

DIETARY CHOICES IN CANADIAN  
SOUTH ASIAN ADOLESCENTS

by

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## Abstract

**Purpose:** Current literature identifies protective factors to healthy eating within the adolescent population, such as family meals, yet it fails to acknowledge variation between families and the difference in family structure associated with South Asian culture. The purpose of this descriptive study is to examine the food choices of South Asian adolescents and the extent to which food choices among Canadian-born South Asian adolescents are influenced by their home environment.

**Methods:** A secondary analysis was conducted of the 2013 Adolescent Health Survey. The sample included adolescents who self-selected as South Asian. Measures included sex, immigrant status (foreign-born or Canadian-born), yesterday food and drink choices, cultural connectedness (language use in the home and engagement in cultural activity) and parental presence at evening meals. Differences in food and drink choices were analyzed for foreign-born and Canadian-born adolescents by sex using cross tabulations. Overall healthy versus less healthy eating was analyzed for foreign-born and Canadian-born adolescents by sex using logistic regression adjusting for significant variables (weekly engagement in cultural activities and parental presence at evening meals).

**Results:** Immigrant status was influential for South Asian adolescent males. Canadian-born South Asian adolescent males ( $p < .01$ ) were half as likely to eat healthy than their foreign-born peers when controlling for parental presence at evening meals and engagement in cultural activities. Even after controlling for immigrant status and parental presence at evening meals, both South Asian adolescent males and females who engage in cultural activities (outside of school) weekly are 1.5 times more likely to eat healthy than those who never engage in cultural activities (outside of school) ( $p < .05$ ). For South Asian adolescent females, parental presence at evening meals demonstrated significance. South Asian adolescent females ( $p < .01$ ) with consistent parental presence at evening meals are 1.6 times more likely to eat healthy than those with inconsistent parental presence at evening meals.

**Discussion and Implications:** This study draws attention to the heterogeneity that exists within this group of adolescents. Country of birth was an important variable, particularly for males. Although this relationship was not seen in females, the value of family meal times for females over males demonstrates that, in addition to country of birth, key sex differences exist with regards to dietary choices in this population. Future research should seek to understand the complex mechanisms which increase the risk of less healthy eating for Canadian-born South Asian adolescent males.

**Preface**

This project is a secondary analysis of the 2013 British Columbia Adolescent Health Survey. Ethical approval for this study was covered by The University of British Columbia Behavioural Research Ethics Board Certificate H12-02630 for the original study titled “BC Adolescent Health Survey V--2013.” This thesis project is original, unpublished work conducted by the author, S. Thind, under the supervision of Dr. Sabrina Wong and advisory of Dr. Elizabeth Saewyc and Dr. John Oliffe.

## TABLE OF CONTENTS

Abstract.....	ii
Preface.....	iii
Table of Contents.....	iv
List of Tables.....	vi
List of Figures.....	vii
Acknowledgements.....	viii
Chapter One: Introduction.....	1
Problem Statement and Research Questions.....	3
Chapter Two: Literature Review.....	5
Social Ecological Framework.....	5
Exploring the Levels of Influence That May Affect Dietary Choices for South Asian Youth.....	6
Macro-Level Environment.....	6
Physical and Social Environments.....	7
Individual Factors.....	11
Identifying the Gaps in Literature.....	12
Chapter Three: Study Methods.....	14
Study Design.....	14
Data Set: British Columbia Adolescent Health Survey 2013.....	14
Integrated Knowledge Translation Approach.....	15
Ethical Considerations.....	16
Measures.....	16
Independent Variables: Immigrant Status, Sex and Ethnicity.....	16
Confounding Variable: Family Connectedness During Mealtimes.....	17
Explanatory Variables: Cultural Connectedness and Time in Canada.....	17
Dependant Variable: Food and Drink Choice.....	19
Data Analysis.....	21
Chapter Four: Results.....	27
Overview.....	27
Characteristics of South Asian Adolescents in British Columbia.....	27

Immigrant Status and Individual Food Choices.....	28
Community Advisory Group Discussion.....	33
Chapter Five: Discussion.....	35
Study of South Asian Adolescent Dietary Behaviours in Canada.....	35
The Influence of Cultural Activity.....	35
The Protective Impact of Cultural Connectedness.....	35
The Intersection Between Sex and Gender Roles.....	36
Parental Presence at Evening Meals and South Asian Family Gender Norms.....	36
The Complex Interplay Between Country of Birth and Sex.....	37
The Canadian Lifestyle.....	37
Strengths and Limitations.....	38
Implications to Practice.....	39
Directions for Future Health Research.....	41
Bibliography.....	42
Appendices.....	50
A. Social Ecological Framework.....	50

## List of Tables

Table 3.1	Study Variables by Concept and Corresponding Questions in the 2013 AHS.....	23
Table 4.1	Characteristics of the South Asian Adolescent Sample.....	27
Table 4.2	Immigrant Status and Yesterday Food/Drink Choice: South Asian Adolescent Females.....	29
Table 4.3	Immigrant Status and Yesterday Food/Drink Choice: South Asian Adolescent Males.....	30
Table 4.4	Unadjusted Predictors of Healthy Eating Among South Asian Female Adolescents .....	31
Table 4.5	Unadjusted Predictors of Healthy Eating Among South Asian Male Adolescents .....	31
Table 4.6	+Adjusted Odds Ratios for Healthy Eating Among South Asian Adolescent Females.....	32
Table 4.7	+Adjusted Odds Ratios for Healthy Eating Among South Asian Adolescent Males.....	33

**List of Figures**

Figure 3.1	Frequency Distribution of the Healthy Eating Index for South Asian Adolescents.....	22
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## Chapter One: Introduction

The obesity epidemic affects adults and children alike and is an internationally acknowledged health concern. Within the Canadian context, the obesity rates have continued to rise over the last decade. Obesity is associated with a plethora of chronic illnesses. One approach to counteracting the obesity epidemic is to use a population health approach to its prevention. Extensive research on health habits has identified two focal areas in obesity prevention: nutrition and physical activity (Roberts, Shields, Groh, Aziz, & Gilbert, 2012; Public Health Agency of Canada). Nutrition focused interventions target structural components (such as creating supportive environments) and individual health behaviours (through accessibility of nutritious foods) (Public Health Agency of Canada).

Nearly one third of Canadian children aged five to seventeen years old are overweight, which approximates to 1.6 million children (Roberts et al., 2012). Nearly 500,000 persons between ages twelve and seventeen self-reported as overweight or obese (Statistics Canada, 2013). Many of these children are South Asian Canadians (Statistics Canada, 2013). As with all adolescents, those of South Asian ancestry lead complex lives through their engagement in multiple environments, including their school, peer groups and home. They continue to be influenced by their family context, which, for some South Asian Canadians may disincentivise nutrition given the family's cultural values surrounding food and its preparation. South Asian Canadians also have a higher risk for obesity and obesity related illnesses including type II diabetes, cardiovascular disease and metabolic syndromes than those of European descent (Anand et al., 2011). Yet, little is known about the health behaviours which mediate the risk for obesity and obesity related medical conditions of Canadian South Asian adolescents.

The home environment creates a context for the development of eating behaviours through means of parental behaviours and practices, food selection and preference, and parental controls (Savage, Fisher and Birch, 2007; Birch and Fisher, 1998; Scaglioni, Salvioni & Galimberti, 2008). The notion of family meals or parental presence at meals is an aspect of the home environment that has been widely acknowledged as improving food choices (Woodruff & Hanning, 2009). While parents shape the home environment (Scaglioni, et al., 2008), so too do the extended family members that make up the typical intergenerational South Asian household living in Canada. The dietary habits of these South Asian adults, who act as role models, have been associated with the increased incidence of chronic illness and mismanagement of chronic illnesses, including diabetes and cardiovascular disease, within the South Asian Canadian populations (Duthie-Nurse, 1998; Lawton et al., 2008).

In South Asian families, women typically fulfill the role of food preparation. Their desire to please their families supersedes their concern for nutrition (Chapman, Ristovski-Slijepcevic & Beagan, 2011; Oliffe et al., 2010). Many Canadian-born South Asian adolescents live between two cultures: South Asian culture and Canadian culture which affects their food preferences. South Asian adolescents identify a desire to consume more Western food than Indian food, which often results in multiple different meals being prepared within one home to ensure all family members are satisfied. South Asian mothers and grandmothers tend to pander to their children's desires for unhealthy meal choices, such as pizza and high sugar beverages (Chapman et al., 2011).

In other ways, however, South Asian adolescents growing up in Canada, are similar to their peers. Adolescents go through numerous physical and emotional changes, which affect their diets. A need for autonomy and a social life results in eating fewer meals at home with their

family and rapid growth in adolescence results in increased dietary needs (Spear, 2002). Adolescents prefer “junk food” to healthful options and as a result consume an excess of foods with low nutrient density, such as cakes, cookies and salty snacks (Phillips, Starkey, & Gray-Donald, 2004). The need for social acceptance and peer approval affects adolescent food choices, as adolescents who have peers that make unhealthy food choices have less inclination to eat healthy themselves (Kalavana, Maes and De Gucht, 2010).

As culture is a dynamic concept, there is a new culture emerging within this specific group of adolescents who are born and/or raised in Canada. This group encompasses adolescents who are Canadian-born (born in Canada) and foreign-born (born outside of Canada and currently reside in Canada as a permanent resident, refugee/international student). The culture of South Asian adolescents with regards to food choices is the basis of this thesis project.

