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Emily Altman April 9, 2013

Childhood Nutrition in Chile:

An Assessment of a National School Food Program

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Abstract

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The purpose of this thesis is to explore school food and its impact on overall health in Chile. Specifically, the goals of the present research are to identify the policy associated with Chile's national school food program, *El Programa de Alimentación Escolar*, understand how the program operates on a local level, and explore how government officials, private food providers, and schoolchildren perceive and function within the program. Ultimately, this thesis aims to identify possible enhancements to the program.

This thesis will first present an overview of Chile's historical and economic context, as well as the recent nutrition transition and the country's changing food landscape. Following will be a discussion of the relationship between diet and health and the importance of schools as sites for nutrition interventions. Once this foundation is established, the thesis will discuss Chile's school food program and other successful nutrition interventions in schools around the world.

Using ethnographic observations of school lunches, a survey with a group of schoolchildren, and interviews with a government official, private food vendors, and experts in the field of childhood nutrition and school food, this research illustrates the need for increased attention to school food as a tool to teach and promote healthy lifestyles among children. Although most schoolchildren consumed breakfast and lunch in school everyday, the food that schools served them lacked important food components, namely fruits and vegetables. In addition, kiosks located in schools, which offered mainly processed snacks at low prices, were popular among students. Schoolchildren generally understood what foods to eat in order to remain healthy and also reported a preference for fruit. However, they rarely enacted this knowledge and subsequently consumed many unhealthy foods in the school environment.

Based on the findings of the present research, this thesis presents a series of simple, evidence-based recommendations detailing possible improvements for Chile's school food program. These recommendations target the macro, policy-level, as well as the micro-level of the program and include increasing government involvement and monitoring of the program, serving more fruits and vegetables, decreasing processed foods offered, and incorporating nutrition education into schools.

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LIST OF ACRONYMS

BMI	Body Mass Index
CDC	Centers for Disease Control and Prevention
CIA	Central Intelligence Agency
GDP	Gross Domestic Product
INTA	*Instituto de Nutrición y Tecnología de los Alimentos* (Chile's Institute of Nutrition and Food Technology)
JUNAEB	*Junta Nacional de Auxilio Escolar y Becas* (Chile's National Board of Student Aid and Scholarships)
NAFTA	North American Free Trade Agreement
NSLP	United States' National School Lunch Program
PAE	*Programa de Alimentación Escolar* (Chile's school food program)
STOPP	Stockholm Obesity Prevention Programme
WHO	World Health Organization

INTRODUCTION

Food is one of the most essential aspects of human life. People not only rely on it for survival, but food also plays an extensive role in human cultural experiences. Anthropologists first began to study food and consumption in the 19th century. Since then, understanding the role of food in culture has become more prevalent in the field (Mintz and Du Bois 2002). According to Mintz and Du Bois (2002), studying food and consumption in an anthropological framework not only provides insight into food's importance to human life, but food also provides us with a unique context within which to understand a culture's political-economic circumstance, values, and collective memory. Rutz and Orlove (1989) point out that although specific patterns of consumption may vary among groups, certain practices (i.e., frequent eating, meals as social interactions, eating rituals, ceremonial feats, and the like) span beyond culture or group. Thus studying a culture's food systems within a broad framework can facilitate a deeper understanding of its social, economic, and political context. The present study examines aspects of culture and food in Chile, primarily in respect to children's eating practices, beliefs and preferences in connection with school food programs.

A person's taste for food functions "as a sort of social orientation, a 'sense of one's place'" (Bourdieu 1984, p. 466) and, by its nature, consumption is a social act that "establish[es], maintain[s], and change[s] social relations" (Rutz and Orlove 1989, p. 5). People's food preferences are central to their sense of self, and thus choices in food provide insight into a person's identity (Mintz 1985). At the same time Bourdieu (1984) argues that people's tastes in food, notions of the body, social class, and culture are inherently intertwined. Thus, eating habits must be considered in the context of an individual's status within society, and understanding

consumption patterns within a population can contribute to a deeper understanding of that population's historical, social, and cultural context.

