs throughout her life, including baking bread and cakes out of her apartment to pay her way through college, and owning her own catering business after
school. Later in life, she began trying holistic and dietary therapies along with traditional treatments for a host of ailments including cancer, chronic pneumonia, and Addison’s Disease.‡ She tried a completely vegan diet at one point and struggled to switch to all organic foods. In her quest to alleviate her symptoms, Fatima began “doing a bunch of research on food” online and included consulting a friend of hers in San Francisco, who is “like, one of the top vegan chefs in the country. She has a TV show and has written books.”

Fatima and Josephine both spoke about the role of the media on their choices; however, they did so only in the context of their food choices and dietary patterns, not exercise. This may not be surprising considering that most health media, like daytime television shows and healthy lifestyle magazines, tend to focus on fad diets, dietary supplements, and recipes. It is interesting in the context of this study because the quantitative data indicate a correlation between the media and increased physical activity, not greater consumption of fruits and vegetables or decreased intake of fats, oils, and sweets. One possible explanation lies in the fact that Fatima and Josephine both reference consumption of health media in terms of their broader lifestyle patterns, which include other healthy aging strategies that they have been employing for years. Individuals who consume health media like this may be getting more physical activity because of their increased understanding of its importance to health aging.

Research indicates that older adults with greater belief and knowledge of the health benefits of physical activity are more likely to adopt or currently participate in a

‡ Chronic adrenal insufficiency resulting in fatigue, muscle weakness, nausea, headaches, and joint pain.
physically active lifestyle (King 1997). These women do more than consume health media and watch their food intake; their lifelong patterns led to increased knowledge and understanding of the benefits of activity and healthful eating, producing patterns that continue to shape their dietary and physical activity practices today. For example, Josephine and her Alaska Native husband moved to several different rural villages while they were raising their children, so that they could all learn how to engage in subsistence activities such as dipnetting, cutting and smoking salmon strips, as well as hunting, butchering, and preserving big game like moose and caribou, all of which are vigorous physical activities. After her divorce, Josephine continued making healthy choices such as quitting smoking and joining a Better Breather’s Club that met once a month to listen to “interesting speakers with useful health information or sometimes we do exercises there like yoga or other types of exercise. It’s probably half and half; half the time it’s speakers and half the time it’s working out.” Likewise, Fatima remembers always being physically active before her health problems began, from soccer, swimming, and cycling as a youth to utilizing several health club memberships and physical therapy programs in adulthood. Even as her health declined, Fatima recognized the importance of exercise, taking pains to walk her dog for at least one hour a day despite her physical limitations.

These two women, and possibly others in this study sample who are influenced by the media, are more likely to consume health media because they have been physically active and interested in health for much of their lives. Both of these women serve as examples of older adults who have employed several lifestyle strategies for many years, and consuming health media is just one of the strategies that lasted into older adulthood. Josephine and Fatima are also getting their motivation and information for diet and
physical activity from health professionals, family, friends, and peers, who make up their network of trusted sources of health information.

**Friends & Peers**

In this dissertation, friends played a role in increased physical activity expenditure (see chapter 4). This finding is not surprising, as the role of strong social support networks on healthy aging is well documented in the gerontological literature (Bryant, et al. 2001; Phillips, et al. 2016; Seeman, et al. 2001). Specifically, the pathways linking friendships to increase physical activity are through intrinsic rewards such as support, encouragement, and companionship (Fraser and Spink 2002). Among this Anchorage sample, older adults with strong social supports tend to eat and exercise with their friends or roommates, resulting in a generally positive influence on each other.

During my observations, I frequently saw friends and neighbors taking walks together, having lunch, or snacking together while playing board games in various locations around the city. Although this happened to some extent at the Sunrise Estates and Quenaga Creek senior living locations, it was most common for me to observe the influence of social interactions on diet and physical activity patterns at medical centers, parks, and community centers. Community center members who used the fitness center or took group classes often had friends and acquaintances that they looked forward to catching up with before and after their workouts. Whether explicitly stated or not, many of the participants who attended community center activities felt accountable to continue attending because of the friends they had made through these activities.
Edna stated that all of her current friends were people she met and interacted with at the Sitka Center. Her husband drove her to the community center every day, dropping her off for several hours while he returned home to “tinker with the cars or build things in the garage.” He would return to pick her up, where they would spend the evening together at home. Although her husband chose to spend the day alone, Edna did not let his solitary patterns dictate her own social network. She felt like she might be letting her friends down if she missed a day at the community center, as they were always excited to see each other again and catch up. She attended at least one group fitness class per day, often also using some of the gym equipment. She usually had lunch and attended other events at the center, like art or writing classes, as well. She even attended the Weight Watchers group that met at the community center on Fridays. Edna explained to me,

“It is a social thing. I’m not one to just exercise at home alone. I’ve done it, but it’s not something that you can do on a regular basis. It’s not fun. I want to enjoy it. I think exercise is fun, it feels good.”

Since I also attended, or taught, many of the fitness classes at the center, I got to know Edna very well. I sometimes had lunch with her and her friends at the community center café. She clearly felt a strong sense of camaraderie and accountability to her friends at the community center, and her desire to exercise and eat with them was so great that she was willing to forgo time with her husband for them.

Most of the men I interviewed indicated that they do not really have many friends to help them get out and be active. Meeting to exercise or attend group fitness classes was really more of a women’s activity, from my observations at the community centers and the senior living complexes. Indeed, lack of social support for exercise in later life is a
key barrier to physical activity among older adults (Cousins 1995; Wilcox, et al. 2003). Most of the men I interacted with during the course of this research indicated that they would get more physical activity if they had someone who would participate with them. For example, Gilbert said that he would be more active “if I had a physical activity partner. The guy that lives down the street has a good bicycle. I mean, I would bike with him.” Gilbert is a friendly and social man, seeking out nearly anyone he can find to show pictures of his grandkids. He also spends his spare time participating in a local philosophical discussion group called the Aristotle Association, but it seemed to be more difficult for him, and most of the other men in the study, to find other people with whom to be active. This is consistent with the literature (see chapter 2) that indicates men tend to be more isolated from social supports in older adulthood.

One exception is Jack, an extremely friendly and social man who spent a lot of time at the Sitka Center. Jack and his wife, Bertha, spend nearly 6 hours per day, every day, at the community center. While she attends group fitness classes and social events with her mostly female friends, he tends to work out in the fitness room for much of this time. He stops to talk to nearly everyone, much to the delight of the other seniors. He is a former police officer and values his physical fitness, so he indicates that he does not need an exercise partner for motivation. He prefers the solitary nature of using the equipment in the weight room, but he turns this into an extremely social activity, joking with the fitness manager, volunteer staff, and practically anyone who enters the room. Jack,

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8. Jack was not an interview participant, although he was included in the quantitative sample of 82 respondents reported in Chapter 4. His wife, Bertha, was too young to participate in the study. Both were a part of participant observation activities because of their frequent presence at the center.
Bertha, and Edna are just a few examples of the many socially connected seniors in Anchorage who find positive influence of others to increase their physical activity.

Nolee’s story is somewhat different, but still shows the influence of friends. She works full-time at a community center and is always on the go. She is always bustling around the center taking care of issues, teaching senior computer classes, attending meetings, teaching children’s sewing classes at church, and other volunteering in her spare time. Nolee has struggled with her weight for the past 15 years, when she was diagnosed with Type-II diabetes. She took medications but did not change her diet, considering diabetes “no big deal.” When she was at her heaviest and had skyrocketing A1C levels (blood sugar) her doctor told her that she might not be around much longer to play with her 10 grandchildren and great-grandchild. She immediately enrolled in Weight Watchers at the community center. Weight Watchers is a support group, but many of the women in the program were already friends and encourage each other outside of the program. Nolee is very social, eating with other people at least once a week. She takes several short walks throughout the day, whenever she can spare the time. At home, she has short exercise videos that she will do after work. She says that her female roommate is a positive influence on her physical activity, as they are both “determined to lose weight” and have been successful since joining Weight Watchers.

Friendships can also provide a positive influence on dietary patterns in older adults (Silverman, et al. 2002). Indeed, 60 participants (73%) in the larger sample indicated that friends played a role in their diet and physical activity choices. For example, Blanche and Cornelia are regulars at the community center. Blanche, who uses a walker, is a board member of the community center and spends the entire day there
volunteering wherever needed. Cornelia, who also uses a walker, also volunteers every day of the week, covering the reception desk and answering phones. Both women have limited mobility due to a series of health conditions that limits their ability to participate in physical activities. Instead, Blanche and Cornelia strategized to eat healthy lunches with each other, knowing that they often had the trade-off of unhealthy dinners at home with their families. Both women purchased their daily lunches at the community center café and both almost always chose the salad and sandwich combo plate when they ate together, talking about how they were watching their weight or trying to be healthier. However, Blanche’s home dietary patterns indicated that she was much less health conscious when eating with her family members. For example, Blanche reported eating TV dinners at home where she lives with her disabled daughter, or “last night for dinner, I had a hot dog, potato chips, and a glass of chocolate milk… and brownies,” items she never purchases for lunch with her friends.

The social pressures of managing one’s health in front of friends can result in positive dietary patterns. However, in Blanche’s case, the community center café may also present her with her only option to eat a healthy meal each day. Because she and her daughter both have physical disabilities and receive a small amount of disability income, it is difficult for them to go shopping, keep fresh and healthy produce in the house, and prepare healthy meals. They rely on whatever food is quick, cheap, and easy to make at home. Blanche indicated that lunch at the community center was her main meal of the day. This is in contrast to Cornelia, who lives with her husband. Although he also experiences some illness, he still works as a security guard, providing extra income to the household. Consequently, Cornelia had the resources, ability, and desire to continue
making elaborate meals at home. Cornelia indicated cooking for herself and her husband, “usually a meat and a vegetable, but it might be rice, it might be potatoes, it might be a macaroni dish… or a hearty wintertime stew.” Cornelia was just one of several respondents who reported an important role of their family on their dietary or activity patterns.

*Family Influences*

Family support can be a major factor in food choices for adults (Anderson, et al. 2007; Shaikh, et al. 2008). Only 16 individuals (19.5%) in the larger study sample indicated that family has no influence on their diet and physical activity choices. Chapter 4 indicated that increased fruit consumption was related to the role of family members on senior’s dietary practices. In Anchorage, family plays a variety of roles in the lives of older adults, not least of which is provisioning of food. Several participants indicated receiving visits from family members who bring meals or groceries to their homes. Milton reported getting frequent food deliveries from his daughter. Although he lived within walking distance of an excellent local grocery store and deli, the items there are expensive and his mobility was somewhat limited. If left to his own devices, he reported he would only eat TV dinners, canned chili, cake, and ice cream, despite his diabetes. He says, “My daughter brings me food once in a while. She brought me this Thai food last night; rice and soup, and egg rolls, I think they’re called,” which often provides him with a healthier, although sporadic, meal.

Although most interviewees reported that family relationships result in provisioning of food to the elder, this is not always the case. Fatima discussed her family
very little in the course of her interview. When I prompted her about her three children, two sons and an adopted daughter who still live in Anchorage, she said that the only role they play in her lifestyle is “wanting to occasionally come over and eat.” This did not result in them bringing food to her, but instead asking her to “cook them things like a steak,” despite the fact that she does not eat red meat. She said, “I’ll make up something like say, you know, this baby bok choy or something with salmon and I’ll ask [my son] you know, would he like some of it. But, no.” So rather than let her children adversely influence her dietary intake, she said she prefers to eat alone.

Family ties can be nutritionally important even if most of the senior’s family no longer lives in Anchorage. Kyung, a married man from Korea, has been in the U.S. since 1979. He met his wife in Alaska and they have a 32-year-old son who now lives in Florida. He reports that the social relationship with his wife around food is more important than the nutritional value,

“Because I’m not looking for food; I’m looking for my relationships. So I’m thinking about more relationship than food. So [some] food I do by myself, you know, standing [in the] kitchen by myself or eating my own thing…but most time with my wife. My wife cook[s] very well.”

Interestingly, Kyung was the only individual who reported a positive influence of a spouse on their patterns. The three remaining married research participants report that their spouses have diet and physical activity patterns that conflict with their own. These three were women who were dieting while their husbands were not. Edna had to cook her husband separate meals because “he’s too skinny.” Indeed, he was a thin, frail-looking man who preferred to eat fried meat with potatoes, items that Edna claimed she needed to avoid. Cornelia had to cook meals that her husband would eat, but chose to spend the rest
of her day increasing her fruit and vegetable intake to “make up for” the larger dinners at home.

Lanuola (aka Lanny) indicated that family supports are extremely important for elders in Anchorage; however, Alaska is thousands of miles away from the rest of the United States, so older adults can be physically isolated from family and other social supports. Samoans are a burgeoning minority group in Anchorage, currently making up nearly 2% of the city’s population. Lanny told me that most new Samoans to Anchorage are arriving because of existing family members who live here. Edna reports no family remaining in Anchorage except her husband. She has a son in Mamterilleq (in rural Alaska), a daughter in Singapore, a daughter in California, and grandchildren going to school in several different states, all of whom are difficult to stay in contact with. Having one son in the state did not necessarily result in closer connections with him than her out-of-state family because most of Alaska is not connected by roads.

In contrast, Nolee also has strong family supports all over the state of Alaska. She regularly receives food from her family; both shared meals as well as coveted food items that are difficult to find in Anchorage. She has many relatives who live in Anchorage and nearby towns, where she eats with family at least once per week. Because she was raised on a traditional subsistence lifestyle, she also relies on her rural family members to provision her with local fish and game. Nolee gets “fish, caribou, moose, ptarmigan, you know, a lot of berries: salmonberries, blueberries, raspberries” from her family members who live in outlying areas, “like my cousin’s husband works as a foreman in a crab plant and so he can get us crab where we couldn’t otherwise afford it.” Her family to the northwest gets her seal oil and her family in interior Alaska send her watermelon berries,
in exchange for fresh fruit from the markets in Anchorage that they cannot obtain in rural Alaska. “It’s a bartering system,” she reports. During my time in Anchorage I also observed that many people sent store-bought fruit and vegetables from Anchorage to their family in more remote Alaskan villages, where prices for these items are astronomical. Such observations and interview responses further validate the result from chapter 4 that family can play a role in increasing fruit consumption among Alaskan elders.

**Social Opportunities**

Another consideration for the diet and physical activity patterns of older adults in this Anchorage sample is participation in a variety of other public and social opportunities. Quantitative analysis in the previous chapter suggests that friends and family can help with increasing physical activity and fruit consumption but participation in cultural events is linked to increased consumption of fats and sweets. Clearly there is a mixed effect of the important influence of others for older adult practices. Research suggests that adults who have commitments and engagements outside of the home get more physical activity than those who are homebound (Belon, et al. 2014; Millen, et al. 2000). Interviewees suggested that occupational and volunteering opportunities were a major driver for getting out of the house and being social in the community. Several older adults indicated that work or volunteering was one of the few reasons they had to leave the house and socialize with others. Most participants stated that they volunteered in one way or another, often at church or a community center.

After retiring from the workforce, Edna volunteered as a greeter at Wal-Mart, an occupation that she enjoyed very much because she liked helping people and, “just
making new friends. I still keep in contact with a lot of the customers.” Blanche also socializes during her volunteer work where she spends five days a week at the community center. She said, “I love my volunteer work. To me, it’s not work; it’s an enjoyable thing. I’m on the board of directors so I feel like I should be here every day.”

Although most participants were retired, even the seniors still in the workforce spent their free time volunteering. For example, Lanny (who still works) said that volunteering made her feel more active in the community, “I feel more powerful and more, not powerful but more happier if I do something. Instead of just coming home and sit and don’t do nothing.” Nolee also enjoys a full life of working, volunteering, learning, and teaching,

“I rarely sit down for more than 5 minutes. I’m on the go a lot, attend a lot of meetings, do a lot of volunteer work. Work here, teach classes, I am real active in my church, I take college level classes in various books of the Bible and things like that. I volunteer for Operation Christmas Child; it’s where you just give basket, food baskets to people who are, you know who wouldn’t otherwise have holidays for their families.”