### **Problem Statement and Research Questions**

Obesity is a complex health concern, which is associated with many chronic health conditions. It is evident that South Asian individuals have high occurrences of chronic diseases, namely metabolic diseases (Mohan, Wilkes & Jackson, 2006). There are cultural influences that, in part, determine the eating behaviours of South Asian families. As South Asian Canadian youth are immersed in both South Asian and Canadian culture, it is important to address this population’s eating behaviours, particularly within the home. Literature identifies protective factors to healthful eating, such as family meals, yet it fails to acknowledge variation between families and the difference in family structure associated with South Asian culture.

The purpose of this descriptive study is to examine the cultural context of food choices for South Asian adolescents. The specific research questions are:

1) Are there differences in food choices of Canadian-born and foreign-born South Asian adolescents? *HO: No difference exists between the food choice of Canadian-born and foreign-born South Asian adolescents.*

2) What is the relationship between the food choices and evening meals among Canadian-born South Asian adolescents and foreign-born South Asian adolescents?

*HO: There is no relationship between food choices and evening meals among Canadian-born South Asian youth and foreign-born South Asian youth.*

3) Are there sex differences regarding food choices for South Asian adolescents?

*HO: There are no sex differences regarding food choices for South Asian youth.*

## **Chapter Two: Literature Review**

The childhood obesity epidemic is an international public health crisis, with an estimated 170 million children projected as overweight worldwide (World Health Organization, 2012). Within Canada, childhood obesity has been steadily rising with over 1 in 4 Canadian children or youth being overweight or obese (Public Health Agency of Canada). The effects of obesity last for decades through short and long-term health concerns, increased health care costs and economic burden (Public Health Agency of Canada).

South Asian's are the single largest minority group in Canada, with over 1.2 million Canadians of South Asian decent (Statistics Canada, 2013). The term "South Asian" includes those of East Indian, Pakistani, Sri Lankan, and Tamil decent (Lindsay, 2007). The profile of the South Asian community has evolved, as 1 in 4 visible minority children are Canadian-born; there is a new generation of Canadian-born South Asians. This group of Canadian-born South Asians have a unique identity as they create a balance between South Asian culture and Western society. Little is known about the eating behaviours of this particular group of South Asian adolescents growing up in Canada, specifically in relation to the childhood obesity epidemic.

### **Social Ecological Framework**

The Social Ecological Framework (SEF) (see appendix A), will be utilized in the analysis of the eating behaviours of South Asian adolescents. A social ecological framework addresses the multiple influences on individual eating behaviours. This framework addresses four levels of influence: macro-level environments (societal and cultural norms and values, government policy, media and marketing, health care systems), physical environments (settings such as home, school, neighbourhoods, and communities), social environments (networks such as family, friends, and peers), and individual factors (personal attributes such as cognitions, attitudes,

lifestyle, genetics, and demographics) (Story, Kamphist, Robertson-O'Brien & Glanz, 2008). Given the complexity of adolescent life, a SEF acknowledges the various factors, which work synergistically, to create a unique environment for each individual.

The SEF locates culture and societal norms at the macro-level of influence. This structure fits for South Asian Canadian youth as both the South Asian culture and the Western culture seen in society influence all aspects of South Asian adolescent's life, including their physical and social environments, and personal factors. For the purposes of this analysis, the macro-level influences of culture and Western society will be discussed in reference to the different levels of the SEF. As physical settings provide specific social environments, the physical and social environment domains will be discussed together.

## **Exploring the Levels of Influence That May Affect Dietary Choices for South Asian Youth**

### **Macro-Level Environment**

Culture is woven into all aspects of an individual's life. Culture is defined as the blueprint to one's innermost workings, encompassing principles that are ingrained from birth guiding our subconscious and conscious decisions and influencing language acquisition and socialization (Singer, 2012). Culture is dynamic and constantly evolving (Singer, 2012), which is exemplified in the unique culture of Canadian South Asian adolescents. Canadian culture underpins daily living within Canadian society. South Asian adolescents living and growing up in Canada are constantly exposed to this overarching culture that permeates daily life through their schooling, societal interactions, peers, and media. At the same time, South Asian adolescents are immersed in South Asian culture through their familial influences, which often incorporates multi-generational families. A new culture exists for these adolescents that incorporates both Canadian

and South Asian ideals and is an example of the changing cultural demographic for many Canadians.

### Physical and Social Environments

Generally adolescents share some aspects of the home environment, such as family connectedness and family meals, which are acknowledged as protective factors for healthful eating (Kalavana, Maes, & De Gucht, 2010). A “family meal” encompasses home-prepared meals, as opposed to unhealthy fast food alternatives, and parental presence or engagement (Videon & Manning, 2003). Adolescents who eat evening meals with a parent present have increased consumption of fruits, vegetables, and dairy products, and are less likely to exhibit poor health behaviours such as skipping meals (Videon & Manning, 2003). However, parental presence is ineffective for adolescent food intake if parents are not relaying health food education (Videon & Manning, 2003), which speaks to the importance of context at family meals. The context of family meals is influenced by the family’s culture and values, and within this context comes a particular social setting. South Asian adolescents live within a household that is influenced by South Asian cultural values, which results in culturally influenced family relationships inside and outside of the household, and a cultural context to meals and food behaviours.

South Asian households encompass intergenerational families, where parents and their children, and paternal grandparents reside together. This family structure results in multiple adult role models in one home. Varying family member schedules can pose barriers to having regular family meal times (Pallan, Perry, & Adab, 2012). Evening meal times vary, on average occurring at 7 p.m. on weekdays and after 9 p.m. on weekends for many South Asian families (Pallan et al., 2012; Sekhon, 1996). Family structure is of matriarchal nature in South Asian families, giving

grandmothers a central role in the household and over the most responsibility for the food intake of young children (Pallan et al., 2012). Having first generation immigrant grandparents making decisions around food and health results in greater ties to cultural meanings and values being passed down generations to Canadian-born or raised children (Hilton, et al., 2001).

Many South Asian cultural beliefs surrounding food stem from the family's country of origin. As work in the country of origin was labour intensive, traditional foods were thought to provide physical strength (Olliffe, et al., 2010). In addition, practices such as adding clarified butter "ghee" or butter to prepared food are common in South Asian culture (Olliffe, et al., 2010). These practices have not adapted for the lifestyle change associated with westernization, being less labour intensive and more sedentary (Olliffe, et al., 2010). Being overweight is viewed as a sign of affluence in traditional South Asian culture, which stems from historical times when food was a scarcity and was associated with wealth (Pallan et al., 2012). As a result of these values, older generations (grandparents) provide an abundance of food to children as a sign of affection (Pallan et al., 2012).

A traditional Indian meal consists of roti (flatbread), dahl (lentil soup), sabji (a vegetable dish) and raita (sweet yogurt) (Sekhon, 1996). Preparation of most South Asian dishes involves a two-step process; firstly sautéing onions with desired spices to create a base and second to add the main component (vegetables, lentils, meats) to produce a curry dish (Sekhon, 1996). Despite incorporating many healthful ingredients, traditionally, this process involves a substantial amount of butter or "ghee" (Sekhon, 1996). South Asians contest that they are now beginning to cook with healthier fats such as olive oils (Pallan et al., 2012), which is an important intervention to create healthier meals within this population. Outside of meals, deep frying and pan frying are typical in the preparation of many appetizers and snacks (Sekhon, 1996). Dairy products are



valued. Many South Asians prepare their own yogurt at home, milk is consumed heavily in traditional chai tea, heavy creams are used in some curry dishes and warm milk is enjoyed by elders (Sekhon, 1996). Historically, dairy products were symbolic of affluence, and the increased accessibility associated with westernization can result in over indulgence (Oliffe, et al., 2010).

South Asian women hold a central role in food preparation (Chapman et al., 2011), and despite the preparation of traditional Indian meals, adolescents of South Asian descent prefer to eat Western foods more often than traditional foods (Chapman et al., 2011; Lawrence, et al., 2007). Like adolescents in general, South Asian adolescents prefer convenience foods, such as fast food and frozen dinners (Caine-Bish & Scheule, 2009; Chapman et al., 2011; Lawrence, et al., 2007). South Asian women make an effort to please all family members, which results in preparing both a traditional and western meal. These women feel it is easier to submit to their children's demands rather than to explain the benefits of healthful foods (Pallan et al., 2012). As context is an important aspect to family meals, this lack of effort to teaching about nutrition and provision of providing healthful meals by South Asian mothers poses barrier to healthful eating behaviours of South Asian adolescents.

Religion has a central role in the social environment of many South Asian families. For those of Islamic religion, attendance at the mosque daily results in little time at home for food preparation, and the use of energy dense snacks as an acceptable alternative (Pallan et al., 2012). At the centre of many Panjabi families of Sikh faith is the Gurduaras (Sikh temple) (Oliffe, et al., 2010). Following worship at the Gurduaras, people are served kara parshad (a mixture of butter, flour, sugar, and water). Many members partake in the community kitchen, which serves traditional Panjabi meals (Oliffe, et al., 2010). Women prepare these meals and their preparation involves deep-frying and excess use of fat and sugar.

Food is central to many social aspects of South Asian culture. Offering and receiving food is seen within social networks, and sweets are given as gifts to celebrate auspicious occasions (Lucas, Murray & Kinra, 2012). The hospitable nature of the South Asian culture results in pressure to consume sweets for fear of offence to the host (Lucas et al., 2012). These practices may result in greater consumption of less healthy foods in the absence of individual desire.