In industrialized societies, as undernutrition becomes less prevalent, rates of diet-related chronic diseases increase (Albala et al. 2001; Tomer 2010). Much of the change in the overall health status in the developed world is attributable to a change in the food system, from traditional to modern. Beardsworth and Keil (1997) outline five major characteristics of modern food systems: a) food production is larger scale and more industrialized and specialized; b) food is widely distributed through the commercial market, and with enough economic capital, food is generally accessible; c) there is an increased opportunity for choice when determining what to consume; d) although food shortages may still occur in specific regions, they are less common globally; and e) it is debatable as to whether the modern food system is sustainable.

Transformations in food consumption (i.e., increasing trends of fast and processed foods both in and outside of the home) have made consumption an increasingly individual behavior (Mintz 1985). Along with the modernization of the food system has come an increased sense that time is limited. In terms of consumption, there is an increasing trend toward "maximum enjoyment in minimum time" (Mintz 1985, p. 203). It is clear that changes in the food system, from traditional to modern, have broad implications on individual and population consumption patterns. Indeed, nutritional beliefs and practices, policy-level decisions, people's food and consumption patterns, and culture are intimately linked.

Since food preferences that are established during childhood are influenced by a number of contexts, including families and schools, they reflect both societal and cultural values (Mintz 1985). Furthermore, because food habits are difficult to change once they are established, targeting healthy behavior at a young age is important (Dangour & Uauy 2007). In that light,

using schools as a site for studying eating habits, food preferences, and concepts of health and nutrition can provide insight into how various food and health-related habits develop and progress through the life course.

Attempts to transform eating habits to promote healthy outcomes are occurring worldwide, especially with a changing worldwide health trend, from infectious to chronic diseases. Chile, a country characterized by a recent nutrition transition, is currently experiencing high rates of overweight and obesity, especially among low socioeconomic families (Albala et al. 2001; Albala et al. 2002). This country provides a good case study for understanding various factors associated with people's food preferences and concepts of health and nutrition. Thus, taking into account the benefits of studying food within an anthropological framework, the purpose of this research is to explore changing patterns of consumption in Chile, and the implications of those changes for overall health among Chilean children. Specifically, the present research examines aspects of a school food program that has been implemented in Chile for nearly five decades. The program, *El Programa de Alimentación Escolar* (PAE), was developed to reduce school dropout rates, decrease absences, and ensure proper nutrition by reducing rates of undernutrition among schoolchildren. PAE was effective in targeting these goals, but today the country struggles with a changing nutritional status of its schoolchildren; namely, overweight and obesity. Understanding the current realities of Chile's school food program and children's food preferences and concepts of health and nutrition requires an in-depth understanding of how a country's political, economic, social, and cultural contexts interact to influence eating behavior and population health.

The specific goals of the present research are to identify the policy associated with Chile's national school food program, understand how the program actually operates in a specific

location, and explore how government officials, private food providers, and schoolchildren perceive and function within the program. A supplemental goal of the research is to identify possible enhancements of Chile's nutritional program, based on the findings and on experiences of similar programs in other countries and regions of the world. To place the Chilean program in a broader context, information is gathered from researchers and other experts in the field who are familiar with childhood nutrition and other school food programs worldwide. This broad-level information aids in understanding both the current regulations of PAE and how school food and nutrition education play a role in promoting health. Literature that describes other worldwide programs is also examined. To the extent possible, this study will gain both descriptive and evaluative information about such programs. The research undertakes school-based observations of the implementation of school lunches, and survey methods are used with Chilean schoolchildren in order to understand their food preferences, nutritional practices, and concepts of health and nutrition. Based on this diversity of data, this thesis will attempt to arrive at preliminary conclusions about the implementation of Chile's school food program, and will offer possible recommendations for increasing the effectiveness of the program as well as suggest lines of inquiry about the relationship between culture, food, and health.