Older adults with whom I spoke in Anchorage also have a desire for lifelong learning. Gilbert continued to substitute teach to keep his mind sharp, while Gilbert and Milton belonged to a philosophical discussion group at the community center. At this time of this writing Harold was finishing his Bachelor’s degree from a local university stating,

“[I hope to] work in human services, any department. I also, well like I could, I don’t want to be a drug counselor, but I could be, but I want to help where I can and whoever needs it kind of thing because that’s the type of person I am; I’m a people person.”

Although several interviewees took classes, worked and/or volunteered, Lanny suggested that not all seniors in Anchorage have the opportunity or ability to do so,
stating, “But I’m pretty sure that we have some of the elders in our community [Samoans]… in Anchorage that would love to do such thing. And just don’t know where I got all that strength and the time to do all that stuff.” Indeed, eight participants reported that they did not have the strength, health, interest, or opportunity to work or volunteer. Expectedly, these individuals also indicated being more lonely and reported less physical activity than those who did work or volunteer outside of the home.

Ethnicity and Subsistence Practices

Participants in this study belonging to ethnic minority groups felt particularly influenced by their cultural identity in regard to their dietary and physical activity patterns (see chapter 4), and this was also true for the interview participants. For example, Nolee stated that local food items are meaningful for her when her family gathers. She stated, “we always have smoked fish, we always have fish pie, we always have, you know that’s part of our, the way we grew up.” Nolee says that these foods are not just a supplement to her local diet, but these native foods are culturally meaningful to her, another common thread among Anchorage participants. She reports that although she has extensive networks throughout the state, halibut is still difficult to obtain “because you’ve gotta take a charter and it’s so expensive. You know, it’s one of the things that I hate about the fact that we don’t have a boat.” Nolee did find some ways to continue traditional subsistence activities in the Anchorage area. For example, “I go blueberry picking every summer, I go blueberry picking and cranberry picking at Hatcher’s Pass. Fishing on Knik and the Kenai [rivers]…” However, she is relatively young and still very
active; it may be that most Alaska Native elders in Anchorage are not so agile as to be able to continue obtaining local foods.

Sergei is a man who refers to himself as a “Kodiak Creole,” of mixed Alaska Native and Russian descent. He has severe physical limitations, such as obesity, nerve pain, Wegener’s Disease,** and bad knees requiring replacement surgeries, which force him into a motorized wheelchair and restrict his ability to engage in subsistence activities. Sergei grew up as an extremely active youth in Anchorage with parents that took him fishing, hunting, and trapping outside of town. His sons now live in rural villages where they continue these activities, but Sergei wistfully admits that he can no longer participate in such active pursuits,

“Set-netting over at Beluga, down the inlet toward the village of Tyonek and on a really, really, really good day, we’d get 900 fish and that’s where you’re in a skiff and you’re putting [seine] nets in the water and pulling the nets out and it’s really difficult physical work. It kind of reminds me of hay-baling or something, you know. It’s pretty, you can get pretty sweaty. But I found that to be some of the most rewarding work I’ve ever done, set-netting each summer for years was just really neat… But I’ve been in this [wheelchair] since I got here [Sunrise Estates] two and a half to three years ago.”

Although Sergei could not engage in subsistence activities, he still valued traditional and native foods, whenever he could obtain them. This was a common theme for Alaska Native participants in this study. Few were still actively engaged in harvesting traditional foods, but the food items themselves still held meaning, however they were acquired.

**Wegener’s Granulomatosis causes inflammation of the blood vessels, restricting blood flow to the kidneys, lungs, and upper respiratory tract, resulting in muscle weakness, nosebleeds, ear infections, chest pain, shortness of breath, joint aches, and swelling.”
For Ada, a woman raised in the Seattle area, traditional Alaskan foods played an important role in her upbringing, as they do for many Alaskans. Ada’s father owned a salmon cannery so she was raised on traditional foods like salmon, halibut, clams, crab, octopus, sea cucumber, scallops, oysters, and cod. She spent the fall and winter in Seattle and the spring and summer fishing seasons in Alaska throughout her childhood. She raised her own seven children in Alaska on canned salmon, “my kids would come from school and they’d take a can of salmon and just eat it right out of the can.” As a senior in Anchorage with family in the Lower 48, she has little ability to obtain traditional foods from her home region. Instead, she takes a shuttle bus over to the local Native health corporation’s elder program building, where lunches are served to Alaska Native seniors living in Anchorage. She says that halibut is her favorite, mostly because it is too expensive for her to buy on her own. Ada laments that it has been 3 years since she bought seafood, because it costs so much. “When I found out how much fish costs, I was in a state of shock.”

Besides local elder’s programs, Alaska Natives living in cities have access to traditional food at local cultural events like potlatches. Potlatches in Alaska are not the elaborate gift-giving, redistributive ceremonies seen in the Northwest coast anthropological literature (see Harkin 2001). Rather, Alaskan potlatches are social gatherings aimed to strengthen ceremonial, spiritual, social, and cultural aspects of communities (Gilbert 2014). Each community in Alaska has a slightly different potlatch custom signifying events such as births, marriages, and most commonly, deaths. Nolee, mentioned above, attends at least 4 potlatches per year. Although these events are often
funerary, she says that the food there is, “wonderful, absolutely wonderful… [there is] native dancing, native fiddlers. I usually make agutak, †† the Eskimo ice cream.” Sharing food at cultural events like potlatches is a common way for Alaskans to maintain and strengthen their cultural connections; however, traveling to attend such events can be difficult for older adults.

*The Physical Environment*

Alaska is known for its challenging physical environment. Not only is Alaska the largest state in the country, it has some of the most remote and isolated settlements. Coupled with the extremely unpredictable climate of the arctic, travel can be difficult, even within the city limits. While the original project did not focus on the influence of the physical environment in shaping food and physical activity behaviors in Anchorage, the research participants made it clear that this was a significant barrier to them. Gilbert elaborates on how elders may feel physically stuck in Alaska,

“Food, gasoline, utilities for your house; those are all higher than most places. And it’s expensive because we’re a captive audience here in Alaska, it is expensive to get away…. Driving from Anchorage to the nearest U.S. border is at least… a 2-3 day drive. With the price of fuel today, that’s expensive…. I mean, just to fly from Anchorage to Seattle costs me as much as it costs to fly from Seattle to Washington, D.C.”

Travel is additionally impeded by the lack of a road system linking most towns in the state and the unpredictable weather. Most interview participants brought up the climate and weather when talking about their limited physical activity. As expected, the lengthy

†† Agutak, or Eskimo ice cream, is a mixture of berries, whitefish, sugar, and whipped fat (often Crisco or seal oil). Sometimes additions such as tundra greens or roots are also added.
winters in this sub-arctic city are especially challenging for older adults. Lanny suggested that new arrivals to Anchorage really struggle with the climate,

“A lot of [Samoan elders] are fishermen; you know they have a lot of stuff that they can do outside where, versus up here in Alaska, you can’t. An elder is so afraid to go outside the house in the winter. They are so fragile they might, you know, fall and hurt themself.”

Although many Alaskans are also fishermen, the activity is very different in tropical environments. New arrivals to Alaska may find that their previous skills do not translate to this environment. Additionally, winter weather takes up most of the year in Alaska, limiting opportunities for physical activity. Lanny continues,

“[Samoan elders] are afraid to go outside in the snow. So they tend to just eat and don’t exercise. And I think the bad out of all this living in Alaska is just the weather; you know the cold, the winter.”

Likewise, Kenjii says that he is much more limited in the winter because he cannot drive. Since he relies on sidewalks to get his wheelchair to bus stops, he is impeded by snow-covered walkways. In Anchorage, municipal ordinances allow for the use of sidewalks as snow depositories when clearing the roadways. Since Anchorage can get huge amounts of snow, there is often a shortage of where to store it all. The city does have several snow dump sites scattered around the municipality limits; however, it is expedient, convenient, and extremely common to shovel the snow into the sidewalks. Of course, this severely impedes the navigability of the city for seniors and people with disabilities.
Despite winter weather limitations, most Alaskans, including Kenjii, claim to love the snow. When I asked Blanche if she was afraid of winter falls, she said that the snow is so beautiful that it was worth any risks. Despite her own history of slipping in the winter, she claims not to be worried about falls,

“No, I don’t because you could, there’s things you can put on your feet [ice cleats/crampons] to keep from falling and you can always dress warm enough for winter. But, I fell on the porch one day; I don’t know what I was doing. I’d come in from someplace and I don’t know what I hit but I went down, kerthunk. I didn’t hurt anything…. But anyway, it’s supposed to snow today. I hope so; we need snow. This is still winter; we’re supposed to have snow in the winter. Well that and the fact that it makes it look a lot cleaner.”

Although several individuals admitted that icy winter weather can be dangerous, most participants commented on the decades-long streak of warmer-than-average weather in Anchorage. According to participants, who had all lived in Anchorage for greater than 10 years, winters are significantly less cold and snowy and the summers have been longer and hotter than ever before. Participants often talked of remembering the temperature dropping below -20 degrees, which rarely happens in Anchorage anymore (Fleischer, et al. 2014). It is possible that seniors downplayed their fears of winter injuries due to these extenuating circumstances. However, Sergei talked of his love for winter sports, including hockey which he played up until his recent knee injuries. He said, “I used to have an office in my house up on the hillside and in the wintertime I could walk out the door and go cross country skiing from the door.”

Edna and Harold were the only participants who suggested that spring and summer were preferable months. Edna talked about her ability to garden and do outdoor
chores while Harold was glad for his ability to play sports and take his grandchildren to
the park in the summer,

“I’m an American Legion high school baseball umpire which kind of gets
me in shape. I also do adult league. And I’m not bragging, but I’m pretty
good at it. But that’s usually the only type of physical activity I have, and
that’s over the summer. Since my grandson is 10 years old now, I do go
out and help coach when I can. I take my grandkid shooting basketballs
but all I do shoot; I don’t run the balls down or nothing. I let him do that. I
take them to the park all the time during the summer.”

Anchorage has many amenities such as numerous parks and natural areas within the
municipality limits, most of which are connected by the trail system. But as Sergei and
Nolee had alluded to above, urban living has its own set of challenges, such as limiting
their intake of traditional foods. In rural Alaska communities, subsistence practices are a
way of life, but in Anchorage there can be some difficulty engaging in such activities or
finding certain foods. As Nolee states succinctly, “I miss [fresh] halibut.” Since
Anchorage is a sprawling city with a limited public transportation system, participants
like Ada also reported feeling secluded from other individuals and the rest of the city,
even within her own senior complex,

“A lot of people in this building get depressed by the isolation of this
place. We’re out of the way of the bus and up on this hill, whereas the bus
stops in front of the other buildings [in this complex]. And a lot of us can’t
walk up there to the bus stop, so people here are very isolated.”

Clearly elders in Anchorage struggle with the realities of accessing desired foods and
traveling outside of their homes in a harsh, seasonal environment. Indeed, seven
individuals mentioned transportation as an issue for seniors navigating the city, described
below.
Transportation Issues

Participants suggested there were only three modes of transportation they could utilize: the city bus, AnchorRides, or catching rides from family members. AnchorRides is a city program providing free or low-cost, on-demand, accessible transportation for seniors and people with disabilities in the municipality. These options may help elders get to the grocery store, but such curb-side services also limit physical activity. Only three individuals reported driving their own cars, while married women like Cornelia and Edna relied on their husbands to drive them where they needed to go. Harold and Kenjii were the only seniors who used the city bus system. Harold is pretty active so he had no problem walking long distances and transferring quickly from one bus to another stating,

“I don’t have a car so I do walk a lot. I take the bus, which is convenient. I also, since I’m a senior citizen, I also get AnchorRides which are free. I can call them up during the week and tell them what time to pick me up, where I’m going, and they’ll do that as long as I call a day ahead of time. So I do get around town during the week really well. Weekends I can usually use my ex’s car.”

As Harold’s quote indicates, AnchorRides can be inconvenient because you need to plan your activities at least a day in advance; they do not accommodate spontaneous plans. Additionally, at the time of this writing the city bus system is undergoing major changes that would greatly reduce their coverage outside of the downtown and midtown areas, where lower-income residents tend to live. Changes are anticipated to negatively affect access for approximately 33,000-85,000 residents (Municipality of Anchorage 2016), many of whom are seniors.
Kenjii was the only one who primary utilized sidewalks and the extensive paved trail system, although he did so from his motorized wheelchair so he did not receive most benefits of physical activity. Kenjii found the trails to be a convenient way to navigate the city in the fair weather months,

“Now, summertime it’s coming up. I’ve got my wheelchair. I will go wherever I want to, whether it’s to Carr’s [Safeway] or to the shopping center at the [mall]. I’ve gone to all kinds of trails just to find out where it’s at and I pretty much know where I’m going because when I first came to Anchorage, I did deliveries of Chinese food…. I try to go out all the time. And I try and [plan] it up ahead; otherwise, I’m at home and I do nothing."

When the trails or the bus were not convenient, Kenjii utilized AnchorRides. Blanche also indicated that AnchorRides was convenient for her and served as her only access out of the home. She utilized this service to get to and from the senior center every day.

Several seniors relied primarily on family members to take them where they needed to go, although no one reported relying on friends for their primary transportation. Harold occasionally had his roommate help when the bus was not convenient. Although living with roommates or family members can be beneficial in many ways for older adults, Lanny found that it could be difficult scheduling rides with family members,

“Try[ing] to get [elders] out and get them to go out and help other elders or be just a part of elders programs depends on where they live, who they live with, families that they live with, their schedule. So it would be easier for us to do it, to get them out of the house, if the family members that they live with, it’s okay, and it fits in their schedule.”

Since relying on family members to drive seniors around town was often not an option for respondents, some felt they must continue driving their own cars, even if it might not be considered a safe practice any longer. Milton states,
“They were talking on the news yesterday about when should an old person not drive any longer. And my response was ‘as soon as there’s a better way to get around,’ which there isn’t. I lived in Baltimore when I was a kid and they had street cars and you could go anywhere for a dime. I really rode the streetcars a lot.... Some people can’t drive and don’t have cars. I have a Jeep; so long as that thing keeps running and they don’t take it away from me, I’ll go to the [community] center in my Jeep.”

Although older adults in Anchorage indicated that they had few transportation options, most participants had found ways to navigate the city. Some participants did state that they were somewhat limited and could not exactly go wherever they wanted to, whenever they wanted to. Seniors were mostly limited to family member or bus schedules, which tended to limit their ability to leave the home at nights and on weekends. However, no participants mentioned utilizing taxi service, likely because this was the most expensive travel option for seniors on limited incomes (Uber, Lyft, and other low-cost ride-share services are not available in Alaska at the time of this writing).

Travel is important for seniors to acquire food and to obtain exercise. Despite the range of transportation options that interviewed seniors mentioned, only Harold reported physically active transportation modes such as walking and bicycling.

Financial Concerns

Related to expensive transportation options are the various financial concerns that older adults in Anchorage face. Alaska has some of the highest costs of living in the country, ranging from the most expensive healthcare to high costs of housing, food, gasoline, and utilities (Fried 2014; 2015). Financial concerns could explain some of the poor dietary patterns and nutritional status demonstrated in the previous chapter.
Individuals on a limited income may be faced with the decision to buy medications or food, as Lanny suggests,

“When my mom moved up here, her kidneys was really bad to where the pills is not working. So then she start the insulin dependence. So she start the insulin and then as she keep going, I’d take her to see the doctor and everything and it was expensive, you know. And she doesn’t want to go to the doctor because she know that she has to pay this amount of money… and she was working, you know, so what she earned from her job and, you know, little money that she can receive will go toward her medicine.”

Lanny’s elderly mother often avoided going to the doctor, knowing that she could not afford to pay the medical bills. She also suggests that new immigrants to Alaska often have to work several jobs to make ends meet,

“I met an elder Samoan and she works 2 jobs cleaning. Just to make her payment for her apartment, you know, and her car. Who knows if she has enough to buy herself something to eat. You know, she just had a surgery… how is she going to get money to pay for her rent? How is she going to get food? How is she going to put gas in her car to go to work?”