The school environment is a physical and social environment where South Asian adolescents spend a significant amount of time, including their midday meal (Woodruff, Hanning, & McGoldrick, 2010). The availability of food in the school environment is influenced by Canadian culture and nutritional values, as evidenced by the school curriculum. The British Columbia School Curriculum for Grades 8-12 incorporates the values of Health Canada depicted in the document “Eating Well with Canada’s Food Guide” (Ministry of Education, 2007). “Eating Well with Canada’s Food Guide” (Minster of Health Canada, 2011) is a comprehensive document outlining recommendations for a balanced diet. This document highlights nutritional values such as limiting unhealthy choices while making healthy food choices and information about reading and assessing food labels for nutritional value. This food guide directs Canadians to healthy food choices and empowers consumers to make informed decisions about the foods they choose.

The school environment is also where many social relationships stem for adolescents. Adolescents are influenced by their peers and seek peer acceptance (Kalavana, et al., 2010). Fear of stigmatization related to being overweight is likely related to the observation that children modify their food intake based on the presence of their peers (Salvy, Coelho, Kieffer, & Epstein,

2007). Peer attitudes about foods influence adolescent's unhealthy eating behaviours, as well as their ability to uptake new eating patterns and behaviours (Kalavana, et al., 2010).

### Individual Factors

Individual choice and socio economic status influences one's food choices. Various factors within the macro-level and physical environments serve as protective or risk factors in the decision-making process for South Asian adolescents. Adolescents have the ability to make healthy food choices, although this interplay of factors with their own personal attributes creates a unique decision-making process for these adolescents.

South Asian adolescents are born with a genetic predisposition for obesity related illnesses. The South Asian population as a whole is at a higher risk for obesity and obesity related illness such as type two diabetes, cardiovascular disease and metabolic syndromes than Caucasians (Anand, et al., 2011). South Asian's in Canada have consistently been found to be less prudent regarding food choices and consume less healthy foods than their Caucasian peers (Brenner & Kreiger, 2011; Chopra, Misra, Gulata & Gupta, 2013). This genetic predisposition coupled with a lack of prudent decision-making for healthy food choices (Chapman, et al., 2011; Lawrence, et al., 2007; Chopra, et al., 2013) results in an exacerbated risk for metabolic diseases.

Similar to their peers, South Asian adolescents undergo developmental changes which influence their eating behaviours. Adolescence is a stage of significant physical growth resulting in increased dietary needs (Spear, 2002). During this time, adolescents seek autonomy, social identity and approval (Kalavana, et al., 2010). Increased autonomy may result in more meals being consumed with peers rather than within the home environment.

For adolescents in general, significant differences are seen between sexes with regards to food choices. Girls demonstrate a preference for carbohydrate rich foods, and fruits and

vegetables, while males select ethnic foods more frequently (Caine-Bish & Scheule, 2009). For South Asian adolescents, culturally defined gender roles around food behaviours may influence their choices. For example, females are thought to assume the role for food preparation, thus may be more inclined to prepare food rather than purchase fast foods. Nonetheless, cooking techniques of South Asian women tend to be learned from elders (Lawrence et al., 2007), thus may be influenced by less healthy cooking methods. Some masculine ideals related to traditional gender roles and the belief of men needing greater physical strength may influence the choices of South Asian adolescent males.

South Asian adolescents food choices may vary based on their country of birth, having being born in Canada versus (vs.) being born in their country of origin. Research of food choices between children of South Asian decent residing in industrialized countries compared with their counterparts residing in their home country demonstrated significant differences in food choices (Edwards et al., 2006). Notably, those residing in Western countries were more likely to consume meats, high sugar and fast foods (Edwards et al., 2006). Those born in their country of origin may hold stronger cultural ties, which intern may affect their food preferences.

### **Identifying the Gaps in Literature**

South Asian Canadian adolescents are immersed in Canadian and South Asian culture, and have created a unique bi-cultural identity. Previous research on this population and their food choices reveal that South Asian adolescents adopt many Western food habits, namely foods high in fat and sugar (Chapman, et al., 2011; Lawrence, et al., 2007). In Canada, South Asians make less prudent food choices than Caucasians (Brenner & Kreiger, 2011; Chopra, et al., 2013) and their children demonstrate a less healthy diet than their counterparts in their home country (Edwards et al., 2006). Current literature fails to acknowledge potential differences between

those adolescents born in Canada and those born in their country of origin. Sex differences in adolescent eating behaviours have been identified, yet it is unclear as to differences between South Asian male and female adolescents given the cultural influence of South Asian gender roles. This study seeks to add to the existing body of knowledge by exploring the impact of being Canadian-born as opposed to foreign-born on food choices by sex. For adolescents in general, the home environment, family meals, and family connectedness are seen as protective factors for healthy eating. Yet, it is unknown how these protective factors pertain to Canadian South Asian adolescents given the context of South Asian homes and culture. This will be the first study, to our knowledge, within Canada to look at the concept of family meals with healthful eating in the South Asian adolescent population. Addressing these gaps in literature will allow for culture and sex specific interventions in promoting healthy eating behaviours within the group of South Asian Canadian Adolescents.

### **Chapter Three: Study Methods**

This section will describe the study design, study variables and analysis process that was used to answer the above stated research questions.

#### **Study Design**

This is a descriptive study that explored the eating behaviours of South Asian adolescents residing within British Columbia who were born in Canada or have immigrated to Canada from their country of origin. A secondary analysis of data from the 2013 British Columbia Adolescent Health Survey (BC AHS) was conducted to describe eating behaviours and explore relationships between family connectedness, cultural connectedness, parental presence at evening meals, gender, and food choices within the South Asian adolescent population. The study population included students who self-identified as South Asian.

#### **Data Set: British Columbia Adolescent Health Survey 2013**

The 2013 BC AHS included 56 of 59 British Columbia (B.C.) school districts, which reflected 98.5% of all students enrolled in grades 7-12 in the province. The sample included all classrooms within the province. The province is divided into 16 health service delivery areas (HSDA). The sampling frame was stratified by HSDA and by grade to ensure that sampling was reflective of the student population in each HSDA. Independent random sampling was conducted for classrooms in each HSDA and grade. All students in the selected classrooms were included in the sample. In total, 42,453 students from 1645 different classroom were selected for participation in the 2013 AHS.

Consent was elicited for participation in the survey in two forms: parental notification with student consent, which included parental encouragement to discuss the survey with students but the overall decision for participation fell on the student; or parental consent with student

consent, which required a signed consent form from parents in order for students to participate. The school districts chose one of these two methods of obtaining consent. Participation in the survey was voluntary and all information was kept confidential. Surveys were administered during regular school hours in a classroom or lunchroom by a trained administrator (public health nurse, nursing student, and other trained administrators). Administrators were available to provide instructions, answer questions and ensure privacy. In addition, administrators noted enrolment, absenteeism and refusals.

The overall response rate for the 2013 BC AHS was 70%, and the data obtained from 29,832 students were weighted to reflect all 260,632 B.C. public school students enrolled in grades 7-12.

The 2013 AHS included 130 questions which provide information on adolescent socio-demographic characteristics (such as age, sex, and family background) as well as a range of topics relevant to adolescent health including perceived physical and emotional health, school and family connectedness, and health/risk-taking behaviours. For this study, students who selected the option “South Asian (East Indian, Pakistani, Sri Lankan etc.)” when asked the question “What is your family background?” was the population of interest. Questions that explore topics around family connectedness, cultural connectedness and dietary behaviours were utilized in the analysis of South Asian adolescents in general, by sex and by level of acculturation based on having been born in Canada or not. Further information regarding the 2013 AHS dataset can be found in the document “Methodology: 2013 BC Adolescent Health Survey” developed by the McCreary Centre Society (2013).

### **Integrated Knowledge Translation Approach**

An integrated knowledge translation approach informed the data analysis and discussion of

findings. An advisory group with representation from key community stake holders (public health nurse, school teacher, parent and adolescent) was used to aid in the interpretation of the results of this study. The participants were recruited from within the community of Surrey B.C. on a voluntary basis through the use of snowball sampling. At the group meeting, a presentation of research findings was presented for discussion amongst the group members.

### **Ethical Considerations**

According to the Tri Council Policy Statement for Ethical Conduct for Research Involving Humans Article 2.4, the proposed study was exempt from review as it is an extension of analysis of anonymous data from the original study, the 2013 AHS. The McCreary Centre Society obtained ethical approval to conduct the original study and data collection. Ethical approval and permission to access the 2013 AHS survey data was sought from the McCreary Centre Society. All data analysis was conducted on site at the McCreary Centre Society. Although no data was taken off site, SPSS outputs of aggregated data were taken off site for analysis.

### **Measures**

All variables used in this study were derived from questions in the 2013 AHS. Table 3.1 provides detailed information of each question that will be used as study measures.

#### Independent Variables: Immigrant Status, Sex and Ethnicity

Data analysis was conducted for both males and females separately to identify potential gender differences.

Students who selected “South Asian” as their family background were included in the study population. As some students selected more than one family background, a variable was created to identify students who selected a single ethnicity (South Asian only) and multiple



ethnicities (South Asian plus one or more other ethnicity). All students (single and multi-ethnic) were included in the study population.