ORGANIZATION OF THE THESIS

The next section of the thesis describes Chile's historical and economic context, the country's nutrition transition, its changing food landscape, and the relationship between diet and health. There then follows a discussion of the importance of schools as sites for nutrition interventions, as well as a description of Chile's school food program, *El Programa de Alimentación Escolar* and other school food programs and interventions around the world. Next is a summary of the research methods used in the present study, which aids in understanding

aspects of the Chilean program as well as children's' eating habits, food preferences and knowledge of nutrition. The subsequent section summarizes the findings of the research, followed by a discussion and analysis of the findings, implications for national policy, and future directions of research. The report concludes with a series of recommendations describing areas of possible improvement for Chile's school food program.

BACKGROUND

CHILE'S HISTORICAL AND ECONOMIC CONTEXT

The Republic of Chile is situated along the western side of South America, and is the longest north-south country in the world. The terrain is made up of coastline to the west and the Andes Mountains to the east, with fertile land running through the center of the country. The driest desert in the world, the Atacama Desert, lies in the northern area of Chile. The central region has a Mediterranean-like climate, and the southern regions are made up of lakes, volcanoes and glaciers. Chile's population of 17 million is mostly made up of whites or white-Amerindians, most of whom are Roman Catholic. Roughly five percent of the population is part of an indigenous group; the largest of these groups is the Mapuche, who reside mainly in the southern regions of the country (CIA World Factbook 2013).

Before the Spanish arrived to present day Chile in the 16th century, the Incan Empire controlled the northern regions of the country, and the Mapuche indigenous population lived in the southern regions. Chile achieved independence from Spain in 1818 and conquered the Mapuche by the 1880's. In 1973, army general and dictator Augusto Pinochet led a military coup and maintained political control until a freely elected president took over in 1990. During his reign, Pinochet suppressed political opposition to maintain power and, despite his wide use of violence, he established comprehensive economic policies that promoted economic growth and a reduction in poverty rates (CIA World Factbook 2013). In the 1990's, after Pinochet lost power, Chile's new democratic government sought regional economic integration. Namely, the country attempted to join the North American Free Trade Agreement (NAFTA). By doing so, Chile opened up its trade practices to the United States and other countries in the region, thus allowing

for an influx of foreign goods into the market – including food. Although Chile failed to join NAFTA, the decade proved to be influential over the long term (Weyland 1999).

Chile is now one of the region's most stable and democratic nations, and high levels of foreign trade drive Chile's market-oriented economy. Exports contribute to one third of the country's GDP, which was estimated to be roughly $319 billion in 2012. Copper makes up the majority of the county's revenue, though agriculture is an integral part of the labor force. Despite a stable economy and a democratic government, Chile struggles with severe income inequality and unequal access to education. Nonetheless, roughly 96% of the population is literate (CIA World Factbook 2013).

Chile's history of political unrest, combined with high levels of socioeconomic disparity, has caused the government to make numerous attempts to boost the economy and improve overall quality of life for the population. These policies have been effective in reducing rates of poverty, but they have failed to decrease high levels of income inequality. Over time, Chile has navigated through periods of economic, social, and political growth. At the same time, it has struggled to reduce the burdens of socioeconomic and education inequalities.

The inequalities that burden Chile as a whole are particularly true in Arica, a port city of roughly 175,000 people located in the northernmost region of Chile (Diagnóstico Situación de Salud 2008). As a result of its close proximity to both Peru and Bolivia, Arica is considered to be a cultural melting pot, with high rates of indigenous Aymara people living in and around the city. Arica is also characterized by some of the highest levels of poverty and homelessness in the country, and the city is known to have higher-than-average rates of hepatitis, tuberculosis, HIV/AIDS, and overweight and obesity (Diagnóstico Situación de Salud 2008). The main focus

of the present research, Arica, serves as an interesting and insightful site to explore food and nutrition in Chile.

THE NUTRITION TRANSITION

Chile, a country characterized by its diversity in ethnic groups and landscape, also has high rates of obesity, a diet-related health problem of epidemic proportions worldwide (WHO 2011). Similar to other countries in South America, Chile underwent epidemiological and demographic transitions over the last four decades. The demographic transition refers to increased aging and decreased birth rate of a population; the epidemiological transition involves increased risk of chronic disease, rapid urbanization, declining fertility, rapid economic growth, improvements in education, and lower infectious disease rates.