Lanny was also aware of the significant financial burden that families caring for elders had to face. In Samoan culture, it is extremely rare to put seniors in nursing homes, so everyone in Anchorage over the age of 55 that she knew was living in the household of their children. This trend is becoming more common throughout American society, as people are more reluctant to institutionalize their own parents and are caring for them longer in the home (U.S. Department of Health Human Services 2016). Lanny elaborates,

“They [family caregivers] will be at work and some of them, they work 2 jobs just trying to make a living. And you know the job they have, it doesn’t pay enough to pay the house, pay everything else, and take care of an elder.”
Since he became a grandparent the previous year, Gilbert has been continuing to substitute teach and work as a licensed investment advisor so that he can save money for the expensive plane tickets to visit the east coast. When asked if he was going to move to be closer to them, he said there are too many economic advantages to living in Alaska, despite the 4,300 mile distance between them. Gilbert says that no state income tax, no state sales or local taxes, discounted property taxes, free car registration for seniors, receiving 10% cost of living incentive to remain in Alaska on state retirement, and the Alaska Permanent Fund Dividend are all reasons he will stay in Anchorage.

The Permanent Fund Dividend, or PFD, is an annual payment made to every permanent resident of Alaska based on the earnings of the Alaska Permanent Fund Corporation. Payments are based on a 5-year average of oil profits and other investments. During this research study, the PFD payment was the third highest in history, each person received $1,884.00. An Alaskan who has received every dividend since its inception in 1982, such as Gilbert and many other seniors, would have collected $37,027.00, as of 2014. However, at the time of this writing the state of Alaska is facing one of the worst budget crises in history (Tully 2015). With a state budget based almost entirely (90%) on oil revenues combined with historically low oil prices, state legislators are making dramatic cuts to PFD payments, Medicaid, disability, and senior services as well as considering instituting income and sales taxes, potentially making it less economically advantageous for seniors without local family supports to remain in Alaska. Even so, Gilbert indicated that Anchorage seniors have a greater appreciation for what they have, because of their fixed incomes.
Seniors have access to several such benefits in Anchorage, such as free weekly food boxes from the Food Bank of Alaska; free local meal programs; and federal programs like SNAP (food stamps), Medicaid, Medicare, and Social Security. For example, both senior living complexes mentioned in this study were host sites for daily free lunch services from the Salvation Army. Several interview participants received these free lunches, and several of the quantitative sample participants received free Food Bank boxes.

Most interview participants were utilizing Social Security as their main source of income. Although limited incomes tend to reduce dietary quality, especially for older adults (Raffensperger, et al. 2010), Josephine saw value in spending her money on food,

“I’m on a lower income; pretty much Social Security income, you know Senior Care and the Permanent Fund [Dividend]. I just feel it’s important to spend money on good nutrition. I mean to me, I mean it’s much more important than buying more dresses every month, you know. I just always had to learn how to stretch my dollars or spend them so that it just gave me more satisfaction.”

However, receiving such government benefits and social programs was viewed as potentially difficult for several people, especially those that require English language proficiency, applications, income documentation, and continuous renewals. Lanny suggested that the bureaucratic requirements to apply for and retain these benefits potentially deters seniors from accessing them,

“With the paperwork that you have to go fill out, the requirements and the paperwork that you have to go through. The appointment time, you know, how to get there, you know it’s so confusing and it gives them a headache. Just keep on doing it because there’s so many things that they have to fill out and, you know, but I know everybody has to go through that.”
Some Alaskan elders reported to me that they are coping with financial uncertainty by getting roommates in order to pool their resources. For example, Sergei said that he just did not have enough income to live alone,

“My income is a little over $20,000.00 a year. I’m a Social Security pensioner. All of my retirement was eaten up by other things in recent years and so I’m very grateful for Social Security…. But with Carol and I living together, we are doing pretty well now. Our household income is up in the neighborhood of $50 grand. We’re pooling it together and by living together, our rent goes down.”

Likewise, Harold recognized the need to share resources with a roommate, so he had been living with his ex-wife for 4 years. Since they are friends, he said,

“And in this day and economy, we pooled our resources just you know to get by. And that’s who I stay with and we’re very good friends but like I said, she is an ex. Living together; you know paying rent together. Paying bills.”

Nolee, Sergei, and Harold had tapped their social connections in order to find roommates that would allow them each to retain more of their income for other expenses. All three participants were also grateful for having company in the home to combat loneliness and share cooking responsibilities. This was particularly advantageous for Nolee, who thought it was very important to have a roommate that supports her dieting and weight loss efforts.

*Excess Body Weight*

As Lanny and others have illustrated above, elders are at risk of obesity in Alaska for several reasons. She put it simply, “they tend to just eat and don’t exercise.” While this may be true for lots of adults across the country, several research participants
indicated that they were concerned about excess body weight. Interviewees had various strategies for dealing with these concerns, most of which involved social supports. For Nolee, her roommate, coupled with a weight-loss program, were important drivers for her dietary changes,

“I have a roommate and we both are determined to lose weight. I am in Weight Watchers now, for about a year. I love it. It teaches me to eat the way I need to eat and it has results. Yeah, I’ve gone from a size 2X down to an 18.”

Edna also found the structure of a weight-loss program to be beneficial to her efforts, which was recommended by her doctor after her knee replacement surgery,

“I just, I didn’t eat anything [healthy], just the wrong foods. And I felt terrible with the weight gain and then the knee, my joint, you know my knees hurt. So I lost weight, and so I still have a little bit to go; I lost 15 lbs. and I have 10 more to go. And so I stopped eating all that junk. I got more toned [from activity at the community center], the flab is gone. And my legs are not as wobbly anymore; they’re a little bit but not as bad, but they’re more toned and more shaped than when I was [bigger].”

For Edna, the medical necessity of losing weight to speed up her recovery from surgery was an important aspect in the decision to finally lose excess weight. In fact, this was true for most seniors who were actively improving their diet and physical activity; the impetus was a doctor’s recommendation. When complaining to his physician about his loss of a favored hobby due to poor health, Sergei was told that if he lost at least 100 pounds his ailments would be alleviated and he might be able to pilot small planes again. This was the reason he joined the senior complex’s fitness class, together with the social nature of group exercise classes.
Individuals who wanted to lose weight but did not have such social supports were at a significant disadvantage. For example, Kenjii had few friends and no family in Alaska. He stated that changes to his Personal Care Assistant (PCA) staff can dramatically influence his nutritional intake and body weight,

“I used to be heavier because my PCA used to come and feed me all the time. Yeah, she used to bring me all kinds of things you know like the, like I told you, the Portuguese sausage and eggs, you know. But I have a different PCA and you know he don’t bring anything; all I get is what I want. And if it’s available. Every once in a while I’ll have him make oatmeal for me. Or, what do you call that, the [ramen] noodles, you know.”

Kenjii’s nutritional status is directly influenced by the cooking skills and compassion of the paid caregivers who shop for his groceries and prepare his meals. This is a significant concern for home-bound elders, because personal care attending is a field of health care that has extremely high staff turnover, due to high stress and low pay work environments, especially in Alaska (Kelley 2014).

Milton is another example of a solitary individual with few social supports to aid in much-needed weight loss. He is also the only participant who reported extremely poor dietary quality, no physical activity, and no efforts to improve those practices. On the other hand, Fatima had a strong desire and medical reasons to lose weight, but her only social contacts were her children who tended to request specific foods from her, often ones that she did not eat (e.g. red meat). She said that she felt her family actually derailed her efforts for losing weight and improving health. Even without physician recommendations for weight loss, participants recognized the link between their excess body weight and many of their other ailments. However, most seniors indicated that they required social supports to realize their healthy aging goals.
**General Health Challenges**

In addition to body weight concerns, participants often reported other illnesses and health issues that influenced their diet and physical activity. Most participants had at least one ailment that impacted their quality of life, and those responses tended to fall in one of two domains: working/volunteering and residence location. When people talked about how their health impacted their daily lives, five individuals suggested that their poor health resulted in the inability to work or volunteer, which limited their overall engagement in activities. Indeed, research suggests that working and volunteering are primary sources of activity and socialization for many elders (see chapter 2). For example, Fatima discussed her past occupations at length, and stated,

“And so I sort of, I’m in limbo at this point. Because of my health, I have not been able to commit myself to any kind of job where I have to be there at set times. Because I just don’t know how I’m going to feel.”

As mentioned above, Fatima suffers from unpredictable symptoms and felt that she was trapped at home in case she had an attack. Cornelia had the same experience in the past with poor health,

“I was in the hospital, oh god, how many times? Maybe 4 or 5 times and a couple of those times I almost didn’t make it. So it kind of you know, your family takes care of you and whatnot. But I had been very sick and out of work for 10 years.”

Cornelia is very lucky because she was able to recover and return to the workforce. In fact, she needed to do so because her husband also became incapacitated for a lengthy period of time and they would have been completely without income. Today, they are
both working and volunteering to the best of their abilities, utilizing wheeled walkers (“rollators”) during the day and having quiet evenings in the home. Being able to volunteer her days increased her social support for dietary change and increased her engagement in physical activities throughout the day.

The location of the home is very important to Alaskans. As previously described, the sprawling city has pockets of isolation that seniors often want to avoid. These areas of town have little access to social supports or safe forms of physical activity. Although Sergei grew up in a different region of Alaska, he feels that he is unable to move back to that town because of their limited medical facilities. Due to his medical complications and unpredictable symptoms, Sergei needs to live near the state’s largest medical centers,

“I’ve had 11 trips to the hospital by ambulance in the last year and a half so I can’t [live] out of town. I need to be close to ambulance service because it comes on; things happen to me, I get infections and that sort of thing and I can be perfectly well at 4:30 shopping at Wal-Mart and at 7 o’clock I’m becoming incoherent…. My standards have changed. I need to live [close] to a hospital with very high levels [of services].”

Lanny concurs, stating that Samoan elders move to Anchorage for access to the medically necessary facilities they need to manage their health problems, notably Type-II diabetes,

“So that’s why our elders, they move from Samoa to here; first it’s the weather and then second is their health. They have a more variety of doctors that they can check; they can go and check their health with. But out of those, you know, I see a lot of them have diabetes to where they ended up [on] dialysis.”

Seniors in Anchorage with health concerns may feel constrained in their ability to navigate away from safe spaces and spend time out in the broader community. The unpredictable nature of symptoms for some common health conditions may create a level
of fear that serves to keep some older adults away from physical activities, out of the workforce, and/or living in locations near medical facilities. Indeed, interview participants of Alaskan Native descent expressed a desire to return to rural areas, but said this was not feasible because they needed the urban amenity of access to healthcare in their older adulthood.

The results of chapter 4 reveal that the media, friends, family, and participating in cultural events are statistically significant sociocultural factors for dietary and physical activity patterns of older adults in Anchorage. The qualitative data echo the importance of these influences, but also suggest that seniors have other factors in their lives that affect diet and physical activity. The qualitative data indicate the weather, urban environment, limited transportation and financial resources, and poor health also influenced their diet and physical activity practices.

**Conclusions**

This chapter has further demonstrated that friends and family are able to positively influence dietary and physical activity patterns for Anchorage seniors. Edna, Jack, Bertha, Blanche, and Cornelia all had similarly positive experiences with improved diet or exercise through their friends and connections to community centers. Nolee demonstrated that roommates for seniors can also be a positive influence, as well as the beneficial effects of social weight loss programs, like Weight Watchers. However, Henrietta, Ada, and Gilbert were examples of relatively isolated seniors who could not find friends with whom to exercise, resulting in low levels of physical activity.
Kyung, Lanny, and Nolee described the ways in which their family members influenced their dietary practices. Kyung expressed the importance of the social connections that shared meals with his wife continue to play for him. For Milton, food provisioning from his daughter was an important source of nutrition for this self-described “sweet tooth.” On the other hand, Gilbert, Fatima, and Edna were examples of seniors whose family lived mostly out of state, and therefore did not receive food provisioning or shared meals from family members. For Edna this was a small issue, because she was still able to share food with her friends, but Gilbert, Fatima, Milton, and Henrietta were more isolated, which resulted in greater consumption of solitary (and processed) microwaveable meals.

Cultural identity also played an important role for participants of ethnic minority groups, such as Alaska Native and Asian, who spoke about their favored foods and physical activities. In these conversations, Sergei, Kenjii, and Ada expressed sorrow when talking about their cultural foods, mostly because their traditional foods are expensive or difficult to acquire. Nolee, however, is an example of a very active elder in Anchorage still engaging in subsistence harvesting and systems of exchange to acquired preferred foods. Cultural identity is reinforced through these foods and physical activities, which have great meaning for these elders who struggle to maintain such ties as they get older.

The combined physical and sociocultural environments may contribute to high rates of obesity in Anchorage, Alaska. This biocultural study examines relationships between older adults and their environments to reveal that seniors in Anchorage generally recognize their limitations and employ several strategies to overcome barriers. For
example, research participants in this study not only prepare appropriately for extreme weather conditions, many of them actually claim to enjoy the winter weather season. Seniors are able to navigate slippery sidewalks by using ice gripping boot covers. They skirt unsafe driving conditions by using public transportation or calling AnchorRides for curbside service. Seniors may get roommates, share meals with others, purchase produce on sale, and call on family members to obtain food or transportation. Even in the most objectionable conditions, some seniors brave the elements to go to community centers for socialization and physical activity. Older adults in Anchorage also report purchasing low-quality foods in an effort to stretch their limited incomes. The many facets of diet and physical activity experiences in Anchorage give us a complex picture of the ways that the sociocultural environment could influence nutritional status and healthy aging among seniors in the subarctic.
Chapter 6: Conclusions & Implications

In this dissertation, I have utilized biocultural nutritional and healthy aging perspectives to investigate the social and cultural influences on diet, physical activity, and nutritional status among urban Anchorage’s senior population. I demonstrated that sociocultural factors have a greater effect on elder’s diet and exercise patterns than they do on BMI and WtHR. In other words, features of the sociocultural environment might influence some diet and exercise habits, but are not entirely responsible for the high rates of obesity within the community. I addressed the research question with three specific aims and 5 associated hypotheses, as follows:

Aim 1: Document the sociocultural influences on diet and physical activity patterns among a small sample of urban elders in Anchorage.

H1: Significant influences on diet and physical activity will come from the media, friends, family, cultural identity, participation in cultural events, and subsistence knowledge & skills.

Aim 2: Document the diet, physical activity, and nutritional status among a larger sample of Anchorage elders.

H2: Diet and physical activity practices will not meet national recommendations for older adults.

H3: Diet and nutritional status will differ adversely from national reference samples.

Aim 3: Identify relationships between the sociocultural environment, diet, physical activity, and nutritional status.

H4: Sociodemographic characteristics (age, sex, income, ethnicity, residence time) will have an effect on diet and physical activity practices.

H5: Participants who report strong social relationships (friends, family) will have healthiest nutritional status.
To tackle each of the five hypotheses in this study, I collected and analyzed several types of data, including participant observation and semi-structured interviews with 15 participants; as well as a structured questionnaire including food frequency, physical activity, and sociocultural surveys coupled with anthropometric measurements among a sample of 82 older adults (aged 65 and over) in Anchorage, Alaska. The qualitative and quantitative data revealed the dietary and physical activity patterns, nutritional status, and the sociocultural influences on these patterns in the study population.

I hypothesized that significant influences on diet and physical activity would come from the media, friends, family, cultural identity, participation in cultural events, and subsistence skills (H1). To address this question, I conducted 15 semi-structured interviews, a literature review, and 82 questionnaires. The 15 semi-structured interviews (see chapter 5) validated findings from the literature review (see chapter 2) that the media, friends, family, cultural identity, participation in cultural events, and possessing subsistence knowledge and skills were significant factors in this population. However, analysis of the 82 questionnaires demonstrated that sample seniors generally recognized the role of all variables except subsistence knowledge and skills; where nearly 82% of participants indicated this influence has no role on their choices. Statistically significant associations appeared for the influence of the media on older seniors, influence of friends on younger seniors and those that had been in Anchorage the longest, influence of cultural identity on Alaska Native participants, and the significant influence of family members among those who did not live alone (see Table 4.14). Therefore, I was able to
reject the null hypothesis because these sociocultural influences came up frequently in interviews and produced statistically significant results.