The population of South Asian adolescents includes both Canadian-born and foreign-born South Asian adolescents. Although those foreign-born may share some experiences of westernization with those Canadian-born, they can hold stronger cultural ties having been born in their country of origin. For the purposes of this study, the foreign-born group served as a comparison group in understanding the effects of being Canadian-born on South Asian adolescent's food habits.

Student response to the 2013 AHS question "Where you born in Canada?" divided adolescents into two groups: Canadian-born and foreign-born. The variable "where you born in Canada" was re-coded to reflect two groups: students who are Canadian-born and foreign-born (includes all responses other than Canadian-born).

#### Confounding Variable: Family Connectedness During Mealtimes

Family connectedness during mealtimes has been shown to influence eating behaviours, adolescents who engage in family meals are said to have healthier food choices and habits (Videon & Manning, 2003). The 2013 AHS addresses family meals by asking about parental presence during evening meals in the past 30 days. This question was analyzed as a potential confounding variable for food choices in South Asian adolescents. For methodological purposes with the use of binary logistic regression, this variable was re-coded to reflect consistent versus inconsistent parental presence at evening meals. This re-coding allowed for clear comparison against a reference category.

#### Explanatory Variables: Cultural Connectedness and Time in Canada

Two variables are identified as measures of cultural connectedness in the 2013 AHS:

language use in the home (question #12) and engagement in cultural activities (question #119). Culture indicating variables in the 2013 AHS will be used as proxy measures for cultural connectedness. As level of cultural connectedness may vary based on a family's level of acculturation, the length of time in Canada for foreign-born South Asian adolescents will be used as a proxy measure for family level of acculturation (question #6).

Measures of ethnic identity have been utilized in assessing ones cultural connectedness in previous studies. The measure of ethnic identity demonstrates cultural connectedness based on exploration about one's culture and commitment to specific cultural groups and norms (Homma, Saewyc, Wong & Zumbo, 2013). For some cultural groups, language use within the home environment has shown a relationship with ethnic identity; those who speak their mother tongue at home have greater ethnic identity scores (Homma, Zumbo, Saewyc, & Wong, 2014).

For Canadian-born South Asians, the concept of language use as a measure of ethnic identity has not yet been validated. Some research supports the idea of bi-cultural identity within this adolescent group, which involves maintaining ties to one's cultural roots while adhering to norms of a dominant culture (Sundar, 2008). This concept resonates with Canadian-born South Asians as it acknowledges the fluidity of cultural identity and the linking of two cultures that is occurring within this group (Sundar, 2008). Like their cultural identity, the language use of South Asian adolescents is dynamic. South Asians born in Western countries may communicate in their mother tongue (e.g. Punjabi) at home, proper English in professional settings, and slang English in some social settings (Jaspal & Coyle, 2010). Use of their mother tongue at home is attributed to parental fear of language loss (Jaspal & Coyle, 2010), which may demonstrate that language use in the home is a reflection of parental cultural values and ties. Thus, language use in the home was used in combination with the variable "engagement in cultural activities."

The variable “engagement in cultural activities” measures frequency of participation in cultural activities outside of school using ordinal responses (“never,” “less than once per week,” “1 to 3 times a week,” and “4 or more times a week”). For analysis purposes, to provide comparison amongst a reference category, this variable was condensed into three responses reflecting no participation, less than weekly engagement in cultural activities and weekly engagement in cultural activities.

#### Dependent Variable: Food and Drink Choice

Food and drink choice data in the 2013 AHS was obtained using a 24 hour recall method, which asked about particular food and drink categories (i.e. fruit, vegetables or green salad, sweets, fast food, and traditional food from my background) and the number of times they were consumed the day prior with categorical ordinal responses (i.e. never; yes, once; yes, twice; yes, three or more times).

Previous studies of dietary intake using 24 hour food diaries or surveys classify dietary intake in reference to nutrient density (e.g. carbohydrates, protein, etc.) (Ali, Jarrar, Sadig, & Yeatts, 2013) or food and drink categories (e.g. sweets, fruits, etc.) (Jenkins, 2014) and provide comparisons amongst groups based on each category or nutrient. Previous literature has used alternate comparisons such as a food scale based on intake, although this requires complex information about portion size and individual caloric need (Dennison & Dennison, 2001). Given the 2013 AHS data set, comparisons of intake by food/drink category is the most theoretically sound.

Initially, the distributions for food and drink choices were analyzed individually for each food and drink category and tested for independence using SPSS Complex Cross tabs by gender and by immigrant status. As determining what constitutes a healthy vs. an unhealthy overall diet

is a controversial topic (Dieticians of Canada, 2014), comparison of overall food/drink intake was done for healthful and less healthful foods using a cumulative food score.

The food and drink choices were re-coded to reflect a Healthy Eating Index. The classification of foods as healthful versus less healthful was determined in reference to Canada's Food Guide for Healthy Eating (Minster of Health Canada, 2011). Those food and drinks recommended for daily intake were classified as "healthful" (i.e. water, fruits, vegetables/green salad) and those which should be limited as "less healthful" (i.e. sweets, fast food, pop/soda, energy drinks, coffee/coffee based beverages). The food category "traditional foods from my background" was not integrated in the food/drink choice score as nutritional value or lack thereof cannot be assumed for traditional food. A score ranging from 0-3 paralleled the ordinal responses (never – yes, three or more times) provided in the 2013 AHS (question #41) for healthful foods. For less healthful foods, a score of 1 was given for not having consumed that food and a score of 0 for having consumed the food once, twice or three or more times. A sum of scores for fruits, vegetables/green salad, water, soda/pop, energy drinks and coffee/coffee based beverages was used as the total healthful food score. The coding for the food and drink choices can be seen in table 3.1. The scores on the Healthy Eating Index ranged from 0-14. Frequency distributions and measures of central tendency were examined for the Healthy Eating Index by sex (see figure 3.1) and revealed normal distributions with median values of 8.

In preparation for the logistic regression, the Healthy Eating Index was then dichotomized to reflect More Healthy Eating/Less Healthy Eating based on the median value for both males and females (Healthy Eating Index of 0-7 = less healthy eating; Healthy Eating Index 8-13 = more healthy eating). Frequency distributions for the healthy eating variable were analyzed in reference to those for the healthy eating score to ensure accuracy of coding. Missing

values (7%) were excluded from analysis. Frequency distributions were conducted and compared for all recoded variables to ensure accuracy of coding against the original data set.

### **Data Analysis**

Statistical Package for Social Sciences (SPSS) Complex Samples Version 20 was used to conduct data analysis to account for the complex cluster-stratified sampling design and ensure accuracy of population estimates. Complex samples descriptive statistics were conducted to explore and describe the sample and the variables used in our analysis. Specifically explored were frequency distributions of demographic, culture-related characteristics and family-related indicators, including age, foreign-born status, single vs. multi-ethnicity, language use in the home, engagement in cultural activities, parental presence at evening meal, and family composition. Tests for independence using Complex Samples Cross-tabs and General Linear Model (GLM) determined demographic differences between male and female, and Canadian-born and foreign-born participants.

Separate binary logistic regression models were conducted for each potential predictor variable (age, parental presence at evening meal, language use at home, engagement in cultural activities, and immigrant status) with the healthy eating variable for both males and females (Table 4.4 and 4.5). Only those variables demonstrating statistical significance ( $p < 0.05$ ) were carried forward into the final logistic regression model. For both males and females, this included the variables: parental presence at evening meal and engagement in cultural activities.

For the final models of analysis, statistically significant variables (parental presence at evening meals and engagement in cultural activities) were input into the logistic regression model along with immigrant status (analyzed in reference to foreign-born) as independent variables. The variable parental presence at evening meals was analyzed in reference to

inconsistent parental presence, and engagement in cultural activities was analyzed in reference to never. The healthy eating variable was input as the dependent variable. Odds ratios and 95% confidence intervals for healthy eating based on each predictor variable are displayed in tables 4.6 and 4.7.

Figure 3.1 Frequency Distribution of the Healthy Eating Index for South Asian Adolescents