The socio-economic and population repercussions of these epidemiological and demographic transitions in Chile have led to a nutrition transition, during which there was a reversal of malnutrition. Historically, Chile struggled with high levels of undernutrition. The nutrition transition, which was caused by changing patterns of consumption, physical activity, and the transformations associated with the epidemiological and demographic transition, resulted in decreased rates of undernutrition and high levels of overweight and obesity. These changing health patterns contribute to other associated health problems, including diabetes, hypertension, and cardiovascular disease (Albala et al. 2001). These same transitions also occurred globally. That is, in the past, nutrition interventions focused on preventing infectious diseases and undernutrition, but with changing health issues, the focus moved to preventing diet-related chronic diseases. Today, the World Health Organization (WHO) and other international organizations have placed increased emphasis on combating obesity and chronic health problems worldwide (Dangour & Uauy 2007).

Chile's nutrition transition progressed at an incredibly rapid speed compared to other countries in the region[1] (Albala et al. 2001). Thus, the country has entered into a unique nutritional status characterized by "malnutrition from excess" (Hernández 2010); a state in which high caloric intake is coupled with insufficient nutrients. Excessive consumption of saturated fats, sugars, salt, and energy-dense foods has increased in recent years (Albala 2002; Santos 2011). In fact, Chile's overall food availability transformed such that the total number of available calories for consumption per person in Chile is higher than ever before (Albala et al. 2002). The typical Chilean diet is no longer comprised mostly of traditional staples of corn and wheat (Sciolla 2010), but includes more energy-dense foods high in saturated fats and sugars. In addition, people began to live more sedentary lifestyles (Albala et al. 2002). Research shows that poor diets and sedentary lifestyles associated with a Western diet[2] are linked to obesity and increased risk of other related health problems (Tomer 2010). Similar to other industrialized nations, obesity is currently the leading nutritional problem in Chile (Aguirre et al. 2010).

The nutrition transition and all its components have resulted in poor health outcomes associated with diet-related chronic diseases in Chile (i.e., obesity, diabetes, hypertension, and cardiovascular disease) (Albala et al. 2002). In Chile as in other countries worldwide, these health problems are especially true of low socioeconomic status families (Albala et al. 2002). Furthermore, having a recent history of undernutrition plays into the current cultural aspects of food consumption and health. Namely, some people view obesity as a sign that the fight against

[1] Although it is unclear why Chile's nutrition transition progressed so rapidly, the transition undoubtedly impacted the country's nutritional state. In addition, at the same time as the country underwent a nutrition transition, the agricultural sector transformed from being characterized by small-scale farmers to being dominated by bigger agribusinesses. Since undergoing neoliberal reforms in the 1970's, fewer farmers produce for local markets and instead, many of the country's large farms focus on exporting fruit (Murray 2007).

[2] The Western diet is increasingly prevalent in industrialized countries and is characterized by energy-dense, processed foods high in fat, sugar, and refined grains. Consumption of the Western diet is associated with high rates of diet-related chronic diseases, such as obesity, type 2 diabetes, cardiovascular disease, and certain types of cancers. (Pollan 2009)

undernourishment was successful and many remain convinced that that they should eat as much as possible (Uauy & Kain 2002). This may be especially true since Chile so rapidly transformed from undernutrition to overweight and obesity.

The main challenge that Chile and other countries worldwide face is that individual and systemic behavior change is necessary to combat diet related chronic diseases. It is especially important to address this problem in children so that healthy habits are instilled at an early age (Dangour & Uauy 2007). However, the media and food industries actively promote sedentary lifestyles and consumption of energy-dense fast food and sugar-sweetened beverages (Albala et al. 2002). Recognizing the attraction of the Western diet is important in understanding the overall nutritional and consumption profile of a population. The appeal of these unhealthy fast foods is rooted in certain personal values, most notably those of seeking new experiences, acting independently, and enhancing one's own personal interests; each of these values is particularly strong among children (Botonaki and Mattas 2010). Especially since the modern food system, which has undoubtedly made its way into Chile, systematically promotes fast-paced, individualized consumption of processed foods (Mintz 1985), the entire culture of consumption has certainly transformed.