These findings are consistent with the literature on the sociocultural factors that influence older adult diet and physical activity patterns. The media can influence older adult’s behaviors, which may be no surprise considering retired adults spend nearly 80% of their waking time engaged in sedentary pursuits such as reading, using computers, and watching TV (Gennuso, et al. 2013; Matthews, et al. 2008). In this dissertation, 89% of study participants (N = 73) reported daily reading (see Table 4.9) and 85.4% of participants (N = 70) reported daily television watching (see Table 4.8). Although Tennant et al.’s research (2015), discussed in chapter 2, suggests that younger seniors are more saavy with electronic media, this dissertation found that older seniors reported greater influence of the media on their choices. It could be that older seniors consume more media than younger seniors in Anchorage, since younger seniors are more likely to be spending their day time working or volunteering and older seniors are more likely to be retired and spending their day time consuming various sources of media (Choi 2003). Public health interventions should utilize various media outlets to reach seniors in Anchorage of all ages, especially the hard-to-reach oldest adults where research suggests targeted media can increase physical activity (Reger, et al. 2002).

Friends were a significant influence on the research participants in this dissertation. A statistically significant association was found for the influence of friends on younger seniors. Research shows that younger seniors are more likely to have varied social connections than the oldest seniors (Chui, et al. 2014), which explains this connection between younger age and influence of friends. This is because older seniors
are more likely to have experienced the loss of many of their friends through declining health, moving away, or death, leading to greater rates of isolation (Brittain, et al. 2017). Seniors who had lived in Anchorage longer also reported a greater influence of their friends on diet and physical activity behaviors than newly arrived residents. Older adults who have newly arrived in Anchorage are less likely to have established friendships than elders who have lived in Anchorage for several years. Therefore, interventions that increase social opportunities for elders can increase their healthy aging behaviors and general well-being.

This dissertation also found that cultural identity was a significant influence in the diet and physical activity practices for Alaska Native elders. This correlation arose in the semi-structured interviews (see Chapter 5) as well as the statistically significant questionnaire analyses (see Table 4.14). Although all humans have culture, it can be difficult for Euro-Americans to recognize their culture as an influence on their identity or behaviors. Since Euro-Americans self-identify with the dominant culture, it is common for them to report that “they have no culture” (Gupta and Ferguson 1992; Rosaldo 1988; Wolf 1982), which is indeed reflected in this dissertation data. Since Alaska Natives are a minority group in Anchorage, they were more likely to recognize and report the significant influence of their cultural upbringing on their diet and physical activity patterns.

Current successful public health programs are finding ways to increase subsistence food intake among urban elders, including bringing salmon, seal oil, caribou meat, moose stew, and seaweed to hospitals and health care facilities (Alaska Native Tribal Health Consortium 2016). The Alaska Department of Health and Social Services,
Alaska Native Tribal Health Consortium, and Southcentral Foundation (local tribal health corporation) have put out a plethora of educational materials, cooking videos, recipe books, and television and radio advertisements extolling the health benefits of consuming local and subsistence foods for Alaska Native peoples.

Family was also an important influence on diet and physical activity patterns for seniors who did not live alone. Living with spouses, children, or other relatives was a common arrangement among those elders who reported that family was an important influence. As expected, family members living in the same home were likely to influence the diet and physical activity choices of study participants. Although the literature has found that family can influence both healthy and unhealthy behaviors (Beverly, et al. 2008; Gao, et al. 2007), public health initiatives that include entire households in promoting healthy behaviors can have the greatest impact on healthy aging (Haber 2013; Kruger, et al. 2011; Schoenberg, et al. 2014; Swanson, et al. 2011).

The second research aim was to document diet, physical activity, and nutritional status among a sample of Anchorage elders (N = 82). Analysis of these data indicated that sample elders had poor nutritional status, dietary intake, and low levels of physical activity. The sample consisted of 82% participants with a BMI in the overweight or obese categories, and 90% of the sample had an unhealthy WtHR (greater than 50%). Men and women displayed expected differences in height and weight, but greater body weight was also statistically correlated with a greater number of people living in the home (see Table 4.2). As indicated above, sometimes family can exert unhealthy influences on seniors, as seems to be the case in Anchorage.
BMI varied by age, such that the youngest seniors had the highest BMI, then decreased significantly for ages 70-79, then increased for individuals over age 80. An inverted U-curve can be seen for BMI by length of time living in Anchorage, where the <10 year residents had a BMI of 25, that increased to 38.8 for the 11-20 year range, then decreased to 30.8 for individuals in the 21+ year group. Although WtHR is high throughout older adulthood in Anchorage, it does increase significantly with number of years spent living in Anchorage (see Table 4.3). Similar patterns are common for older adults, who tend to lose weight in the oldest age categories (Reinders, et al. 2017); however, the rates of obesity in Anchorage still exceed national averages (Kaiser Family Foundation 2010). Healthy aging strategies should intervene in diet and physical activity patterns before reaching older adulthood to prevent these dramatic increases in body weight and nutritional status that seem to accompany increasing age and length of time spent in Anchorage.

My second hypothesis was confirmed by the questionnaire data, that diet and physical activity practices would not meet national recommendations (H2). Consumption of fruit, vegetables, grains, protein, and dairy were below national recommendations while consumption of fats/sugars was statistically higher than recommended (see Table 4.7). Recommendations for daily vegetable and fruit intake are approximately 4 servings, whereas the sample reported consumption of 3.5 and 1.5 servings, respectively. Although consumption of grains was higher in the sample (4.42 servings), it still fell below the recommended 5 servings, most of which should be whole grain. Seniors should consume 3-4 servings of protein per day and 2-3 servings of dairy, but sample elders reported only 2.4 and 1.36 servings (respectively) while intake of fats and sugars (2.93 servings)
exceeded the recommendation of <2 servings (see Table 4.7) as hypothesized. Other published research verifies these findings that older Americans do not tend to obtain recommended amounts of healthy foods and over-consume sugars and fats (Hsiao, et al. 2012). Interventions to increase fruit, vegetable, protein, and whole grain intake while reducing sugary and fatty foods would benefit all seniors, especially if provided in a community-based, social setting (Hendrix, et al. 2008).

Seniors in this dissertation reported a variety of sedentary activities but few moderate or vigorous physical activities. Television watching and reading made up much of the day for most seniors. Younger seniors were more likely to engage in moderate activities, vigorous activities, and expended more weekly energy than the oldest seniors (see Tables 4.10-4.12), which is to be expected since research suggests adults tend to decrease activity as age and frailty increase (Arking 2006; Dogra and Stathokostas 2012; Marques, et al. 2014). Although my other findings, above, link living with at least one other person to increased body weight, these analyses also show that having a roommate can increase weekly energy expenditure in this study (see Table 4.10-4.11). Increasing physical activity among seniors is best done at the household level, since these housemates have such an influence on behaviors.

Exercise results in this dissertation also indicate that women expend less weekly energy than men, and that Alaska Native participants expended the least energy when compared to all ethnic groups (see Table 4.12). Both of these findings are evidence in the older adult literature, where women and ethnic minorities tend to obtain the least amount of exercise in old age (Swartz, et al. 2007). Although some Arctic research suggests indigenous circumpolar populations obtain high levels of physical activity (Hopping, et
al. 2010a), most research among Alaska Natives suggests the opposite (Redwood, et al. 2008; Redwood, et al. 2009a; Slattery, et al. 2010). Physical activity programs should be targeted to Alaska Native elders living in Anchorage, especially those that are culturally-appropriate and meaningful, such as subsistence activities (Bachar, et al. 2006; Brown, et al. 2010). For example, the Southcentral Foundation elder’s program has exercise and nutrition programs that include field trips, taking older Alaska Native residents of Anchorage on berry picking and foraging trips (Southcentral Foundation 2017).

The third hypothesis that diet and nutritional status would differ from national references (H3) was only partially rejected since nutritional status data were mixed. First, diet quality in the sample, as measured by HEI score, was below the reference population mean. The HEI score for the research participants was 57 while the national reference score was 68, indicating higher quality diet among the reference sample (see Table 4.7). This is not surprising in light of the fact that sample intakes were low in fruit, vegetables, dairy, grains, and proteins and high in fats and sugars, when compared to national recommendations (see Table 4.7). Second, nutritional status in the sample did not differ significantly from the national reference population for BMI or weight (see Table 4.4). However, the sample women did have statistically smaller waist circumference than the CDC reference sample, a finding which is surprising considering the other nutritional status findings in this dissertation (high body weight, BMI, and WtHR). It is possible that measurement error is a factor in this finding, since waist circumference measures have a higher degree of error than height or weight and “anthropometric measurement error is unavoidable” (Ulijaszek and Kerr 1999: 174).
The literature on older adult dietary intake suggests that most seniors in the U.S. do not get enough fruit and vegetables, especially in urban settings (Hemphill, et al. 2008; Miller, et al. 2012). Likewise, research suggests that high rates of overweight and obesity in urban locations (Popkin 1999) and in the circumpolar north are not uncommon (Galloway, et al. 2012). These dissertation findings seem to support the assertion that the pressures of urban living are compounded with the stressors of the sub-arctic environment to create a local biology of extremely high rates of cross-cultural obesity in later life (Kuhnlein, et al. 2004; Lock and Kaufert 2001; Schell and Ulijaszek 1999).

However, improved activity and nutritional outcomes can come from programs and interventions that reduce the stressors of urban isolation, increase physical activity opportunities and intake of fruit and vegetables by bolstering social supports (Brittain, et al. 2017; Holmes, et al. 2008; Rugel and Carpiano 2015; Walker and Beauchene 1991).

The final research aim to identify relationships between sociocultural environment, diet, physical activity, and nutritional status was addressed with two hypotheses. I predicted that sociodemographic characteristics would have an effect on diet and physical activity practices (H4) and indeed this was the case among the Anchorage sample. T-tests indicated that sex and number of people residing in the household were statistically correlated with height and weight in the sample, such that men were taller and heavier than women, but this is to be expected, and people who lived with others were heavier than those who lived alone (see Table 4.2). Although research suggests that spousal support can be beneficial in improving dietary intake for seniors trying to manage chronic conditions (Beverly, et al. 2008; Choi, et al. 2015), some studies also suggest that living with other people can increase sedentary behaviors (Gao,
et al. 2007). However, findings in this dissertation suggest that people who lived with others were also statistically more likely to obtain moderate or vigorous physical activity and had greater overall energy expenditure than those who lived alone (see Tables 4.10 - 4.11). Men and younger seniors also expended more energy than women or older seniors (see Table 4.11). To alleviate some of these complicated relationships, successful programs should recruit entire households to improve diet, physical activity, and nutritional status for older adults in Anchorage.

Additionally, ANOVA tests revealed that age and length of time spent living in Anchorage influenced nutritional status (see Table 4.3). As participants age, their BMI followed an inverted-U curve, so that elders in their 70s have higher BMIs than participants in their 60s or 80s. This relationship is supported in the research, where it is common for the oldest-old to lose weight and become more frail (Reinders, et al. 2017). These findings and other research suggest that weight reduction strategies are best implemented with younger seniors while the oldest seniors may benefit more from fall prevention, balance, and strength training to reduce frailty (Buchner 1997; Freire Junior, et al. 2017). However, all older adults will likely benefit from increased physical activity.

The relationship between length of time in Anchorage was more straightforward in these dissertation findings; individuals who had lived in Anchorage the longest had higher BMI and WtHR than the newer arrivals (see Table 4.3). Anthropological literature suggests that new arrivals to urban locations often adjust to their new surroundings through dietary and physical activity patterns that promote weight gain (Gray, et al. 2005; Himmelgreen, et al. 2009; Kremmyda, et al. 2008; Patil, et al. 2009). Since new arrivals are also unlikely to have extensive social connections, interventions that provide social
supports for new elder residents are well positioned to positively affect diet, physical activity, and nutritional status in Anchorage (Driscoll, et al. 2013; Lowe 2010).

Sex and age also influenced diet and physical activity patterns in this sample. Sex influenced intake of fats/sweets such that men consumed statistically greater amounts than females (see Table 4.6). Age shaped the frequency of vigorous activity, whereby the youngest seniors were most likely to engage in this type of physical activity than the oldest elders (see Table 4.10). These findings are consistent with the literature that indicate significant differences in diet by sex and decreasing physical activity with increasing age (Nobmann, et al. 2005; Rennemark, et al. 2009; Westenhoefer 2005; Wu, et al. 2009). Although all seniors would benefit from social support programs, ones that target recruitment to reaching men and the oldest seniors will have the greatest impact.

Lastly, Table 4.12 demonstrates that American Indian / Alaska Native participants obtained less weekly physical activity than other ethnic groups in the sample, a conclusion also found in the research literature (Coble and Rhodes 2006; Redwood, et al. 2009a; Wilcox, et al. 2000). Programs that are successful at increasing dietary quality and physical activity among American Indian / Alaska Native peoples are culturally tailored, community-based projects that include subsistence components (Coble and Rhodes 2006; Cunningham-Sabo, et al. 2008; Jernigan 2010; Perry and Hoffman 2010; Selle 2007; Sharma, et al. 2010).

Sociodemographic characteristics also shaped some of the sociocultural influences. Table 4.14 shows that age influenced the reported role of the media and friends on diet and physical activity. Older seniors reported being more influenced by the media and younger seniors were most influenced by their friends. Elders who had lived in
Anchorage the longest indicated more influence of their friends on diet and physical activity than newer arrivals. The role of cultural identity on diet and physical activity was significant only for the Alaska Native participants. Lastly, older adults who lived with at least one other person reported higher influence of their family on diet and physical activity practices. Despite these reported influence of sociocultural factors on diet and physical activity, I was unable to confirm my final hypothesis, which stated that participants who reported strong social relationships would have healthier nutritional status (H5).

The data presented here suggest that although higher reported influence of the media and friends is correlated with greater energy expenditure, and higher reported influence of family may be related to increased fruit consumption, there were no statistical relationships between sociocultural influences and nutritional status (see Table 4.15). Reported positive associations between friends and physical activity were also supported by interview responses and my participant observations of older adults socializing while exercising or eating with friends and peers around the city (see Chapter 5).

Although I was unable to find any statistical relationships between sociocultural influences and nutritional status, this dissertation demonstrated a number of important findings. Study participants exhibited high rates of overweight and obesity (82%) and suboptimal dietary patterns, such as low consumption of vegetables, fruit, grains, protein, and dairy with high consumption of fats, oils, sugars, and sweets. Engagement in recommended levels of physical activity is also low in Anchorage, where only one senior in the study achieved CDC guidelines for aerobic fitness and muscle strengthening. Diet
quality and rates of exercise are low in Anchorage, which likely contribute to such high rates of overweight and obesity among the older population. Viewing these biocultural data holistically through a lens of healthy aging frameworks demonstrates several social, cultural, and environmental pathways through which public health workers can intervene to increase consumption of fruits and vegetables, decrease consumption of fats, oils, and sweets while also increasing physical activity for older adults in Anchorage. The potentially positive influence of the media, friends, family, and cultural identity are ideal entry points to intervention with elders. Focusing on improving these patterns may be an ideal goal because they can have a great socioemotional and psychosocial effect on improving quality of life, health, and well-being for these adults in their later years (Pike and Williams 2006).

**Study Limitations**

This study was limited by a small sample size and convenience sampling strategy. The small sample size coupled with the fact that these older adults were overwhelmingly overweight, obese (according to BMI), and “unhealthy” (according to WtHR), meant that I was unable to conduct more robust statistical tests with these data. Regression models may have allowed me to link sociocultural variables to nutritional status if the sample population had been larger and the nutritional status outcomes had been more varied.

The data collection strategies in this dissertation largely relied on participant self-report, which may be less accurate than other measurement methods of dietary intake and physical activity. Errors in remembering foods consumed and estimating the duration and frequency of physical activities may be compounded by the sensitive nature of reporting
these patterns to a researcher (Prince, et al. 2008; Westerterp and Goris 2002); however, the Block FFQ tool mitigates these factors and is considered reliable with this population (Boucher, et al. 2006).

Nutritional status was measured in this study with waist-to-height ratios and body mass index, and BMI is not without controversy. BMI is an indirect measure of body fat that cannot account for distinctions in fat and nonfat mass, like bone or muscle tissue (Frisancho 2008). Additionally, BMI calculations do not reflect the changes that occur with age, when the proportion of body fat increases and muscle mass decreases (Rothman 2008). However, research demonstrates that BMI underestimates overweight and obesity in adults (Gómez-Ambrosi, et al. 2012), an error which likely did not affect this study’s results significantly because the sample population had such high rates of both nutritional outcomes from the outset. Despite these drawbacks, calculating BMI from height and weight measurements remains the standard, internationally recognized measure of nutritional status outcomes and population health (Dufour 1991; WHO 2000). To account for some of these limitations with BMI, I also collected waist circumference to calculate waist-to-height ratios, a methodology that is considered a better measure of central adiposity and cardiovascular disease risk (Ashwell and Hsieh 2005; Savva, et al. 2000).