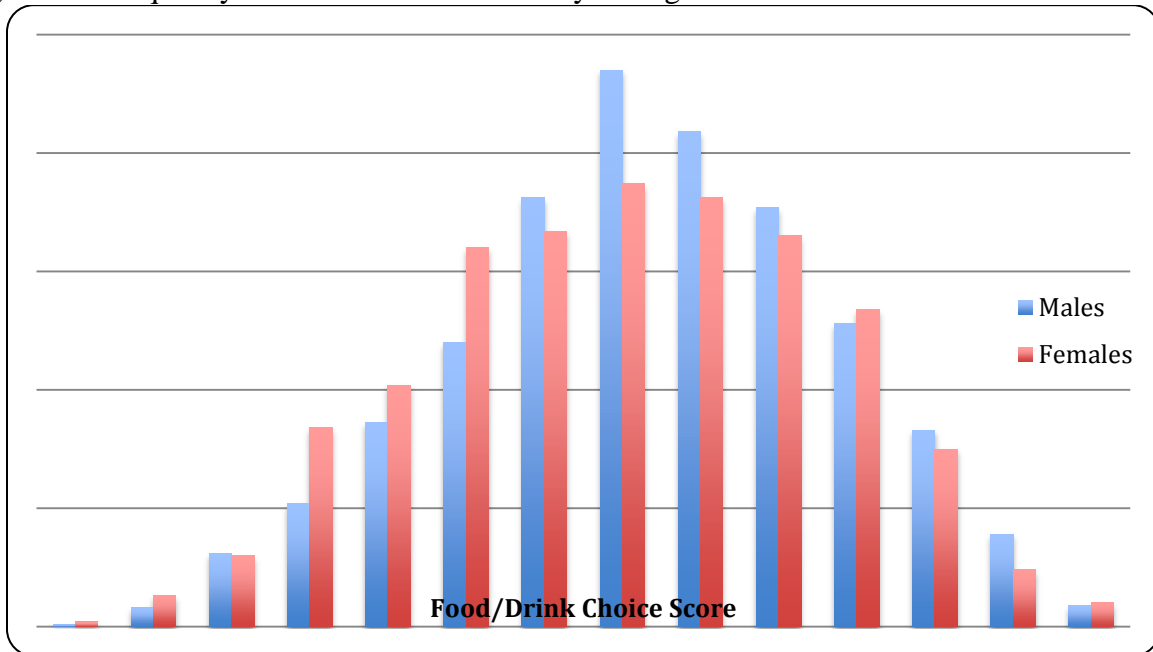


Table 3.1 Study Variables by Concept and Corresponding Questions in the 2013 AHS

Operationalization		Analysis
Independent Variable		
<b>Immigrant Status</b> Q5: “Where you born in Canada?”	Categorical Responses “Yes, I was born in Canada.” “No, I am an international student” “No, I am a refugee” “No, I am a permanent resident/Canadian citizen	Two groups: Canadian-born coded “0” and foreign-born coded “1” includes: international students, refugees, permanent resident/Canadian citizens SPSS Variable Name: “CanadianBorn”
Potential Confounding Variables		
<b>Ethnicity</b> Q7: “What is your family background?” MARK ALL THAT APPLY	Categorical Response: Aboriginal African European (British, Irish, German, Dutch, Ukrainian, Italian, Russian etc.) East Asian (Chinese, Japanese, Korean etc.) South Asian (East Indian, Pakistani, Sri Lankan, etc.) Southeast Asian (Cambodian, Filipino, Indonesian Vietnamese, etc.) West Asian (Afghani, Iranian, Arab, Kazakhstani, etc.) Latin American, South American, Central American Australian, Pacific Islander Other, specify: _____ Don't know	All students who self-identify as South Asian included in sample including those who selected multiple ethnicities. Of South Asian adolescent sample, a variable created to identify if student identifies with more than one ethnicity. Single Ethnicity coded “0” Multi-ethnic coded “1” SPSS Variable Name: “MULTISOUTH”

	<b>Operationalization</b>	<b>Analysis</b>
<b>Culture</b>		
Q6: :How long have you lived in Canada?	Categorical Responses “Less than 2 years” “Between 2 and 5 years” “6 years or more”	Recoded to analyze in reference to “less than 2 years” 1 = 6 years or more 2 = between 2 and 5 years 3 = less than 2 years SPSS Variable Name: “livedRECODE”
Q12: “How often do you speak a language other than English at home?”	Categorical/Ordinal “Never” “Sometimes” “ Most of the time”	Recoded to analyze in reference to “never” 1 = most of the time 2 = sometimes 3 = never SPSS Variable Name: “languageRECODE”
Q119: “In the past 12 months, other than in school classes, how often have you taken part in.... Cultural or traditional activities (dance, holidays, etc.)?”	Categorical/Ordinal “Never” “Less than once a week” “1 to 3 times a week” “4 or more times a week”	Recoded to allow for analysis in reference to “Never” 0 = 1 or more times/week 1 = less than once/week 2 = never SPSS Variable Name: “cultureRECODE”
<b>Family Connectedness During Meals</b>		
Q22: “During the past 30 days, how often did your parent(s) or guardian(s) eat an evening meal with you?”	Categorical/Ordinal “Never” “Rarely” “Sometimes” “Most of the time” “Always”	Recoded to reflect consistent vs. inconsistent presence at meal times 0 = never/rarely/sometimes 1 = most of the time/always SPSS Variable Name: “Q22parentmeal2”



Operationalization	Analysis																																																																											
Descriptive Variable*																																																																												
<b>Home Environment</b>																																																																												
Q13: “Who do you live with most of the time?”	<table border="0"> <tr> <td style="vertical-align: top;">           Categorical Responses:            MARK ALL THAT APPLY            “Mother/Stepmother”                “Father/Stepfather”                “Two mothers or two fathers”            “Grandparent(s)”            “Foster parents”            “Brother(s), sister(s)”            “Stepbrother(s), stepsister(s)”            “Your own child or children”            “Other children or youth”            “Other adults related to you”            “Other adults <u>not</u> related to you”            “I live alone”            “I live with both of my parents at different times”         </td> <td style="vertical-align: top; padding-left: 20px;">           No analysis done.            Descriptive statistics for those who selected            “Grandparents”         </td> </tr> </table>	Categorical Responses: MARK ALL THAT APPLY “Mother/Stepmother” “Father/Stepfather” “Two mothers or two fathers” “Grandparent(s)” “Foster parents” “Brother(s), sister(s)” “Stepbrother(s), stepsister(s)” “Your own child or children” “Other children or youth” “Other adults related to you” “Other adults <u>not</u> related to you” “I live alone” “I live with both of my parents at different times”	No analysis done. Descriptive statistics for those who selected “Grandparents”																																																																									
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Dependent Variables																																																																												
<b>Yesterday Food/Drink Choices</b>																																																																												
Q41: “Think about the meals and snacks you ate yesterday from the time you got up until the time you went to bed (including food you ate at home, at school, at restaurants or anywhere else)?”																																																																												
<p style="text-align: center;"><b>“Did you eat the following things yesterday?”</b></p>																																																																												
<table border="0"> <tr> <td style="width: 30%;"></td> <td style="width: 10%; text-align: center;">No</td> <td style="width: 10%; text-align: center;">Yes, Once</td> <td style="width: 10%; text-align: center;">Yes, twice</td> <td style="width: 10%; text-align: center;">Yes, 3 or more times</td> </tr> <tr> <td>Fruit</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Vegetables or green salad</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sweets (cookies, cakes, candy, chocolate, etc.)</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Fast food (pizza, hot dogs, burgers, chips, fries, etc.)</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Traditional foods from my background*</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Food grown or caught by me or my family*</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		No	Yes, Once	Yes, twice	Yes, 3 or more times	Fruit					Vegetables or green salad					Sweets (cookies, cakes, candy, chocolate, etc.)					Fast food (pizza, hot dogs, burgers, chips, fries, etc.)					Traditional foods from my background*					Food grown or caught by me or my family*					<table border="0"> <tr> <td style="width: 30%;"></td> <td style="width: 10%; text-align: center;">No</td> <td style="width: 10%; text-align: center;">Yes, Once</td> <td style="width: 10%; text-align: center;">Yes, twice</td> <td style="width: 10%; text-align: center;">Yes, 3 or more times</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td style="text-align: right;">Descriptive statistics only</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td style="text-align: right;">Not analyzed</td> </tr> </table>		No	Yes, Once	Yes, twice	Yes, 3 or more times																														Descriptive statistics only					Not analyzed
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Operationalization		Analysis			
<b>“Did you drink the following thing yesterday?”</b>					
	No	Yes, Once	Yes, Twice	Yes, 3 or more times	
Water					
Pop/Soda					
Energy drinks (Red bull, Rockstar, Monster, etc.)					
<b>Healthy Eating Index</b>					
<b>Items and Scoring for Healthy Eating Index</b>					
	No	Yes, Once	Yes, Twice	Yes, 3 or more times	
Water	0	1	2	3	Dichotomized for use of logistic regression. 0-7 = Less Healthy Eating 7-14 = More Healthy Eating
Fruits	0	1	2	3	
Vegetables/Green Salad	0	1	2	3	
Sweets	1	0	0	0	
Fast Food	1	0	0	0	
Pop/Soda	1	0	0	0	
Energy Drinks	1	0	0	0	
Hot/Cold Coffee/Coffee-based Beverage	1	0	0	0	

\* Variable not included in logistic regression model

## Chapter Four: Results

### Overview

This chapter presents the findings of this research study. Sample characteristics are presented followed by results of binary logistic regression and multiple regression models.

### Characteristics of South Asian Adolescents in British Columbia

There were an estimated 10,371 male and 10,350 female Canadian-born, and 2,284 male and 1,766 female foreign-born South Asian adolescents in the weighted sample (table 4.1).

Foreign-born males were older on average than their Canadian-born counterparts ( $p < 0.01$ ).

Significantly more foreign-born students spoke a language other than English at home most of the time compared those Canadian-born ( $p < .01$ ).