Such an environment of a post-nutrition transition country, like Chile, is considered to be "obesogenic," or promoting of unhealthy behaviors (Swinburn et al. 1999). Combatting these systemic problems is necessary to reduce the burden of chronic diseases in countries that underwent nutrition transitions. Preventing related chronic diseases is entirely possible, and is important to begin at a young age so that healthy habits are instilled in the population over the life course (Dangour & Uauy 2007).

CHILE'S CHANGING FOOD LANDSCAPE

Food and health are intrinsically linked, and both are influenced by one's culture and surroundings. Although foods can be analyzed in terms of their nutritional components, they are also central aspects of culture -- representing power, community, traditions, and beliefs (Aguirre et al. 2010). Smith (2006) describes "the act of consuming [as] represent[ing] the ultimate basic locus of identity, conformity, and resistance." Thus, food preferences and eating patterns also may be a defining factor of personal identity. Understanding a population's notions about health and food can provide insight into other aspects of that culture, including gender relations, family structure, and social class. That is, food traditions and health beliefs exist in conjunction with other social and cultural values, and can serve as an indication of those larger social systems (Sobo 1997). Indeed, in order to promote a healthy lifestyle, it is critical to take into consideration the interaction among a culture's past and current food preferences, political economy, family structure, and health beliefs and practices.

Identity and Culture

Understanding the implicit and deeply rooted relationship between food, identity, and culture reveals that consumption is both a biological necessity and a reflection of a peoples' cultural and social values. Indeed, what people believe to be "good food" varies among groups, and what people eat conveys "who and what they are, to themselves and to others" (Mintz 1985, p. 13). Bourdieu's (1990, p. 53) notion of the habitus, a system of "cognitive and motivating structures" that is shaped particularly by a person's childhood and familial experiences illustrates how people's experiences and perceptions influence their actions, including those relating to consumption and taste. Bourdieu (1990, p. 56) argues that a person's habitus constantly

influences their decision making more than rules or norms of society, since it is "internalized as second nature."

Humans require a somewhat high-quality diet that provides them with the necessary nutrients to survive. However, within those nutritional and biological requirements there is much variation in actual foods consumed, due to sociocultural and individual food preferences (Beardsworth and Keil 1997). Thus, when people eat they are not only consuming nutrients necessary for survival, but they are consuming "gustatory (i.e., taste-related) experiences, and … meanings and symbols" (Beardsworth and Keil 1997, p. 51). Indeed, since any decision people make, including those with regard to food choices, is influenced by their habitus and is also a defining factor in terms of their identity, there is much to learn from understanding peoples' tastes in food.

Traditional and Western Food

Taking into account generational food traditions, rituals, and how the food landscape of Chile has changed provides insight into the development of unhealthy eating behaviors and overconsumption (Aguirre et al. 2010). Since the 17th century, corn and wheat were staples of the traditional Chilean diet (Sciolla 2010), and food traditions were generally passed through the female line of the family. However, with the nutrition transition, processed foods became increasingly prevalent throughout the country (Busidiecker et al. 2000). Along with the nutrition transition, economic development is said to have resulted in increased demand for processed and prepared food items. Indeed, more affluent food consumption patterns are visible in post nutrition-transition countries (Gerbens-Leenes et al. 2010). Mintz (1985) points out that although consuming prepared foods saves time, it also takes away freedom of choice in terms of what foods people eat. However, people are instinctively drawn to the processed food items readily

available. Despite the negative health impact these foods may have, their palatability, which Kessler describes as involving taste as well as the "motivation to pursue that taste," plays an important role in high consumption levels of processed foods. Incorporating salt, fat, and sugar into foods, which enhance palatability, makes these foods difficult to avoid (Kessler 2010, p. 12). The increase in processed food consumption has undoubtedly altered the food landscape and cultural food identity of Chile.