Lastly, it is possible that my sociocultural model did not account for enough variables. Several sociocultural influences were statistically associated with diet and physical activity patterns in this dataset, and my model suggested that those influences would also predict nutritional status. There are several possible reasons for this discrepancy. As mentioned above, there may be some error in self-report. The sociocultural survey asked participants to rank how much each factor influenced their diet
and physical activity patterns. Since participants were forced to choose a single answer to what may have been two separate constructs, their responses may not accurately reflect the influences on these two behaviors. Additionally, there are other factors than sociocultural influences that can mediate the pathways between diet, physical activity, and nutritional status. This study was unable to test for the physical environment, genetic, or other differences in disease states that may be responsible for some overweight and obesity in this sample.

**Personal Lessons Learned**

This project took many turns along its four-year journey to completion. The initial project scope was to focus on the sociocultural influences on nutrition among Alaska Natives in a rural village. Although I had faculty connections to research institutes in rural Alaska, the realities and potential dangers of conducting research in such remote locations proved to be too much for this project. My first major revision to the study design was to move the location to an urban setting, rather than find some other rural arctic location. This decision was made because so little research has been done in urban locations of the circumpolar north, especially involving indigenous groups. Since most American Indian and Alaska Native peoples now live in urban rather than rural areas, this was an appropriate decision from a research standpoint.

However, there were still complications with focusing the study on Alaska Native elders, most notably the lengthy and seemingly convoluted process to receiving tribal approvals. In addition, tribal members tend to be most interested in participating in applied projects that directly and immediately benefit the community. Although I
believed the applied aspects of this project to be self-evident, the tribal community did not. For example, when I sat down to meet the director of Alaska Native elder programs in Anchorage during my pre-dissertation field season in 2012 (who is also an applied anthropologist by training), her initial reaction to me conducting my dissertation research with elders was quite guarded. She asked what programs and services I could directly provide, and when I stumbled with my response she politely suggested that I cut my research teeth with a different community. She said that if I wished to “turn applied,” then I could come back and work with Alaska Native elders. She had suggestions for how I could make my dissertation more applied and collaborative, how I could contract with local health institutions to evaluate or design programs, and how I could volunteer with elders during my fieldwork. That first meeting made me feel like an outsider, a sensation that never completely dissipated during my dissertation data collection phase. Although I incorporated several of her suggestions, working in collaboration with health organizations and volunteering at the elder’s center during data collection, the project needed another major revision, since it was clear I would not be able to access the intended population.

The final change to the study was to utilize a cross-cultural sample, where Alaska Native elders were included in a broader sampling strategy, and not the sole participants. A multi-ethnic sample alleviated some of the tribal complications for the project as well as increased the broader applicability of this study. Cross-cultural variation in aging is an inherently anthropological topic with little published research to account for such populational differences. Additionally, policy and program applications are increased
because this study can speak to a broader set of seniors in Anchorage, one of the country’s most diverse cities.

There were times in the proposal planning and initial entry to the field where I felt as though I was stumbling my way through the process. Learning to make adjustments to the project prior to, and within the field, was not something for which I felt my graduate seminars had truly prepared me. Phone calls to my advisor in Kentucky persuaded me that I had the proper training and just needed the confidence to make decisions in the field. Although I had conducted many other research projects before this dissertation, I had always been part of multi-disciplinary teams who made decisions together. The “lone wolf” anthropological approach to research was a difficult hurdle to overcome from thousands of miles away from campus. The experience also reinforced my prior orientation toward team-based projects as crucial to applied anthropological work (see also Cliggett and Crooks 2007; Lamphere 2004; Moreno-Black and Homchampa 2008; Schoenberg, et al. 2013; Schoenberg, et al. 2014).

When the fieldwork season ended I moved permanently to Anchorage and remained immersed in the lives and experiences of the study participants throughout the writing of this dissertation. I continued my volunteering and started working full-time in the field of aging and disability policy in Alaska. This interconnected position in the community did not allow me to distance myself from my field site like many anthropologists (Clifford 1997), but instead served to continually ground my writing in the realities of aging in the far north (Shuttleworth 2004).

During this two-year dissertation writing process I also realized that I feel more comfortable and useful if I research within my own community. My past research
projects had all been within a short distance of my own house in the Midwest, and included populations of people that I could relate to on several levels (Bennett, et al. 2014; Griebling, et al. 2013; Kruger, et al. 2012; Schoenberg, et al. 2013; Schoenberg, et al. 2011; Scott, et al. 2012; Tarasenko, et al. 2015b; Vaughn, et al. 2009; Vaughn, et al. 2008). For me, conducting research thousands of miles away from everything I knew was a real disadvantage to my research. Rather than utilizing some insightful etic perspective, there were times when I did not know enough about the particularities of conducting research in this community. Although that is likely the point of much anthropological research (feeling uncomfortable, working through it, and writing about it), there is also a growing movement of community-based anthropological and gerontological work to which I now belong (see also Fialkowski, et al. 2012; Israel, et al. 2005; Minkler 2004; Rowles and Lewis 2005; Sobo 2016; Wallerstein and Duran 2006).

To truly carry out relevant applied research, the researcher needs to have close ties to the community. I have found that I best accomplish this by having a vested and personal interest in the community; living in the environment before, after, and during data collection. I am also driven to produce useful research in the community that I call my home, to make my city a better place to live. Now that I live permanently in Anchorage and have spent several years conducting policy research and advocacy for the elder and disabled communities, I have taken a more applied career path than I had ever anticipated. I am now taking the advice of the Alaska Native elders program director who inadvertently left me feeling awkward years ago; I am now directly involved in policy, program development, and designing implementation practices for vulnerable Alaskans.
Program & Policy Implications

Over the past 10 years, the population of seniors has increased by 30% and the 85+ age group is projected to triple by 2040. Racial and ethnic minorities have increased from 18% of the older adult population to 22%, and are projected to increase to 28% of older adults by 2030. Lastly, life expectancy has increased to a whopping 78 years of age (U.S. Department of Health Human Services 2016), suggesting that the wave of adults reaching senior age in the coming years may have unique needs that the public health community is still not prepared to handle.

This dissertation study can positively influence policy and programs in Alaska in several ways. Basic approaches to addressing nutrition among community-dwelling older adults start with annual screening so that healthcare professionals can determine risk for malnutrition (Tilly 2017). These can be done at annual or preventative check-ups as well as during hospital admissions or when elders are transitioning to other care settings. Elders receiving home and community-based services (HCBS) or living in nursing homes should be screened quarterly. Research shows that this screening step is often missing, as doctors are reticent to discuss overweight, obesity, and lifestyle changes with their older patients (Bardach, Schoenberg & Howell 2016; 2017). However, screening and physician recommendations are important motivators for dietary change among older adults (Matthews, Peden & Rowles 2009). This was certainly true for Edna (p. 134) and Nolee (p. 146), who may not otherwise have chosen to engage in healthier practices without such professional guidance. Research also shows that community outreach efforts utilizing clinical navigators can be successful in bringing hard-to-reach
populations into medical settings where they can obtain such screenings and physician recommendations to improve dietary patterns (Schoenberg, et al. 2017).

Following nutritional screening, assessment of at-risk individuals allows professionals to determine the sources of nutritional risk in the elder’s life (Visvanathan 2014). Tailored approaches work well for older adults, so that specific risks are addressed through provision of meals, meal enhancements, nutritional supplements, or physical therapy (Tilly 2017). Since this dissertation suggests that Anchorage elders do not get enough vegetable, fruit, whole grain, protein, or dairy, policies and programs that can increase access to these items would be beneficial. For example, including more of these nutrient-dense items in the prepared meals or food boxes that many elders receive from the Food Bank of Alaska or Salvation Army could increase consumption. Research shows that when small improvements are made to home-delivered meal programs, like adding breakfast or nutrition and exercise education, elders experience improvements in diet quality, nutrient intake, nutritional status, functional status, quality of life, and hospital readmission rates (Campbell, et al. 2015; Cho, et al. 2015; Zhu and An 2013). Since Anchorage elders also do not get enough exercise, low-impact physical activities like walking groups can address both the energy imbalance and potential for isolation.

Research shows that social interventions can treat isolation and depression, and can improve nutritional status through support, encouragement, and companionship, especially in diverse populations of seniors (Donini, et al. 2013; Luger, et al. 2016; Quandt, et al. 2001; Rugel and Carpiano 2015; Silverman, et al. 2002). Henrietta (p. 171) and Gilbert (pp. 137, 145) were examples of relatively isolated seniors who could not find friends with whom to exercise, resulting in low levels of physical activity. These
experiences can help illustrate to public health researchers the importance of social connections as a beneficial influence on healthy aging.

This dissertation found that men reported greater intake of sweets and fats than women (see Table 4.6). Finding ways to encourage men to attend social events where healthy food or activities are provided, such as Men’s Groups, could decrease their nutritional risk. Additionally, finding ways to reach the oldest seniors can also improve their socialization and lifestyle behaviors. For example, the Anchorage Senior Activities Center has a free monthly luncheon for Anchorage residents who are aged 90+ where people can socialize and partake in regularly scheduled healthy meals.

This study also found that this oldest age group was strongly influenced by health media, so they may be reached via television and radio programs or advertisements. Josephine and Fatima’s experiences (pp. 140-142) demonstrate that mass media campaigns hold potential for increasing healthy aging practices for older adults, by increasing knowledge and awareness of the importance of energy balance (King 1997; Reger, et al. 2002).

Lastly, this study found that new arrivals to Anchorage may lack the social supports for healthy aging (see Table 4.14). Reaching out to immigrant and refugee groups, ethnic churches, and congregate meal settings may be a fruitful way to advertise the social events and meal programs available in the community. Promotion of healthy cultural food and physical activities may have salience for older adults in this ethnically diverse city (Fry, et al. 1997), especially among Anchorage’s largest minority group of Alaska Native seniors (Redwood, et al. 2008; Selle 2007). Research suggests that trying to reach older adults with diverse needs through a variety of channels, including the
media, social networks, and social/cultural events, can help promote health, optimize diet and physical activity behaviors, and facilitate social engagement (Brawley, et al. 2003a), all of which are components of the National Prevention Strategy to promote healthy aging (see Figure 6.1).

Figure 6.1. The national prevention strategy to promote healthy aging.

*Adapted from the National Prevention Council (2016).

The National Prevention Strategy influences federal and state policies that can greatly improve elder nutritional status. Federally funded nutrition programs under the Older American’s Act, such as home-delivered meals and congregate nutrition services, help seniors meet their nutritional needs. Advocating the continued funding for such programs can help assure that over 2 million seniors receive meals and other needed services. These programs are often situated in senior centers or adult day centers, where nutritional screening, assessment, and counseling also occur. Increasing the availability of information about these vital programs can increase utilization throughout Anchorage. Lastly, states often financially supplement these federally funded programs, so
advocating for local policies and funding opportunities to maintain or expand elder nutrition services can be critical for healthy aging.

Future research addressing the myriad influences on elder nutritional status in Anchorage is recommended with a random, representative sample. If a larger sample were obtained with a more diverse range of nutritional status outcomes, most robust statistical findings may be obtained. A random sample would also eliminate any potential homophily or volunteerism biases of the participants. Health researchers in Anchorage may also consider more objective measurement of food intake and physical activity than self-report. New research suggests that daily food diaries coupled with wearable cameras to document food intakes may result in more accurate data than food frequency questionnaires (O'Loughlin, et al. 2013). Additionally, pedometers and accelerometers are acceptable and feasible objective measurement tools to collect physical activity data that can yield more accurate data than self-report (Hart, et al. 2011; Tarasenko, et al. 2015a). The drawbacks of these methods are that they require the purchase and monitoring of expensive pieces of equipment, as well as large amounts of data that require specialized expertise for analysis.

This dissertation demonstrated linkages between the environment, diet, physical activity, and healthy aging patterns that can directly inform targeted, culturally-appropriate obesity prevention interventions and policy in the region (Going, et al. 2003; Kochevar, et al. 2001; Lardon, et al. 2007; Sharma, et al. 2010). These findings have the potential to inform the public health and anthropological communities of the multifaceted nature of dietary and physical activity patterns of the older adult population in this urban environment. This dissertation revealed that older adults utilize several food and
nonfood-based coping strategies to deal with the barriers to well-being that they face in their daily lives (Hadley and Crooks 2012). Improvement in diet and physical activity practices can result in healthier aging patterns, which also help to reduce symptoms from a wide range of chronic and acute conditions that elders face. These data indicate a need for culturally-responsive programs that maintain relationships with family members and make connections between elders with similar healthy aging goals in order to improve diet and physical activity practices. Such programming would ideally also address transportation and economic considerations for Anchorage’s vulnerable elders.

**Contributions to the Literature**

Few biocultural or nutritional anthropologists study aging. Instead, researchers tend to focus on child growth and reproduction because of their greater influence on evolutionary processes (Ice 2003). However, aging should be of interest to human population biologists because human variation is greatest in older adulthood (Pearson and Crews 1989), where population and individual differences in sociocultural and biological characteristics can vary considerably (Crews and Bogin 2010; Ice 2005; Stini 1994).

This dissertation contributes to the scholarship of local biologies (Lock and Kaufert 2001) that documents the health and well-being of local populations exhibiting varied biological outcomes in sociocultural context (see also Dufour 2006). Much biological anthropological work with northern populations, including Alaska Natives, has been particularly concerned with cold climate adaptations that are physiological, morphological, or genetic (Crawford 2007; Keenleyside 1998; Scott 2003; Steegmann 2007). However, while Alaska Natives may express some genetic variation (Voruganti, et
al. 2006), population genetics plays only a small role in human variation of nutritional status outcomes (Benyshek, et al. 2001; Brewis 2011). Instead, sociocultural and physical environmental conditions experienced through the life course appear to greatly impact local biologies, although these factors and their pathways to nutritional status are limited in the literature (Worthman and Kohrt 2005).

This dissertation work contributes to the biocultural anthropological literature by elucidating the pathways through which various aspects of the sociocultural environment shape the diet and physical activity patterns of elders (Ice, et al. 2011). Identifying these pathways provides opportunities to support older adults as they age in their communities. As shown in this work, opportunities to support healthy aging in elders include assistance with making and maintaining friendships and strengthening family ties, valuing participation in cultural events and traditions, overcoming barriers to the physical environment and transportation limitations, and providing ways to obtain healthy foods at low cost.

This work addresses the call from researchers working in circumpolar regions for an integrated biocultural approach to health in the region, where much cultural, demographic, and public health research has been fragmented and conducted in isolation from other highly relevant anthropological projects (Schindler, et al. 1985; Young 1994). This study utilized biocultural frameworks to elucidate the nature of elder negotiations of their urban environment within a framework of healthy aging, contributing to both the anthropological and gerontological literatures. This project also fills an important gap in the public health literature documenting the sociocultural context for diet and physical
activity, which can play an important role on nutritional status outcomes (Piperata and Dufour 2007).

Although older adults are healthier now than they have ever been in human history, predictions indicate that future populations may have reduced life expectancy due to diseases linked to adverse nutritional status with outcomes, such as Type-II diabetes, coronary heart disease, cancer, and other conditions (Olshansky, et al. 2005). Since how we age is strongly influenced by current socio- and bio-cultural processes, there is tremendous variation in aging as a cross-cultural phenomenon (Wiley and Allen 2013). This research has revealed not only that aging is a biological phenomenon strongly influenced by the sociocultural and physical environment, but has pointed out several ways that researchers and program planners may apply anthropological findings to improve quality of life and well-being for seniors living in northern regions.

This dissertation suggests that trying to reach older adults with diverse needs through a variety of channels, including the media, social networks, and social events, can help alleviate some of the barriers to healthy diet and exercise patterns. These data indicate a need for culturally-responsive programs that maintain relationships with family members and make connections between elders with similar healthy aging goals in order to improve diet and physical activity practices.
APPENDIX A
RECRUITMENT FLYER

Men and Women Over Age 65
Needed for Aging Research Study

As we age, our food and exercise patterns play a big role on our overall health. This university research project will investigate the influences on food and physical activity choices among older Alaskan adults who are living in Anchorage. This will take 1-1 1/2 hours and involve an interview about your typical food and exercise patterns and taking basic measurements (height, weight, waist).