Table 4.1 Characteristics of the South Asian Adolescent Sample

	Canadian-born		Foreign-born	
	Males (10,371)	Females (10,350)	Males (2,284)	Females (1,766)
N (weighted)	(10,371)	(10,350)	(2,284)	(1,766)
Mean Age (SE)	14.8 (.08)+	14.8 (.08)	15.4 (.13)	14.9 (.17)
Have lived in Canada: (%)*+				
Less than 2 years	0.0	0.0	10.9	9.8
Between 2 and 5 years	0.4	0.3	26.8	28.9
6 years or more	99.6	99.7	62.3	61.3
Speak a language other than English at home (%) *+				
Never	11.4	12.3	8.4	7.5
Sometimes	39.7	46.7	29.1	26.9
Most of the time	48.9	41.0	62.6	65.7
Engage in a cultural activities, outside of school (%)				
Never	63.1	48.7	54.3	45.2
Less than once/week	23.7	34.0	30.2	30.3
1-3 times/week	9.9	13.0	12.4	16.7
4 or more times/week	3.3	4.3	3.1	7.8
Eat an evening meal with parent/guardian present (%)				
Never	3.3	4.5	5.7	5.6
Rarely	8.7	9.8	7.2	7.8
Sometimes	16.5	13.8	13.6	7.2
Most of the time	29.8	30.8	26.1	24.2
Always	41.2	41.1	47.4	55.2
Healthy Eating Variable +				
Less Healthy Eating	37.2	42.8	26.5	36.6
More Healthy Eating	62.8	57.2	73.5	58.1

Source: 2013 British Columbia Adolescent Health Survey

+ Canadian-born males vs. foreign-born males  $p < 0.01$

\* Canadian-born females vs. foreign-born females  $p < 0.01$

### **Immigrant Status and Individual Food Choices**

Canadian-born and foreign-born adolescents demonstrate some differences in individual food and drink choice. Table 4.2 shows food and drink choices reported by South Asian adolescent females. Canadian-born females reported eating traditional foods less frequently ( $p < .00$ ) but drinking more water ( $p < .01$ ) than their foreign-born counterparts. Canadian-born and foreign-born females further demonstrated differences in the intake of fruit ( $p < .05$ ) and coffee/coffee-based beverages ( $p < .05$ ). Statistically significant differences were observed for both males and females in the intake of vegetables/green salad ( $p < .05$ ), traditional foods ( $p < .01$ ) and water ( $p < .05$ ). Table 4.3 shows food and drink choices reported by South Asian adolescent males. Similar patterns were reported by Canadian-born males with differences in the intake of water ( $p < 0.05$ ), traditional foods ( $p < 0.01$ ), and vegetables/green salad compared to their foreign-born counterparts.

Table 4.2 Immigrant Status and Yesterday Food/Drink Choice: South Asian Adolescent Females

	Canadian-Born % (95% CI)	Foreign-born % (95% CI)	Adj F	df1/df2	p-value
Ate fruit			.166	2.960/1281.9	.917
None	16.2 (13.8, 18.9)	17.5 (12.7, 23.6)			
Once	36.6 (33.4, 40.0)	34.3 (27.3, 42.0)			
Twice	29.8 (26.9, 32.9)	31.6 (24.6, 39.5)			
Three times or more	17.3 (14.9, 20.0)	16.7 (11.6, 23.4)			
Ate vegetables/green salad			2.670	2.953/1278.8	.047
None	18.6 (13.2, 25.5)	20.9 (18.4, 23.7)			
Once	33.3 (26.3, 41.1)	42.4 (39.2, 45.6)			
Twice	32.4 (25.8, 39.8)	25.7 (22.9, 28.8)			
Three times or more	15.7 (10.7, 22.5)	11.0 (9.2, 13.1)			
Ate sweets			1.167	2.966/1284.2	.321
None	17.3 (14.9, 19.9)	20.0 (14.4, 26.9)			
Once	45.4 (42.1, 48.8)	50.1 (42.7, 57.6)			
Twice	24.8 (22.0, 27.8)	20.6 (15.1, 27.5)			
Three times or more	12.5 (10.4, 15.0)	9.3 (5.9, 14.3)			
Ate fast food			1.119	2.956/1279.8	.340
None	49.7 (46.3, 53.2)	55.5 (47.7, 63.0)			
Once	37.9 (38.4, 41.1)	30.9 (24.5, 38.2)			
Twice	8.7 (6.9, 11.0)	10.5 (6.8, 15.9)			
Three times or more	3.6 (2.6, 5.1)	3.1 (1.3, 7.2)			
Ate traditional foods			22.834	2.959/1281.4	.000
None	34.1 (31.1, 37.3)	13.2 (8.8, 19.3)			
Once	40.3 (37.2, 43.5)	32.3 (25.3, 40.3)			
Twice	16.9 (14.6, 19.6)	28.2 (22.4, 34.9)			
Three times or more	8.6 (6.9, 10.8)	26.3 (19.7, 34.0)			
Drank water			3.755	2.922/1265.3	.011
None	6.1 (4.8, 7.9)	3.0 (1.3, 7.0)			
Once	14.6 (12.5, 17.0)	12.1 (8.0, 17.9)			
Twice	20.0 (17.5, 22.9)	12.8 (8.4, 19.2)			
Three times or more	59.2 (64.8, 78.7)	72.1 (55.9, 62.4)			
Drank pop/soda			2.043	2.979/1290.0	.107
None	60.0 (56.6, 63.2)	68.4 (60.3, 75.6)			
Once	29.8 (27.0, 32.7)	23.8 (17.3, 31.8)			
Twice	7.7 (6.2, 9.4)	4.1 (2.0, 8.3)			
Three times or more	2.6 (1.8, 3.8)	3.6 (1.6, 7.9)			
Drank energy drink			1.876	2.959/1281.3	.133
None	95.2 (93.4, 96.6)	96.6 (92.6, 98.4)			
Once	3.6 (2.4, 5.4)	1.9 (0.7, 5.3)			
Twice	0.7 (0.3, 1.4)	0.0 (0.0, 0.0)			
Three times or more	0.4 (0.2, 1.1)	1.5 (0.5, 5.1)			
Drank hot/cold coffee or coffee based drink			1.144	2.947/1276.0	.330
None	63.1 (60.2, 65.9)	64.3 (57.0, 71.0)			
Once	26.8 (24.2, 29.6)	21.7 (16.3, 28.5)			
Twice	7.9 (6.4, 9.7)	10.7 (6.7, 16.5)			
Three times or more	3.3 (1.3, 7.9)	3.3 (1.3, 7.9)			

Table 4.3 Immigrant Status and Yesterday Food/Drink Choice: South Asian Adolescent Males

	Canadian-Born % (95% CI)	Foreign-born % (95% CI)	Adj F	df1/df2	p-value
Ate fruit			3.510	2.867/1246.9	.016
None	12.6 (10.6, 14.9)	19.4 (14.5, 25.6)			
Once	36.1 (32.9, 39.4)	29.8 (23.7, 36.7)			
Twice	30.0 (27.0, 33.1)	25.0 (19.4, 31.7)			
Three times or more	21.3 (18.7, 24.2)	25.8 (20.2, 32.3)			
Ate vegetables or green salad			14.378	2.950/1283.2	.004
None	20.6 (18.1, 23.4)	20.3 (15.0, 27.0)			
Once	40.6 (37.4, 43.9)	36.9 (30.4, 43.9)			
Twice	26.7 (23.8, 29.7)	21.2 (16.2, 27.2)			
Three times or more	12.1 (9.9, 14.6)	21.6 (16.7, 27.4)			
Ate sweets			.496	2.893/1258.6	.678
None	21.2 (18.5, 24.1)	22.3 (16.5, 29.4)			
Once	46.5 (43.4, 49.5)	44.0 (36.8, 51.4)			
Twice	22.0 (19.5, 24.6)	20.6 (15.7, 26.5)			
Three times or more	10.4 (8.4, 12.7)	13.1 (9.0, 18.7)			
Ate fast food			2.538	1256.9/2.890	.057
None	44.6 (41.4, 47.9)	50.9 (43.5, 58.2)			
Once	40.1 (37.0, 43.3)	31.8 (25.6, 38.8)			
Twice	11.2 (9.2, 13.5)	9.6 (6.1, 14.8)			
Three times or more	4.1 (2.0, 5.7)	7.7 (4.1, 14.0)			
Ate traditional foods			22.483	2.960/1287.6	.000
None	28.9 (26.0, 32.0)	13.4 (9.3, 18.7)			
Once	39.0 (36.0, 42.1)	30.1 (24.3, 36.5)			
Twice	21.5 (18.9, 24.4)	26.7 (21.4, 32.9)			
Three times or more	10.6 (8.7, 12.8)	29.9 (24.1, 36.4)			
Drank water			13.182	2.835/1233.2	.000
None	3.1 (2.1, 4.6)	0.9 (0.3, 2.8)			
Once	13.7 (11.6, 16.1)	3.2 (1.5, 6.4)			
Twice	18.1 (15.7, 20.7)	10.1 (6.3, 15.6)			
Three times or more	65.1 (61.9, 68.1)	85.9 (80.1, 90.2)			
Drank pop/soda			1.579	2.882/1253.7	.194
None	51.0 (47.9, 54.1)	52.7 (45.4, 59.9)			
Once	35.8 (32.9, 38.8)	29.5 (23.8, 35.8)			
Twice	10.1 (8.3, 12.2)	12.9 (8.6, 18.9)			
Three times or more	3.1 (2.1, 4.5)	5.0 (2.7, 9.2)			
Drank energy drink			.349	1.947/846.8	.700
None	93.0 (91, 94.5)	92.1 (87.1, 95.3)			
Once	4.6 (3.4, 6.3)	6.0 (3.7, 9.8)			
Twice	1.5 (0.9, 2.5)	0.9 (0.2, 4.2)			
Three times or more	0.9 (0.5, 1.9)	1.0 (0.2, 4.3)			
Drank hot/cold coffee or coffee based drink			2.754	2.948/1282.2	.042
None	74.7 (71.4, 77.6)	65.5 (58.3, 72.1)			
Once	17.7 (15.2, 20.5)	22.5 (17.1, 28.9)			
Twice	5.8 (4.4, 7.5)	8.5 (5.4, 13.2)			
Three times or more	1.9 (1.2, 3.0)	3.5 (1.7, 7.4)			

Tables 4.4 and 4.5 show the influence of different factors on healthy eating for South Asian adolescents. For both South Asian male and female adolescents, consistent parental presence at evening meals and engagement in cultural activities weekly (outside of school) demonstrated a significant influence on eating healthy ( $p < .05$ ) compared to inconsistent parental presence at evening meals and never engaging in cultural activities (outside of school).