Chileans traditionally have small breakfasts, large lunches in the middle of the day, and small dinners late in the evening. Families usually come together for a mid-day lunch; however, this tradition has become less prevalent in recent years (Hernández 2010), and many children eat both breakfast and lunch at school instead of at home (Evaluación de Impacto 2006). White bread is considered a staple of the typical Chilean diet. In fact, 81.5% of Chileans eat white bread for breakfast, and 79.2% eat white bread for dinner. Generally, dinner in Chile consists primarily of foods high in carbohydrates and fat (Estudio Obesidad 2011). As a whole, Chile's per capita bread consumption is the second highest in the world, and Chileans of lower income households consume more bread than wealthier ones. Chile produces most of its own wheat, but also imports wheat from other countries – particularly from the United States. In fact, between 2002-2010, the amount of wheat from the United States inspected for export to Chile by the Federal Grain Inspection Service increased by roughly 250,000 metric tons (US Wheat 2011).

Family Structure and Social Class

As Chile became a more globalized society, the overall pace of life increased, and more women joined the work force and subsequently had less time to cook or prepare food in the home. These changes resulted in increased consumption of fast and processed foods, as well as snack foods (Busidiecker et al. 2000; Poppendieck 2010). Changing consumption patterns in the

home have had implications on family culture. That is, as more women entered the labor market, and convenience/processed food consumption increased, families ate fewer meals together, and individual family members more often made their own decisions on when and what to eat. In turn, these changes increased the potential for individuals' food preferences to be influenced by advertising and other external factors (Beardsworth and Keil 1997). Furthermore, as the countrywide work force changed, and Chile's political economy progressed, traditional household roles also shifted (Aguierre 2010). Today, families with enough economic capital employ *nanas*, or housekeepers, who clean the home, take care of the children, and cook meals -- instead of the mother of the household. In Arica, the focus of the present research, *nanas* often come from small neighboring Andean towns. The result is a transformation of household practices and a mixing of traditional Andean and modern foods (Aguierre 2010).

There is a distinct connection between social class and obesity. In industrialized countries, lower income is generally associated with higher rates of obesity; this connection is attributed to different types and manners of consumption among groups (Olivares et al. 2007). In Chile, similar to other countries, this seeming paradox results from the fact that Chileans with a lower income purchase more bread, meat, processed snacks, and soft drinks than higher-class populations (Albala et al. 2001), who tend to purchase and consume more higher-quality meats, seafood, and fresh produce (Drewnowski 2004).

Media and Advertising

Not only are higher quality proteins and fresh fruits and vegetables more expensive, it is also the case that advertising of processed and other unhealthy foods has become increasingly popular on Chilean television. Nearly all schoolchildren in metropolitan Santiago, the capital city of Chile, watch television at home, regardless of their socioeconomic status, age, or gender

(Olivares et al. 1999) and, on average, these children watch at least two hours of television per day (Albala et al. 2001). Added together, Chilean children view, on average, three hours of advertisements on television per week. Most of these children (70%) develop strong preferences for energy-dense foods high in saturated fats, sugar, and salt, as well as sugar-sweetened beverages as a direct result of contact with television advertisements (Olivares et al. 1999). Thus media and television advertising are effective among children in Chile. Moreover, since most advertisements display less healthy processed foods and soft drinks, advertising promotes obesogenic behaviors among youth (Olivares et al. 1999).

Food advertising also directly affects consumption behaviors in the school setting. Research shows that regularly viewing television commercials is linked with increased snack consumption in schools (Albala et al. 2002). In addition, children who are overweight and/or obese are more able to recognize food advertisements and actively display increased consumption after viewing advertisements than normal weight children (Halford 2003). Thus watching television is not only a sedentary behavior but is also an obesity-promoting activity among children (Halford 2003).

Food Traditions in Arica, Chile

Arica lies close to Chile's borders with Peru and Bolivia, and *Ariqueños*, the citizens of Arica, come from a mixture of ethnicities, with many able to trace their ancestors to ancient Andean/Incan populations, African descendants, and Chinese and European migrants. Thus the region is a melting pot of ethnicities and, therefore, of food traditions (Aguierre 2010). Alongside Western foods, some foods that are typical in Arica today include: bread, rice (which comes from the Chinese influence), corn, pastries, ceviche and other fish dishes, and *pebre*, a mild chili sauce.