You may be eligible for this study if you:

- Are age 65 years or older; AND
- Are not in a wheelchair

Benefits include:

- Information about your current BMI (body mass index), and
- Research participants will be compensated for their time.

For more information and to see if you are eligible, please contact the researcher:

Britteny Howell

Call: (989) 621-6606

Or email: AKNativeFood@gmail.com

This research is being conducted in collaboration with the University of Kentucky and the University of Alaska Anchorage. UAA IRB #1331019, Alaska Area IRB #557630.
APPENDIX B

Semi-Structured Interview Guide

This interview guide provides broad topics and flexible questions that allow for open-ended responses, discussion, and conversation. Interviews are expected to last approximately 1 hour.

General Questions

- Tell me about yourself. *Probe:* Try to obtain information on age, ethnicity/tribal affiliation(s), where they were born, when they moved to Anchorage, occupation, hobbies, interests, etc.
- Do you have any friends or family? *Probe:* Try to obtain information on ties to traditional lifestyles, cultural foods, or activities.

Food & Diet Questions

- What typical foods are currently eaten in your household?
- What are some of the factors that influence your eating patterns? *Probe:* How do you decide what to buy, what to cook, what to eat, and when (for example, price, taste, social, cultural influences, other)?
- Does your background or ethnicity play a role in food choices? How?
- How do other people affect your eating? *Probe* for community, family, peers, the media, other influences.
- What foods did you grow up with? Any that have special meaning to you from childhood that continue to be important to you today?
- What do you think of when someone says “cultural foods?” (If applicable, also ask if this different/same as “traditional / native foods?”).
- What role do these cultural foods play in your life? What meaning do these foods have to you?
- If applicable: What meanings do store-bought or “Western” foods have in your life?
• When/where/how are these cultural foods consumed? In Anchorage?
• How are these foods obtained in cities like Anchorage? How are these foods stored, prepared?
• Are there places or events in Anchorage where these foods are found and consumed?

Physical Activity and Exercise Questions
• What types of physical activities do you engage in? How often, duration?
• What are some of the factors that influence your physical activity? Probe: How do you decide what to do, when, and for how long (for example, time available, general enjoyment of activities, social or cultural influences, other)?
• Does your background or ethnicity play a role in your physical activities? How?
• How do other people affect your physical activities? Probe for community, family, peers, the media, other influences.
• What activities or sports did you grow up doing? Any that have special meaning to you from childhood that continue to be important to you today?
• Are there any activities that you consider to be “cultural / traditional”?
• What role/meanings do cultural ceremonies / activities have in your life?
• Can you engage in these activities in Anchorage? If so, where/when? If not, where must you go to do these things?
• Is there anything else you’d like me to know about your diet or physical activity patterns?

Thank you for your time!
APPENDIX C
Influences on Nutritional Status among Alaskan Older Adults of Anchorage, Alaska
PI: Britteny M. Howell

Date: __________________________
ID: ___________________________

1. Gender
   1 – Male
   2 – Female

2. Age: ________________

3. DOB: ________________

4. How long have you lived in Anchorage? ______________________

5. How many people currently reside in your household? __________

6. What is your ethnicity?
   a) Caucasian / White
   b) Alaska Native or American Indian. Please specify: ______________
   c) Asian. Please specify: ________________________________
   d) African American / Black
   e) Latino(a) / Hispanic
   f) Native Hawaiian or Pacific Islander. Specify: ______________

7. Height: ________________ Weight: ________________

8. Annual Income
   1. Under $25,000
   2. $25,000 - $44,999
   3. $45,000 - $99,999
   4. Above $100,000
CHAMPS Activities Questionnaire for Older Adults

This questionnaire is about activities that you may have done in the past 4 weeks. The questions on the following pages are similar to the example shown below.

INSTRUCTIONS

If you DID the activity in the past 4 weeks:

Step #1 Check the YES box.

Step #2 Think about **how many TIMES a week** you usually did it, and write your response in the space provided.

Step #3 Circle how many **TOTAL HOURS in a typical week** you did the activity.

Here is an example of how Mrs. Jones would answer question #1: Mrs. Jones usually visits her friends Maria and Olga twice a week. She usually spends one hour on Monday with Maria and two hours on Wednesday with Olga. Therefore, the total hours a week that she visits with friends is $3\frac{1}{2}$ hours a week.

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<th>In a typical week during the past 4 weeks, did you...</th>
<th>How many TOTAL hours a week did you usually do it?</th>
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<td>How many TOTAL hours a week did you usually do it?</td>
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If you DID NOT do the activity:

- Check the NO box and move to the next question
### In a typical week during the past 4 weeks, did you …

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<th>Activity</th>
<th>How many times a week?</th>
<th>How many TOTAL hours a week did you usually do it?</th>
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<th>1-2½ hours</th>
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<td>1. Visit with friends or family (other than those you live with)?</td>
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<td>4. Attend church or take part in church activities?</td>
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<td>5. Attend other club or group meetings?</td>
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### In a typical week during the past 4 weeks, did you …

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<td>6. Use a computer?</td>
<td>How many TIMES a week?</td>
<td>How many TOTAL hours a week did you usually do it?</td>
<td>Less than 1 hour</td>
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| 7. Dance (such as square, folk, line, ballroom) (do not count aerobic dance here)? | How many TIMES a week? | How many TOTAL hours a week did you usually do it? | Less than 1 hour | 1-2½ hours | 3-4½ hours | 5-6½ hours | 7-8½ hours | 9 or more hours |
| □ YES | | | | | | | | |
| □ NO | | | | | | | | |

| 8. Do woodworking, needlework, drawing, or other arts or crafts? | How many TIMES a week? | How many TOTAL hours a week did you usually do it? | Less than 1 hour | 1-2½ hours | 3-4½ hours | 5-6½ hours | 7-8½ hours | 9 or more hours |
| □ YES | | | | | | | | |
| □ NO | | | | | | | | |

| 9. Play golf, carrying or pulling your equipment (count walking time only)? | How many TIMES a week? | How many TOTAL hours a week did you usually do it? | Less than 1 hour | 1-2½ hours | 3-4½ hours | 5-6½ hours | 7-8½ hours | 9 or more hours |
| □ YES | | | | | | | | |
| □ NO | | | | | | | | |

| 10. Play golf, riding a cart (count walking time only)? | How many TIMES a week? | How many TOTAL hours a week did you usually do it? | Less than 1 hour | 1-2½ hours | 3-4½ hours | 5-6½ hours | 7-8½ hours | 9 or more hours |
| □ YES | | | | | | | | |
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In a typical week during the past 4 weeks, did you …

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<td>11. Attend a concert, movie, lecture, or sport event?</td>
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<td>How many TIMES a week? ______</td>
<td>How many TOTAL hours a week did you usually do it?</td>
<td>Less than 1 hour</td>
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<td>12. Play cards, bingo, or board games with other people?</td>
<td>□ YES</td>
<td>How many TIMES a week? ______</td>
<td>How many TOTAL hours a week did you usually do it?</td>
<td>Less than 1 hour</td>
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<td>13. Shoot pool or billiards?</td>
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<td>14. Play singles tennis (do not count doubles)?</td>
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<td>How many TOTAL hours a week did you usually do it?</td>
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<td>15. Play doubles tennis (do not count singles)?</td>
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<td>16. Skate (ice, roller, in-line)?</td>
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<td>17. Play a musical instrument?</td>
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<td>20. Do light work around the house (such as sweeping or vacuuming)?</td>
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<td>□ YES</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>□ NO</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In a typical week during the past 4 weeks, did you …

<table>
<thead>
<tr>
<th>Question</th>
<th>How many TIMES a week did you usually do it?</th>
<th>Less than 1 hour</th>
<th>1-2½ hours</th>
<th>3-4½ hours</th>
<th>5-6½ hours</th>
<th>7-8½ hours</th>
<th>9 or more hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>21. Do heavy gardening (such as spading, raking)?</td>
<td>☐ YES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>☐ NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Do light gardening (such as watering plants)?</td>
<td>☐ YES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>☐ NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. Work on your car, truck, lawn mower, or other machinery?</td>
<td>☐ YES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>☐ NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Please note:** For the following questions about running and walking, include use of a treadmill.

<table>
<thead>
<tr>
<th>Question</th>
<th>How many TIMES a week did you usually do it?</th>
<th>Less than 1 hour</th>
<th>1-2½ hours</th>
<th>3-4½ hours</th>
<th>5-6½ hours</th>
<th>7-8½ hours</th>
<th>9 or more hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>24. Jog or run?</td>
<td>☐ YES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>☐ NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. Walk uphill or hike uphill (count only uphill part)?</td>
<td>☐ YES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>☐ NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### In a typical week during the past 4 weeks, did you …

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
<th>How many TOTAL hours a week did you usually do it?</th>
<th>Less than 1 hour</th>
<th>1-2½ hours</th>
<th>3-4½ hours</th>
<th>5-6½ hours</th>
<th>7-8½ hours</th>
<th>9 or more hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>26. Walk <strong>fast or briskly</strong> for exercise (do not count walking leisurely or uphill)?</td>
<td>□ YES  How many TIMES a week? ____ →</td>
<td>□ NO</td>
<td>How many TIMES a week? ____ →</td>
<td>How many TOTAL hours a week did you usually do it?</td>
<td>Less than 1 hour</td>
<td>1-2½ hours</td>
<td>3-4½ hours</td>
<td>5-6½ hours</td>
<td>7-8½ hours</td>
</tr>
<tr>
<td>27. Walk <strong>to do errands</strong> (such as to/from a store or to take children to school (count walk time only))?</td>
<td>□ YES  How many TIMES a week? ____ →</td>
<td>□ NO</td>
<td>How many TIMES a week? ____ →</td>
<td>How many TOTAL hours a week did you usually do it?</td>
<td>Less than 1 hour</td>
<td>1-2½ hours</td>
<td>3-4½ hours</td>
<td>5-6½ hours</td>
<td>7-8½ hours</td>
</tr>
<tr>
<td>28. Walk <strong>leisurely</strong> for exercise or pleasure?</td>
<td>□ YES  How many TIMES a week? ____ →</td>
<td>□ NO</td>
<td>How many TIMES a week? ____ →</td>
<td>How many TOTAL hours a week did you usually do it?</td>
<td>Less than 1 hour</td>
<td>1-2½ hours</td>
<td>3-4½ hours</td>
<td>5-6½ hours</td>
<td>7-8½ hours</td>
</tr>
<tr>
<td>29. Ride a bicycle or stationary cycle?</td>
<td>□ YES  How many TIMES a week? ____ →</td>
<td>□ NO</td>
<td>How many TIMES a week? ____ →</td>
<td>How many TOTAL hours a week did you usually do it?</td>
<td>Less than 1 hour</td>
<td>1-2½ hours</td>
<td>3-4½ hours</td>
<td>5-6½ hours</td>
<td>7-8½ hours</td>
</tr>
<tr>
<td>30. Do other aerobic machines such as rowing, or step machines (do not count treadmill or stationary cycle)?</td>
<td>□ YES  How many TIMES a week? ____ →</td>
<td>□ NO</td>
<td>How many TIMES a week? ____ →</td>
<td>How many TOTAL hours a week did you usually do it?</td>
<td>Less than 1 hour</td>
<td>1-2½ hours</td>
<td>3-4½ hours</td>
<td>5-6½ hours</td>
<td>7-8½ hours</td>
</tr>
</tbody>
</table>
### In a typical week during the past 4 weeks, did you …

<table>
<thead>
<tr>
<th>Question</th>
<th>How many TIMES a week?</th>
<th>How many TOTAL hours a week did you usually do it?</th>
<th>Less than 1 hour</th>
<th>1-2½ hours</th>
<th>3-4½ hours</th>
<th>5-6½ hours</th>
<th>7-8½ hours</th>
<th>9 or more hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>31. Do water exercises (do not count other swimming)?</td>
<td>□ YES</td>
<td>How many TIMES a week?____→</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32. Swim moderately or fast?</td>
<td>□ YES</td>
<td>How many TIMES a week?____→</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33. Swim gently?</td>
<td>□ YES</td>
<td>How many TIMES a week?____→</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34. Do stretching or flexibility exercises (do not count yoga or Tai-chi)?</td>
<td>□ YES</td>
<td>How many TIMES a week?____→</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35. Do yoga or Tai-chi?</td>
<td>□ YES</td>
<td>How many TIMES a week?____→</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### In a typical week during the past 4 weeks, did you …

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Yes/No</th>
<th>How many times a week?</th>
<th>How many TOTAL hours a week did you usually do it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>Do aerobics or aerobic dancing?</td>
<td>□ YES</td>
<td>How many TIMES a week?</td>
<td>How many TOTAL hours a week did you usually do it?</td>
</tr>
<tr>
<td></td>
<td>□ NO</td>
<td></td>
<td></td>
<td>Less than 1 hour</td>
</tr>
<tr>
<td>37</td>
<td>Do moderate to heavy strength training (such as hand-held weights of more than 5 lbs., weight machines, or push-ups)?</td>
<td>□ YES</td>
<td>How many TIMES a week?</td>
<td>How many TOTAL hours a week did you usually do it?</td>
</tr>
<tr>
<td></td>
<td>□ NO</td>
<td></td>
<td></td>
<td>Less than 1 hour</td>
</tr>
<tr>
<td>38</td>
<td>Do light strength training (such as hand-held weights of 5 lbs. or less or elastic bands)?</td>
<td>□ YES</td>
<td>How many TIMES a week?</td>
<td>How many TOTAL hours a week did you usually do it?</td>
</tr>
<tr>
<td></td>
<td>□ NO</td>
<td></td>
<td></td>
<td>Less than 1 hour</td>
</tr>
<tr>
<td>39</td>
<td>Do general conditioning exercises, such as light calisthenics or chair exercises (do not count strength training)?</td>
<td>□ YES</td>
<td>How many TIMES a week?</td>
<td>How many TOTAL hours a week did you usually do it?</td>
</tr>
<tr>
<td></td>
<td>□ NO</td>
<td></td>
<td></td>
<td>Less than 1 hour</td>
</tr>
<tr>
<td>In a typical week during the past 4 weeks, did you …</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40. Play basketball, soccer, or racquetball (do not count time on sidelines)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ YES How many TIMES a week? ____ ➔</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How many TOTAL hours a week did you usually do it? ➔</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 hour</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>41. Do other types of physical activity not previously mentioned (please specify)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ YES How many TIMES a week? ____ ➔</td>
</tr>
<tr>
<td>□ NO</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How many TOTAL hours a week did you usually do it? ➔</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 hour</td>
</tr>
</tbody>
</table>

Thank You
This form is about the foods you usually eat. It will take about 30 - 40 minutes to complete.

- Please answer each question as best you can. Estimate if you aren’t sure.
- Use only a No. 2 pencil.
- Fill in the circles completely, and erase completely if you make any changes.

Please print your name in this box.

### AVERAGE USE IN THE PAST YEAR

<table>
<thead>
<tr>
<th>LESS THAN 1 OZ PER WEEK</th>
<th>1-2 per WEEK</th>
<th>3-4 per WEEK</th>
<th>5-6 per WEEK</th>
<th>1 per DAY</th>
<th>1 1/2 per DAY</th>
<th>2 per DAY</th>
<th>3 per DAY</th>
<th>4+ per DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>About how many servings of vegetables do you eat, per day or per week, not counting salad or potatoes?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>About how many servings of fruit do you eat, not counting juices?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How often do you eat cold cereal?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How often do you use fat or oil in cooking?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What kinds of fat or oil do you usually use in cooking? MARK ONLY ONE OR TWO

- Don’t know, or Pam
- Butter/margarine blend
- Lard, fatback, bacon fat
- Stick margarine
- Low-fat margarine
- Crisco
- Soft tub margarine
- Corn oil, vegetable oil
- Olive oil or canola oil

PLEASE DO NOT WRITE IN THIS AREA
During the past year, have you taken any vitamins or minerals regularly, at least once a month?