Table 4.4 Unadjusted Predictors of Healthy Eating Among South Asian Female Adolescents

	Odds Ratio Exp (B)	95% CI		P
		Lower	Upper	
Canadian-born	.770	.547	1.083	.133
Age	.950	.879	1.026	.189
Parent Presence at Meal	1.715	1.298	2.266	.000*
Speak a language other than English at home				
Sometimes	.680	.462	1.002	.051
Most of the time	.693	.462	1.041	.077
Engage in cultural activities outside of school				
< once/week	1.224	.916	1.637	.172
>/= once/week	1.964	1.238	2.319	.001*
Lived in Canada				
2-5 Years	.594	.184	1.921	.384
6 Years or more	.631	.224	1.775	.382

Speak a language other than English at home – analyzed in reference to “Never”

Engage in cultural activities outside of school – analyzed in reference to “Never”

Parental Meal – Analyzed in reference to inconsistent parental presence

Table 4.5 Unadjusted Predictors of Healthy Eating Among South Asian Male Adolescents

	Odds Ratio Exp (B)	95% CI		P
		Lower	Upper	
Canadian-born	.610	.434	.857	.004*
Age	.937	.878	1.000	.05
Parent Presence at Meal	1.352	1.020	1.793	.036*
Speak a language other than English at home				
Sometimes	.640	.399	1.027	.064
Most of the time	.687	.439	1.074	.099
Engage in cultural activities outside of school				
< once/week	1.176	.882	1.568	.269
>/= once/week	1.846	1.186	2.874	.007*
Lived in Canada				
2-5 Years	1.323	.519	3.371	.556
6 Years or more	.839	.372	1.890	.671

Engage in cultural activities outside of school – analyzed in reference to “Never”

Parental Meal – Analyzed in reference to inconsistent parental presence

Speak a language other than English at home – analyzed in reference to “Never”

Even after controlling for immigrant status and parental presence at evening meals, both South Asian adolescent males and females who engage in cultural activities (outside of school) weekly are 1.5 times more likely to eat healthy than those who never engage in cultural activities (outside of school) ( $p < .05$ ) (table 4.6 & 4.7). Moreover, for South Asian adolescent females, parental presence at evening meals continued to demonstrate significance. South Asian adolescent females ( $p < .01$ ) with consistent parental presence at evening meals are 1.6 times more likely to eat healthy than those with inconsistent parental presence at evening meals.

Immigrant status was influential for South Asian adolescent males. Canadian-born South Asian adolescent males ( $p < .01$ ) were half as likely to eat healthy than their foreign-born peers when controlling for parental presence at evening meals and engagement in cultural activities.

Table 4.6 +Adjusted Odds Ratios for Healthy Eating Among South Asian Adolescent Females

	Odds Ratio	95% CI		P-value
		Lower	Upper	
*Canadian-born	.846	.599	1.248	.435
**Less than weekly engagement in cultural activities (outside of school)	1.186	.879	1.600	.263
**Weekly engagement in cultural activities (outside of school)	1.596	1.153	2.209	.005
***Consistent Parental Presence at Evening Meals	1.615	1.212	2.153	.001

Note. +Logistic Regression controlled for immigrant status, engagement in cultural activities and parental presence at evening meals

\*Canadian-born analyzed in reference to foreign-born

\*\*Cultural activities analyzed in reference to "Never"

\*\*\*Consistent parental presence at evening meals analyzed in reference to inconsistent parental presence



Table 4.7 +Adjusted Odds Ratios for Healthy Eating Among South Asian Adolescent Males

	Odds Ratio	95% CI		P-value
		Lower	Upper	
*Canadian-born	.597	.421	.847	.004
**Less than weekly engagement in cultural activities (outside of school)	1.100	.821	1.475	.522
**Weekly engagement in cultural activities (outside of school)	1.768	1.129	2.769	.013
***Consistent Parental Presence at Evening Meals	1.331	.995	1.781	.054

Note. +Logistic Regression controlled for immigrant status, engagement in cultural activities and parental presence at evening meals

\*Canadian-born analyzed in reference to foreign-born

\*\*Cultural activities analyzed in reference to “Never”

\*\*\*Consistent parental presence at evening meals analyzed in reference to inconsistent

### Community Advisory Group Discussion

Community advisory group discussion brought forth some key ideas associated with Western lifestyle that impede healthier eating and family meal times for families of Canadian-born adolescents. Given the high pace and economic demands associated with the Canadian lifestyle, parents reported pressure and stress to provide healthy meals while balancing work and extracurricular activities. Parents and youth mentioned active involvement in sports, which have practices that tend to go later into the evening, particularly as adolescents age, making it difficult to prepare and plan family meals. These pressures have resulted in relying more on convenience foods, for which, adolescents contested that healthier foods often are associated with increased cost, for example, purchasing a salad is more expensive than a hamburger at McDonalds Restaurant. Accessibility to healthier options was a concern brought forth by parents and adolescents, who reported that when adolescents are needing to purchase a meal at school, most of the healthier options have typically been already purchased by teachers. Accessibility of affordable healthy convenience foods within all environments, including the school setting, was

a reoccurring need. Although, families of foreign-born adolescents may face similar barriers and perhaps further financial constraints to obtaining healthy foods, it was argued that being new to the country may decrease the pressures associated with the Canadian lifestyle, thereby decreasing time constraints caused by having both working parents and engagement in extracurricular activities.

The community advisory group discussion emphasized the power of awareness. It was suggested that providing the results to adolescents and parents may provide tangible evidence to facilitate change.

## **Chapter Five: Discussion**

### **Study of South Asian Adolescent Dietary Behaviours in Canada**

This study is the first to address the influence of family meals on dietary behaviours of South Asian adolescents in the context of South Asian culture and families. This study adds to the growing body of evidence supporting family meal times. Dietary behaviours of South Asians have been previously researched in Canada for young adults (Brenner & Kreiger, 2011) and through qualitative means to identify family norms and values (Chapman et al., 2011).

In general, we found some trends in the dietary behaviours of South Asian Canadian adolescents that warrant further investigation. Contrary to Canada's Food Guide recommendations, 20% of South Asian adolescents report having eaten no vegetables in the previous day. In addition, 80% of South Asian adolescents report having eaten sweets and 50% having eaten fast food in the previous day. These findings support existing literature on the adolescent population in general, wherein adolescents frequently consume low nutrient density foods such as cakes, salty snacks and carbonated beverages (Philips, Starkey & Gray-Donald, 2004), showing that in some ways, South Asian adolescents in Canada demonstrate similar dietary behaviours to their non-South Asian peers.

### **The Influence of Cultural Activity**

Weekly engagement in cultural activities resulted in significantly greater odds of healthier eating for both South Asian males and females. In the current study, cultural activities was used as a proxy measure for cultural connectedness, and encompassed a variety of different activities (dance, holidays, etc.).

### **The Protective Impact of Cultural Connectedness**

Literature for adolescents demonstrates that a sense of belonging and connectedness

serves as a protective factor for health and well-being (Resnick, Harris & Blum, 1993). A study looking at a diverse sample of adolescents using the 2008 AHS found that cultural connectedness serves as a protective factor against risk behaviours, promoting positive outcomes (Poon, Homma, Saewyc & Smith, 2010). Although, the aforementioned study did not look at eating behaviours, the current study suggests that the protective impact of cultural connectedness may extend into the dietary choices for South Asian adolescents. Given that culture is deeply embedded in the social context of South Asian families, this relationship may demonstrate an aspect of family connectedness as a protective factor, although additional research is required to fully test this hypothesis.

### **The Intersection Between Sex and Gender Roles**

Country of birth was an important variable, particularly for males, as Canadian-born males tended to have less healthy food choices than their foreign-born peers. Although this relationship was not seen in females, the value of family meal times for females over males demonstrates that, in addition to country of birth, key sex differences exist with regards to factors which influence dietary choices in this population. These sex differences may have links to family gender norms within the South Asian culture.

### **Parental Presence at Evening Meals and South Asian Family Gender Norms**

The results of the current study suggest that healthier eating and parental presence at evening meals are important for both South Asian Canadian males and females. It is particularly evident in females after adjusting for engagement in cultural activities and immigrant status. These findings confirm existing literature, which identifies variation in the effect of family meals on the food choices and weight status among ethnic males (Rollins, Belue, and Francis, 2010), and further a lack of association between family meals and weight status for adolescent males

(Fulkerson, Neumark-Sztainer, Hannan & Story, 2008). The greater significance of family meals for South Asian females than males may not be unique to those of South Asian origin, and could in fact reflect sex differences.

For adolescent girls, it has been observed that being of Asian family origin serves as a protective factor against obesity (Olaughlin, Paradis, Renaud, Meshefedjian & Gray-Donald, 1998), which emphasizes the potential influence of family gender norms. In South Asian culture, parents are often hyper protective of their daughters which reduces social activities outside of school hours (Ghuman, 2000) and results in girls spending more time at home, thereby increasing opportunities for healthier food choices and parental presence at meal times.