☐ No, not regularly  ☐ Yes, fairly regularly

(IF YES) WHAT DID YOU TAKE FAIRLY REGULARLY?

<table>
<thead>
<tr>
<th>VITAMIN TYPE</th>
<th>HOW OFTEN</th>
<th>FOR HOW MANY YEARS?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A FEW DAYS</td>
<td>1-3 DAYS</td>
</tr>
<tr>
<td></td>
<td>PER MONTH</td>
<td>PER WEEK</td>
</tr>
<tr>
<td>Multiple Vitamins. Did you take...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular Once-A-Day, Centrum, or Thera type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress-tabs or B-Complex type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antioxidant combination type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Vitamins (not part of multiple vitamins)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin A (not beta-carotene)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beta-carotene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Folic acid, folate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium, alone or combined with something else</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zinc, alone or combined with something else</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selenium</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you took Once-a-day, Centrum or Thera-type multiple vitamins, did you usually take types that

☐ contain minerals, iron, zinc, etc.
☐ do not contain minerals
☐ don't know

If you took vitamin C or vitamin E:

How many milligrams of vitamin C did you usually take, on the days you took it?

100 250 500 750 1000 1500 2000 3000+  Don't know

How many IUs of vitamin E did you usually take, on the days you took it?

100 200 300 400 600 800 1000 2000+  Don't know

Did you take any of these supplements at least once a month?

☐ Ginkgo  ☐ Ginseng  ☐ St. John's Wort  ☐ Kava Kava  ☐ Echinacea  ☐ Melatonin  ☐ DHEA
☐ Glucosamine/Chondroitin  ☐ Something else  ☐ Didn't take these

The next section is about your usual eating habits in the past year or so. This includes all meals or snacks, at home or in a restaurant or carry-out. There are two kinds of questions to answer for each food:

HOW OFTEN, on average, did you eat the food during the past year?

☐ Please DO NOT SKIP any foods. Mark "Never" if you didn't eat it.

HOW MUCH did you usually eat the food?

*Sometimes we ask how much you eat, such as 1 egg, 2 eggs, etc., ON THE DAYS YOU EAT IT.
*Sometimes we ask how much as A, B, C or D. LOOK AT THE ENCLOSED PICTURES. For each food, pick the picture (bowls or plates) that looks the most like the serving size you usually eat.
*If you don't have picture: A=1/4 cup, B=1/2 cup, C=1 cup, D=2 cups.
*Sometimes we made the "D" column a darker color. This is just to remind you to make sure you really eat that large a serving.

EXAMPLE: This person drank apple juice twice a week, and had one glass each time. Once a week he ate a "C" sized serving of rice (about 1 cup).

<table>
<thead>
<tr>
<th>HOW OFTEN</th>
<th>A FEW TIMES</th>
<th>ONCE</th>
<th>2-3 TIMES</th>
<th>4-6 TIMES</th>
<th>EVERY DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PER YEAR</td>
<td>PER WEEK</td>
<td>PER WEEK</td>
<td>PER WEEK</td>
<td></td>
</tr>
<tr>
<td>Apple juice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HOW MUCH EACH TIME</th>
<th>SEE PORTION SIZE PICTURES FOR A-B-C-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many glasses each time</td>
<td></td>
</tr>
<tr>
<td>How much each time</td>
<td></td>
</tr>
<tr>
<td>HOW OFTEN</td>
<td>A FEW TIMES PER YEAR</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Tomato juice or V-8 juice</td>
<td></td>
</tr>
<tr>
<td>Real 100% orange juice or grapefruit juice, including fresh, frozen or bottled</td>
<td></td>
</tr>
<tr>
<td>When you drink orange juice, how often do you drink a calcium-fortified brand?</td>
<td>Usually calcium-fortified</td>
</tr>
<tr>
<td>Other real fruit juices like apple juice, prune juice, lemonade</td>
<td></td>
</tr>
<tr>
<td>Kool-Aid, Hi-C, or other drinks with added vitamin C</td>
<td></td>
</tr>
<tr>
<td>Drinks with some juice in them, like Sunny Delight, Juice Squeeze</td>
<td></td>
</tr>
<tr>
<td>Instant breakfast milkshakes like Carnation, diet shakes like SlimFast, or liquid supplements like Ensure</td>
<td></td>
</tr>
<tr>
<td>Glasses of milk (any kind)</td>
<td></td>
</tr>
<tr>
<td>When you drink glasses of milk, what kind do you usually drink? MARK ONLY ONE:</td>
<td></td>
</tr>
<tr>
<td>□ Whole milk □ Reduced-fat 2% milk □ Low-fat 1% milk □ Non-fat milk □ Rice milk □ Soy milk □ I don't drink milk or soy milk</td>
<td></td>
</tr>
<tr>
<td>HOW OFTEN</td>
<td>A FEW TIMES PER YEAR</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Regular soft drinks, or bottled drinks like Snapple (not diet drinks)</td>
<td></td>
</tr>
<tr>
<td>Beer or non-alcoholic beer</td>
<td></td>
</tr>
<tr>
<td>What kind? MARK ONLY ONE:</td>
<td>□ Regular beer □ Light beer □ Non-alcoholic beer □ I don't drink beer</td>
</tr>
<tr>
<td>Wine or wine coolers</td>
<td></td>
</tr>
<tr>
<td>Liquor or mixed drinks</td>
<td></td>
</tr>
<tr>
<td>Glasses of water, tap or bottled</td>
<td></td>
</tr>
<tr>
<td>Coffee, regular or decaf</td>
<td></td>
</tr>
<tr>
<td>Tea or iced tea (not herb teas)</td>
<td></td>
</tr>
<tr>
<td>What do you usually add to coffee? MARK ONLY ONE:</td>
<td>□ Cream or half &amp; half □ Nondairy creamer □ Milk □ None of these</td>
</tr>
<tr>
<td>What do you usually add to tea? MARK ONLY ONE:</td>
<td>□ Cream or half &amp; half □ Nondairy creamer □ Milk □ None of these</td>
</tr>
<tr>
<td>Do you usually add sugar (or honey) to coffee?</td>
<td>No</td>
</tr>
<tr>
<td>Do you usually add sugar (or honey) to tea?</td>
<td>No</td>
</tr>
</tbody>
</table>
## HOW OFTEN

<table>
<thead>
<tr>
<th>HOW OFTEN</th>
<th>NEVER</th>
<th>A FEW TIMES PER YEAR</th>
<th>ONCE MONTHLY</th>
<th>ONCE WEEKLY</th>
<th>2-3 TIMES PER WEEK</th>
<th>4-6 TIMES PER WEEK</th>
<th>EVERY DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw peaches, apricots, nectarines, while they are in season</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Cantaloupe, in season</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Strawberries, in season</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Watermelon, in season</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Any other fruit in season, like grapes, honeydew, pineapple, kiwi</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

## HOW MUCH EACH TIME

<table>
<thead>
<tr>
<th>HOW MUCH</th>
<th>SEE PORTION SIZE PICTURES FOR A-B-C-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td>A</td>
</tr>
<tr>
<td>1</td>
<td>B</td>
</tr>
<tr>
<td>2</td>
<td>C</td>
</tr>
<tr>
<td>3</td>
<td>D</td>
</tr>
</tbody>
</table>

## How often do you eat the following foods all year round? Estimate your average for the whole year.

<table>
<thead>
<tr>
<th>HOW OFTEN</th>
<th>HOW MUCH EACH TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eggs, including egg biscuits or Egg McMuffins (Not egg substitutes)</td>
<td>☐</td>
</tr>
<tr>
<td>Bacon</td>
<td>☐</td>
</tr>
<tr>
<td>Breakfast sausage, including sausage biscuits</td>
<td>☐</td>
</tr>
<tr>
<td>Pancakes, waffles, French toast, Pop Tarts</td>
<td>☐</td>
</tr>
<tr>
<td>Breakfast bars, granola bars, Power bars</td>
<td>☐</td>
</tr>
<tr>
<td>Cooked cereals like oatmeal, cream of wheat or grits</td>
<td>☐</td>
</tr>
<tr>
<td>High-fiber cereals like All Bran, Raisin Bran, Fruit-n-Fiber</td>
<td>☐</td>
</tr>
</tbody>
</table>

## Which high-fiber cereal do you eat most often? MARK ONLY ONE:
- ☐ All Bran or Bran Buds
- ☐ Raisin Bran
- ☐ Fiber One, Fruit-n-Fiber, etc.
- ☐ Something else
- ☐ I don't know
- ☐ I don't eat it

| Product 19, Just Right or Total cereal | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Any other cold cereal, like Corn Flakes, Cheerios, Special K | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Milk or milk substitutes on cereal | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Yogurt or frozen yogurt | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Cheese, sliced cheese or cheese spread, including on sandwiches | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

When you eat cheese, is it ☐ Usually low-fat ☐ Sometimes low-fat ☐ Hardly ever low-fat ☐ Don't know/Don't eat
<table>
<thead>
<tr>
<th>HOW OFTEN</th>
<th>A FEW TIMES PER YEAR</th>
<th>1-2 TIMES PER MONTH</th>
<th>2-3 TIMES PER WEEK</th>
<th>3-4 TIMES PER WEEK</th>
<th>EVERY DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broccoli</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Carrots, or mixed vegetables or slaws containing carrots</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Corn</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Green beans or green peas</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Spinach</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Mustard greens, turnip greens, collards</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>French fries, fried potatoes or hash browns</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>White potatoes not fried, incl. boiled, baked, mashed &amp; potato salad</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Sweet potatoes, yams (Not in pie)</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Cole slaw, cabbage</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Green salad</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Raw tomatoes, including in salad</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Salad dressing</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
</tbody>
</table>

Is your salad dressing  ○ Usually low-fat  ○ Sometimes low-fat  ○ Hardly ever low-fat  ○ Don’t know/don’t use

<table>
<thead>
<tr>
<th>HOW OFTEN</th>
<th>A FEW TIMES PER YEAR</th>
<th>1-2 TIMES PER MONTH</th>
<th>2-3 TIMES PER WEEK</th>
<th>3-4 TIMES PER WEEK</th>
<th>EVERY DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any other vegetable, like okra, squash, cooked green peppers</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Refried beans or bean burritos</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Chili with beans (wth or without meat)</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Baked beans, black-eyed peas, pintos, any other dried beans</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Vegetable stew</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Vegetable soup, vegetable beef, chicken vegetable, or tomato soup</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Split pea, bean or lentil soup</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Any other soup, like chicken noodle, chowder, mushroom, instant soups</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Spaghetti, lasagna or other pasta with tomato sauce</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Cheese dishes without tomato sauce, like macaroni and cheese</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Pizza, including carry-out</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
</tbody>
</table>
### How Often

<table>
<thead>
<tr>
<th>Food Description</th>
<th>Never</th>
<th>A Few Times per Year</th>
<th>Once per Month</th>
<th>Once per Week</th>
<th>2-3 Times per Week</th>
<th>4-6 Times per Week</th>
<th>Every Day</th>
<th>How Much Each Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamburger, cheeseburger, meat loaf, at home or in a restaurant</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How much meat</td>
<td>1/2 lb</td>
<td>1/4 lb</td>
<td>1/8 lb</td>
<td>1/16 lb</td>
</tr>
<tr>
<td>Tacos, burritos, enchiladas, tamales, etc. with meat or chicken</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How much meat</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Beef steaks, roasts, pot roast, or in frozen dinners or sandwiches</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How much meat</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>How do you like beef cooked?</td>
<td>Rare</td>
<td>Medium</td>
<td>Well done</td>
<td>I don't eat beef</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pork chops, pork roasts, or dinner ham</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How much meat</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>When you eat meat, do you</td>
<td>Avoid eating the fat</td>
<td>Sometimes eat the fat</td>
<td>Often eat the fat</td>
<td>I don't eat meat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veal, lamb or deer meat</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How much meat</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Ribs, spare ribs</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How many ribs</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Liver, including chicken livers or liverwurst</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How much</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Glazed, pork neckbones, chitterlings, pigs feet, etc.</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How much meat</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Mixed dishes with beef or pork, like stew, corned beef hash, stuffed cabbage, meat dish with noodles</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How much meat</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Mixed dishes with chicken, like chicken casserole, chicken &amp; noodles, pot pie or in stir-fry</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How much meat</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Fried chicken, at home or in a restaurant</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How much meat</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Chicken or turkey not fried, such as baked, grilled, or on sandwiches</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How much meat</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>When you eat chicken, do you</td>
<td>Avoid eating the skin</td>
<td>Sometimes eat the skin</td>
<td>Often eat the skin</td>
<td>I don't eat skin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oysters</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How much meat</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Other shellfish like shrimp, scallops, crabs</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How much meat</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Tuna, tuna salad, tuna casserole</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How much of the tuna</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Fried fish or fish sandwich, at home or in a restaurant</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How much meat</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Other fish, not fried</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How much meat</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Hot dogs, or sausage like Polish, Italian or chorizos</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How many</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Are your hot dogs</td>
<td>Usually low-fat</td>
<td>Sometimes low-fat</td>
<td>Hardly ever low-fat</td>
<td>Don't know/don't eat them</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bologna, sliced ham, turkey lunch meat, other lunch meat</td>
<td>No</td>
<td>Yes</td>
<td>IF NO, SKIP TO NEXT PAGE</td>
<td>How many slices</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Are your lunch meats</td>
<td>Usually low-fat or turkey</td>
<td>Sometimes low-fat</td>
<td>Hardly ever low-fat</td>
<td>I don't know/don't eat them</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HOW OFTEN</td>
<td>NEVER</td>
<td>A FEW TIMES PER YEAR</td>
<td>2-3 TIMES PER MONTH</td>
<td>3-4 TIMES PER WEEK</td>
<td>5-6 TIMES PER WEEK</td>
<td>EVERY DAY</td>
<td></td>
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<td>-----------</td>
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<td>-------------------</td>
<td>-----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noodles, macaroni, pasta salad</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tofu, bean curd</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat substitutes, such as veggie burgers, Gardenburgers</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinese food, Thai or other Asian food, not counted above</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snacks like potato chips, corn chips, popcorn (not pretzels)</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Are these snacks ☐ Usually low-fat ☐ Sometimes low-fat ☐ Hardly ever low-fat ☐ Don't know/don't eat

<table>
<thead>
<tr>
<th>HOW OFTEN</th>
<th>NEVER</th>
<th>A FEW TIMES PER YEAR</th>
<th>2-3 TIMES PER MONTH</th>
<th>3-4 TIMES PER WEEK</th>
<th>5-6 TIMES PER WEEK</th>
<th>EVERY DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peanuts, other nuts or seeds</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>Crackers</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>Doughnuts, Danish pastry</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>Cake, sweet rolls, coffee cake</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
</tr>
</tbody>
</table>

Are they ☐ Usually low-fat ☐ Sometimes low-fat ☐ Hardly ever low-fat ☐ Don't know/don't eat

<table>
<thead>
<tr>
<th>HOW OFTEN</th>
<th>NEVER</th>
<th>A FEW TIMES PER YEAR</th>
<th>2-3 TIMES PER MONTH</th>
<th>3-4 TIMES PER WEEK</th>
<th>5-6 TIMES PER WEEK</th>
<th>EVERY DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cookies</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
</tr>
</tbody>
</table>

Are your cookies ☐ Usually low-fat ☐ Sometimes low-fat ☐ Hardly ever low-fat ☐ Don't know/don't eat

<table>
<thead>
<tr>
<th>HOW OFTEN</th>
<th>NEVER</th>
<th>A FEW TIMES PER YEAR</th>
<th>2-3 TIMES PER MONTH</th>
<th>3-4 TIMES PER WEEK</th>
<th>5-6 TIMES PER WEEK</th>
<th>EVERY DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ice cream, ice milk, ice cream bars</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
</tr>
</tbody>
</table>

Is your ice cream ☐ Usually low-fat ☐ Sometimes low-fat ☐ Hardly ever low-fat ☐ Don't know/don't eat

<table>
<thead>
<tr>
<th>HOW OFTEN</th>
<th>NEVER</th>
<th>A FEW TIMES PER YEAR</th>
<th>2-3 TIMES PER MONTH</th>
<th>3-4 TIMES PER WEEK</th>
<th>5-6 TIMES PER WEEK</th>
<th>EVERY DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pumpkin pie, sweet potato pie</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>Any other pie or cobbler</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>Chocolate candy, candy bars</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>Other candy, not chocolate, like hard candy, caramel, jelly beans</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐</td>
</tr>
</tbody>
</table>

PLEASE DO NOT WRITE IN THIS AREA
### HOW OFTEN

<table>
<thead>
<tr>
<th>Food Item</th>
<th>Never or a few times per year</th>
<th>1-2 times per month</th>
<th>Once per month</th>
<th>Once per week</th>
<th>2-3 times per week</th>
<th>3-4 times per week</th>
<th>5-6 times per week</th>
<th>Everyday</th>
<th>2+ times per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biscuits or muffins</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rolls, hamburger buns, English muffins, bagels</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Dark bread like rye or whole wheat, including in sandwiches</td>
<td></td>
<td></td>
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<tr>
<td>White bread or toast, including French, Italian, or its sandwiches</td>
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</tr>
<tr>
<td>Corn bread, corn muffins</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Tortillas</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Rice, or dishes made with rice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Margarine (not butter) on bread or on potatoes or vegetables, etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Butter (not margarine) on bread or on potatoes or vegetables, etc.</td>
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<td></td>
<td></td>
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<tr>
<td>Gravy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peanut butter</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>Jelly, jam, or syrup</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mayonnaise, sandwich spreads</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catsup, salsa or chile peppers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mustard, soy sauce, steak sauce, barbecue sauce, other sauces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### HOW MUCH EACH TIME

<table>
<thead>
<tr>
<th>Size of Portion</th>
<th>Pictures for A-B-C-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many times</td>
<td>per serving</td>
</tr>
<tr>
<td>How many times</td>
<td>per week</td>
</tr>
<tr>
<td>How many times</td>
<td>per month</td>
</tr>
<tr>
<td>How many times</td>
<td>per day</td>
</tr>
</tbody>
</table>

Did you use the pictures to choose your serving size on this form?  ○ Yes □ No □ I didn’t have any pictures.

Would you say your health is  ○ Excellent  ○ Very good  ○ Good  ○ Fair  ○ Poor

How many times have you gone on a diet?  ○ Never  □ 1-2  □ 3-5  □ 6-8  □ 9 or more

Did you ever drink more beer, wine or liquor than you do now?  ○ Yes □ No

How many hours do you watch television or video, per day or per week on average?  ○ None  □ 1-6 hours/week  □ 1 hour/day  □ 2 hours/day  □ 3 hours/day  □ 4+ hours/day

Do you smoke cigarettes now?  □ No □ Yes  IF YES, On the average about how many cigarettes a day do you smoke now?  ○ 1-5  □ 6-14  □ 15-24  □ 25-34  □ 35 or more

What language do you usually speak at home or with friends?  ○ English  ○ Spanish  ○ Something else  ○ English & something else equally

What is your ethnic group? (MARK ONE OR MORE)  ○ Hispanic or Latino  ○ Black or African American  ○ American Indian or Alaska Native  ○ White, not Hispanic  ○ Asian  ○ Native Hawaiian or Other Pacific Islander

Thank you very much for filling out this questionnaire. Please take a minute to go back and fill in anything you may have skipped.
ALASKAN FOODS QUESTIONNAIRE

Please print your name in this box.

<table>
<thead>
<tr>
<th>HOW OFTEN</th>
<th>HOW OFTEN IN THE PAST YEAR</th>
<th>HOW MUCH EACH TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>never</td>
<td>6 X 12 INCHES</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
</tr>
</tbody>
</table>

How often do you eat each of the following foods?

- Caribou, moose, elk
- Moose
- Deer, venison
- Seal
- Beaver
- Harp or rabbit
- Ducks
- Other birds, like ptarmigan, geese, swans
- Salmon
- Halibut
- Other fish like Chum, Cisco, Dolly Varden, Sheefish, Smelt, Whitefish
- Muktuk
- Agutuk with berries
- Agutuk with fish only
- Agutuk with fish and berries
- Finbread
<table>
<thead>
<tr>
<th>Food Description</th>
<th>How Often</th>
<th>How Much Each Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seabird</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scallops</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green like beach asparagus, fiddlehead, sandmark</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walrus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sea lion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dried fish</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Berries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bird eggs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herring eggs, or other fish eggs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaporated milk or creamer added to coffee or tea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soda, soft drinks, pop (NOT DIET)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tong</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Sociocultural Influences Survey

Consumption of traditional, cultural, or wild foods has a spiritual and cultural significance to many people. The following questions will help us understand the importance of these cultural foods in the total diet.

1. How important is eating cultural, traditional, or native food to you?
   1. Very important
   2. Somewhat important
   3. Doesn’t matter

2. Do you think that you are eating more, less, or about the same amount of cultural, traditional, or native food than:
   5 years ago?  1 – More Now  2. Less Now  3. About the same amount
   15 years ago?  1 – More Now  2. Less Now  3. About the same amount
   If more or less, why?________________________________________________________________________

3. Do you have any concerns about your cultural, traditional, or native foods? (safety, health, etc) 1 – Yes  2 – No
   If yes, please describe:
   ___________________________________________________________________________________
   ___________________________________________________________________________________

4. Do you have any concerns about store-bought foods? (safety, health, etc) 1 – Yes  2 – No
   If yes, please describe:
   ___________________________________________________________________________________
   ___________________________________________________________________________________
These questions ask how much each sociocultural factor influences your dietary and physical activity patterns. Please indicate your level of agreement with each statement.

<table>
<thead>
<tr>
<th>Question</th>
<th>Has no role in my choices</th>
<th>Has very little role in my choices</th>
<th>Has some role in my choices</th>
<th>Has strong role in my choices</th>
<th>Has most important role in my choices</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. The media (television, movies, advertisements)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. My friends</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. My family members</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. My cultural identity (e.g. Tlingit, Yup’ik, Hmong, Scottish, etc)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. My participation in cultural events (e.g. potlatches, ceremonies, etc)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. Possessing subsistence knowledge &amp; skills (e.g. hunting, fishing, gathering)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
### APPENDIX D

**MET Values for Physical Activities Measured in the CHAMPS Survey**

<table>
<thead>
<tr>
<th>General Light Activity (METs &gt;1 and &lt; 3)</th>
<th>CHAMPS VARIABLE</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>CHAMPS5</td>
<td>Attend other club or group meetings</td>
</tr>
<tr>
<td>1.3</td>
<td>CHAMPS18</td>
<td>Read</td>
</tr>
<tr>
<td>1.5</td>
<td>CHAMPS1</td>
<td>Visit with friends or family</td>
</tr>
<tr>
<td>1.5</td>
<td>CHAMPS2</td>
<td>Go to the senior center</td>
</tr>
<tr>
<td>1.5</td>
<td>CHAMPS4</td>
<td>Attend church or take part in church activities</td>
</tr>
<tr>
<td>1.5</td>
<td>CHAMPS6</td>
<td>Use a computer</td>
</tr>
<tr>
<td>1.5</td>
<td>CHAMPS11</td>
<td>Attend a concert, movie, lecture, or sport event</td>
</tr>
<tr>
<td>1.5</td>
<td>CHAMPS12</td>
<td>Play cards, bingo, or board games with other people</td>
</tr>
<tr>
<td>2.0</td>
<td>CHAMPS8</td>
<td>Do woodworking, needlework, drawing, or other arts or crafts</td>
</tr>
<tr>
<td>2.0</td>
<td>CHAMPS10</td>
<td>Play golf, riding a cart (count walking time only)</td>
</tr>
<tr>
<td>2.0</td>
<td>CHAMPS34</td>
<td>Do stretching or flexibility exercises (do not count yoga or Tai Chi)</td>
</tr>
<tr>
<td>2.0</td>
<td>CHAMPS35</td>
<td>Do yoga or Tai Chi</td>
</tr>
<tr>
<td>2.25</td>
<td>CHAMPS22</td>
<td>Do light gardening (such as watering plants)</td>
</tr>
<tr>
<td>2.5</td>
<td>CHAMPS3</td>
<td>Do volunteer work</td>
</tr>
<tr>
<td>2.5</td>
<td>CHAMPS13</td>
<td>Shoot pool or billiards</td>
</tr>
<tr>
<td>2.5</td>
<td>CHAMPS17</td>
<td>Play a musical instrument</td>
</tr>
<tr>
<td>2.5</td>
<td>CHAMPS20</td>
<td>Do light work around the house (such as sweeping or vacuuming)</td>
</tr>
<tr>
<td>2.5</td>
<td>CHAMPS27</td>
<td>Walk to do errands (such as to/from a store or to take children to school (count walk time only)</td>
</tr>
</tbody>
</table>

226
<table>
<thead>
<tr>
<th>CHAMPS Activity</th>
<th>CHAMPS Activity</th>
<th>CHAMPS Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>CHAMPS28</td>
<td>Walk leisurely for exercise or pleasure</td>
</tr>
<tr>
<td>2.5</td>
<td>CHAMPS39</td>
<td>Do general conditioning exercises, such as light calisthenics or chair exercises (do not count strength training)</td>
</tr>
<tr>
<td><strong>Moderate Activity (METs ≥ 3 and ≤ 6)</strong></td>
<td><strong>CHAMPS VARIABLE</strong></td>
<td><strong>Question</strong></td>
</tr>
<tr>
<td>4.5</td>
<td>CHAMPS7</td>
<td>Dance (such as square, folk, line, ballroom) (do not count aerobic dance here)</td>
</tr>
<tr>
<td>3.0</td>
<td>CHAMPS9</td>
<td>Play golf, carrying or pulling your equipment (count walking time only)</td>
</tr>
<tr>
<td>6.0</td>
<td>CHAMPS14</td>
<td>Play singles tennis (do not count doubles)</td>
</tr>
<tr>
<td>4.0</td>
<td>CHAMPS15</td>
<td>Play doubles tennis (do not count singles)</td>
</tr>
<tr>
<td>4.5</td>
<td>CHAMPS16</td>
<td>Skate (ice, roller, in-line)</td>
</tr>
<tr>
<td>3.0</td>
<td>CHAMPS19</td>
<td>Do heavy work around the house (such as washing windows, cleaning gutters)</td>
</tr>
<tr>
<td>4.0</td>
<td>CHAMPS21</td>
<td>Do heavy gardening (such as spading, raking)</td>
</tr>
<tr>
<td>3.0</td>
<td>CHAMPS23</td>
<td>Work on your car, truck, lawn mower, or other machinery</td>
</tr>
<tr>
<td>6.0</td>
<td>CHAMPS25</td>
<td>Walk uphill or hike uphill (count only the uphill part)</td>
</tr>
<tr>
<td>3.5</td>
<td>CHAMPS26</td>
<td>Walk fast or briskly for exercise (do not count walking leisurely or uphill)</td>
</tr>
<tr>
<td>4.0</td>
<td>CHAMPS29</td>
<td>Ride a bicycle or stationary cycle</td>
</tr>
<tr>
<td>5.0</td>
<td>CHAMPS30</td>
<td>Do other aerobic machines such as rowing or step machines (do not count treadmill or stationary cycle)</td>
</tr>
<tr>
<td>3.0</td>
<td>CHAMPS31</td>
<td>Do water exercises (do not count other swimming)</td>
</tr>
<tr>
<td>METs</td>
<td>CHAMPS Variable</td>
<td>Activity Description</td>
</tr>
<tr>
<td>------</td>
<td>-----------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>5.0</td>
<td>CHAMPS32</td>
<td>Swim moderately or fast</td>
</tr>
<tr>
<td>3.0</td>
<td>CHAMPS33</td>
<td>Swim gently</td>
</tr>
<tr>
<td>3.5</td>
<td>CHAMPS36</td>
<td>Do aerobics or aerobic dancing</td>
</tr>
<tr>
<td>4.6</td>
<td>CHAMPS37</td>
<td>Do moderate to heavy strength training (such as hand-held weights of more than 5 lbs., weight machines, or push-ups)</td>
</tr>
<tr>
<td>3.0</td>
<td>CHAMPS38</td>
<td>Do light strength training (such as hand held weights of 5 lbs. or less or elastic bands)</td>
</tr>
<tr>
<td>5.0</td>
<td>CHAMPS40</td>
<td>Play basketball, soccer, or racquetball (do not count time on sidelines)</td>
</tr>
</tbody>
</table>

**Vigorous Activity (METS > 6)**

<table>
<thead>
<tr>
<th>METs</th>
<th>CHAMPS Variable</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.0</td>
<td>CHAMPS24</td>
<td>Jog or run</td>
</tr>
</tbody>
</table>

*METs based on Stewart and colleagues (2001) and Ainsworth and colleagues (2000).*
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254
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269

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Weber, Robert Philip

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Vitae

1. Place of Birth: Dearborn, Michigan

2. Educational Institutions Attended and Degrees Awarded:
   Central Michigan University, Bachelor of Science in Anthropology, 2005
   University of Cincinnati, Master of Arts in Anthropology, 2007

3. Professional Positions Held:
   Coordinator of Research and Development, Hope Community Resource, Inc.
   Research Analyst III, Governor’s Council on Disabilities and Special Education,
   Division of Senior and Disabilities Services, State of Alaska Department of Health
   and Social Services
   Instructor, Eastern Kentucky University, Department of Sociology and Anthropology
   Instructor, Northern Kentucky University, Department of Sociology, Anthropology,
   and Philosophy
   Instructor, Gateway Community and Technical College, Division of Arts,
   Humanities, and Social Sciences
   Teaching Assistant, University of Kentucky, Department of Anthropology
   Research Assistant, University of Kentucky, College of Medicine, Department of
   Family and Community Medicine
   Research Assistant, University of Kentucky, College of Public Health, Department of
   Health Behavior
   Research Assistant, University of Kentucky, College of Medicine, Department of
   Behavioral Science
   Research Technician, University of Alaska Anchorage, Institute of Social and
   Economic Research (ISER)
   Research Assistant, University of Kentucky, College of Arts & Sciences, Department
   of Sociology
   Evaluation Specialist, Cincinnati Children’s Hospital Medical Center, Education and
   Learning Department, Division of Education Research and Measurement
   Teaching Assistant, Central Michigan University, Department of Sociology, Anthropology,
   and Social Work
   Research Assistant, Central Michigan University, Department of Psychology
   Medical Transcriptionist, Ronan Psychological Associates, Mt. Pleasant, Michigan
   Museum Intern, Chippewa Nature Center, Midland, Michigan
   Site Interpreter, Sanilac Petroglyphs, State Historical Museum, Michigan

4. Scholastic and Professional Honors:
   James VanStone Advanced Graduate Scholarship, Alaska Anthropological
   Association
   National Science Foundation Doctoral Dissertation Improvement Grant, Arctic Social
   Sciences Program Award (1331019)
   Leslie A. White Award, Central States Anthropological Society section of the
   American Anthropological Association
   Susan Abbott-Jamieson Pre-Dissertation Award, University of Kentucky, Department

273
of Anthropology
Lyman T. Johnson Fellowship, The Graduate School, University of Kentucky
Graduate Research Assistantship, Department of Behavioral Sciences, University of Kentucky
Dorine Seaquist Woman of the Year Award nominee, Cincinnati Children’s Hospital Medical Center
Outstanding Poster Presentation Award, Graduate Student Research Poster Forum, University of Cincinnati
University Graduate Scholarship, University of Cincinnati
Graduate Student Governance Association Travel Grant, University of Cincinnati
Charles Phelps Taft Graduate Student Travel Grant, University of Cincinnati
Charles Phelps Taft Graduate Enrichment Grant, University of Cincinnati
Global Studies Grant, University of Cincinnati
Michigan Competitive Scholarship
UAW Ford Automotive Scholarship
Study Abroad Scholarship, Central Michigan University
Leslie Lieberman Scholarship for Anthropology, Central Michigan University
Michigan Merit Award

5. Publications:
Bardach, S., N.E. Schoenberg, and B.M. Howell

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Wies, J., B.M. Howell, and M. Falk

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Kruger, T., B.M. Howell, A. Haney, R.E. Davis, N. Fields, and N.E. Schoenberg

B.M. Howell

B.M. Howell

B.M. Howell

Schoenberg, N.E., B.M. Howell, and N. Fields

B.M. Howell

B.M. Howell

Vaughn, L.M., J. Forbes, and B.M. Howell


B.M. Howell

6. Typed Name of Student: Britteny Marie Howell