#### The Complex Interplay Between Country of Birth and Sex

South Asian males who are Canadian-born are less likely to eat healthier than those foreign-born after adjusting for parental presence at evening meals and engagement in cultural activities. This finding supports literature regarding differences in food choices between South Asian children residing in their home country and those in a Western country, suggesting that some aspects of Western life may have a negative influence on dietary behaviours for South Asian Canadian adolescent males. Independent of their ethnic origin, males who are born and raised in Canada are at a higher risk of being obese than those who are foreign-born (Olaughlin, et al. 1998). The relationship between immigrant status and health behaviours may not be exclusive to those of South Asian descent, but rather indicative of a sex difference in Canadian-born versus foreign-born adolescents in general.

#### *The Canadian Lifestyle*

Involvement in extracurricular activities is common for many adolescents growing up in Canada, which was a theme brought forth in our advisory group discussion. It was suggested that

adolescent's extracurricular activities tend to be later in the evening as they age, which creates challenges round family meals. Parents report a struggle allocating time for preparation of healthy meals due to extracurricular activities schedules. It is suggested that foreign-born South Asian adolescent males, depending on their level of acculturation, may be less engaged in extra curricular activities, thereby decreasing this barrier to healthier eating. Furthermore, as South Asian family gender roles are less restrictive for males (Ghuman, 2000), Canadian-born South Asian males may have increased exposure to extra curricular activities than females. Existing literature suggests that too many extracurricular activities and working student jobs creates a barrier to healthier eating namely to family mealtimes (Rovner et al., 2010). This finding implies the need for and difficulty in obtaining a balance for parents between healthy eating and physical activity, both important aspects of obesity prevention.

### **Strengths and Limitations**

There were several limitations to the current study. Although the 2013 AHS is a comprehensive questionnaire, the use of a 24 hour food diary rather than, or in conjunction with, survey questionnaires would have provided a more thorough picture of dietary intake. Survey classification of foods such as pizza and hotdogs as less healthy does not account for home made healthier versions of these foods. Given the value assigned to dairy products in South Asian culture, the lack of dairy consumption on the 24 hour food and drink recall question limited what we can reasonably say about the dairy preferences and intake for South Asian adolescents. We constructed the Healthy Eating Index, which was not previously validated. Given that our population of interest included those foreign-born, the administration of the survey in English may have also influenced responses of foreign-born youth. All of the aforementioned limitations can be addressed with future studies, and in particular mixed methods, longitudinal studies have

great potential for advancing understandings in this field.

Despite these limitations, a key strength of this study is the use of data from a population-based survey, The 2013 AHS, which utilizes sampling methods that provide a sample reflective of the adolescent population in British Columbia, and provides generalizability of the findings. The use of a community advisory group provided important additional insights to contextualize the study findings.

### **Implications to Practice**

Implications of this study are relevant to an array of stakeholders. Our community advisory group brought forth the importance of awareness in the adolescent population. Information pertaining to the current state of dietary choices for South Asian adolescents should be shared and discussed with adolescents through the use of school and community information sessions. As public health nursing involvement with adolescents is sparse, in collaboration with individual schools, public health nurses can ensure the delivery of this information by arranging and facilitating information sessions.

Public health nurses should also share this information with school administration. Grass roots initiatives, such as increasing the number of healthy options offered at school cafeterias, can easily reduce the barrier identified by the community advisory group regarding healthier meal options having been already purchased by adults within the school environment.

The protective influence of parental presence at evening meals and engagement in cultural activities should be affirmed as health promoting and shared with adolescents and parents. Current public health nursing practice entails promoting family meals in parents of children aged 0-5, yet more emphasis needs to be put on carrying this message beyond childhood and into adolescence. Public health nurses can be incorporate this messaging into their current

nursing practice by educating parents of children 0-5 years old of the importance of family meals into adolescence. In collaboration with schools, public health nurses can advocate for health promotion messaging around family meals and cultural activities in school newsletters and at parent advisory meetings.

Media is a powerful tool for spreading information. Information obtained from this study around the current state of South Asian adolescents diet and the protective impact of family meal times and engagement in cultural activities can be shared with the population at large through media. Collaboration with a South Asian radio talk show aired on a radio station emphasizing community diversity would provide a means to relay information and generate discussion amongst the South Asian population.

There is a need for greater policy support. Public health policy and supportive environments within the school and community settings are required to allow for family meal times and increase accessibility to healthy food choices when time pressures prevail. Nurses have a role in lobbying for healthy public policy. Nurses can lobby for changes to extracurricular time schedules to allow for adolescents to be home during family meal hours and for an increase in number of recreational facilities to support scheduling. Nurses can also lobby for policy to support increased access to healthier convenience foods within the school setting for students and in the community for times when home meals are not feasible for parents.

The current study highlights the variability that exists within a subset of a cultural group. Clinicians working with this group should be aware of this variation and provide competent care based on individual needs, accounting for factors such as country of birth and sex. Furthermore, community programs targeting South Asian Canadian adolescents should be mindful of the diverse needs within that subgroup.



### **Directions for Future Health Research**

More research is required to understand the complex mechanisms in Western society that contribute to the increased risk for less healthy eating for Canadian-born South Asian adolescent males. Although current research identifies family values and norms for South Asian families in Canada, the variability found within this population warrants further study of South Asian family lifestyle for those with Canadian-born and foreign-born children.

The protective impact of cultural connectedness, namely engagement in cultural activities should be further explored. Given that cultural activities includes an array of activities in the current survey, the specific aspects of cultural activity that create a protective effect for South Asian adolescents in Canada warrants further investigation.

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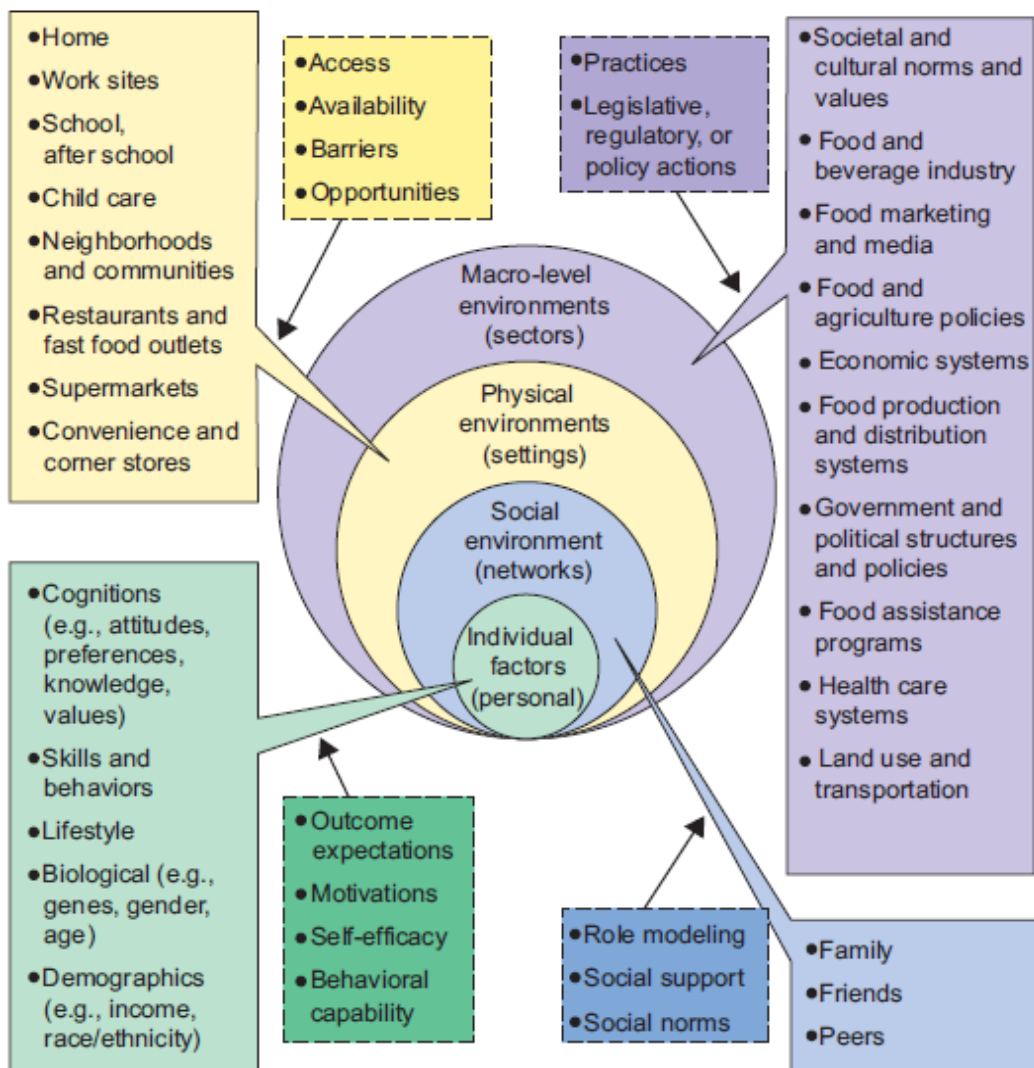
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## Appendix A

## Social Ecological Framework



Derived from: Story, M., Kaphingst, K., Robinson-O'Brien, R., & Glanz, K. (2008). Creating healthy food and eating environments: policy and environmental approaches. *Annual Review of Public Health, 29*, 253-272.