Eating patterns in Arica reflect a mixture of region-wide and familial traditions, class, and ethnicities (Aguierre 2010). Although these traditional foods remain prevalent in the Arican diet, Western foods and food systems (particularly those that entered Chile when the government was seeking inclusion in NAFTA) have had considerable impact on the typical diet of *Ariqueños*. In particular, consumption of meats and processed foods with high levels of fat, salt, and sugar increased beginning in the early 1990's. At the same time, consumption of fruits and vegetables decreased. In addition, there has been a significant rise in the consumption of sugar-sweetened beverages (Hernández 2010). Each of these foods new to the Arican diet is a risk factor for chronic disease.

DIET AND HEALTH

In 2010, 25.4% of children in the northern region of Arica and Parinacota were overweight. This figure was 12.4% higher than the countrywide levels and close to 50% higher than the regional average in 2005.[3] Obesity levels follow a similar pattern, with increasing prevalence especially in the past decade (Diagnóstico Nutricional 2010). Unemployment and poverty levels, as well as mortality rates among children due to chronic diseases such as type 2 diabetes, are also higher in the northern Chilean region of Arica and Parinacota than the rest of the country (Albala et al. 2001; Diagnóstico Nutricional 2010).

Although the main cause of overweight and obesity, an imbalance of energy consumed and energy expended, is relatively simple, reversing this health trend is more complex. Chronic diseases are extremely complicated and are caused by a combination of biological, behavioral, environmental, and psychological factors (Hernández 2010). Obesity, in particular, is a result of

[3] These obesity rates are determined by Body Mass Index (BMI), which is a measure of a person's height and weight, not fat content or distribution, which are more specific indicators of obesity and risk of diet-related chronic diseases. Since BMI does not identify everybody who is overweight or obese, it is likely that the actual rates of obesity are higher than reported (Wells 2002).

genetic, environmental, economic, cultural, and social factors, which are root causes in the rising epidemic (Vio et al. 2007). Prevalence of childhood obesity is increasing steadily throughout the country, especially among younger children in the northern regions (Estudio Obesidad 2011). Both male and female schoolchildren entering first grade have become increasingly obese since the 1980's; this trend is especially true among children from lower income and education families (Vio et al. 2007).

The Chilean government has successfully addressed undernutrition by organizing free food supplementation programs. However, these programs may be linked to rising obesity rates, especially among younger children who were specifically targeted by the free food programs (Albala et al. 2001). Today, most complementary feeding programs do not take into account population anthropometric measurements, but rather focus on socio-economic status, thus providing food to populations already obese and in need of proper nutrition interventions, not necessarily extra food (Uauy & Kain 2002). Despite some efforts to stop the obesity trend, interventions to date have not been effective in Chile. In 2000, the National Board for Health Promotion developed a six-year plan to reduce childhood obesity. However, by 2006, obesity rates throughout the country only worsened (Vio et al. 2007). In Arica, as in much of Chile, many of these changes in health are attributable to shifting food preferences, an unhealthy diet, and a more sedentary lifestyle (Diagnóstico Nutricional 2010).

SCHOOLS AS SITES FOR NUTRITION INTERVENTIONS

Nutrition education can positively impact people's eating habits and concepts of health and nutrition (Lakshman et al. 2010). Chile has made an effort to educate the general public about healthy nutrition through nutrition pamphlets handed out at food point of sale locations, as well as some educational advertisements that air on television (Vio et al. 2007). However, there

are distinct gaps in nutritional knowledge among the Chilean population. One third of Chileans do not know about the nutritional components of food, and many do not read food labels (Estudio Obesidad 2011). The majority of Chileans believe that the responsibility of providing nutrition education and healthy food options lies with the education system, but most people also believe that schools are doing a poor job (Estudio Obesidad 2011). In addition, many nutrition programs do not easily respond to changing population health. As Chile rapidly underwent a nutrition transition, the existing nutrition programs did not always adjust to address increased problems of obesity and, as a result, these programs are somewhat outdated (Uauy & Kain 2002).

Schools are in a unique position to instill positive behaviors in children since they are public institutions regulated by the government, whereas promoting healthy behavior change in homes may be more difficult.[4] Distributing healthy foods in schools, such as fruits and vegetables, can help promote healthy eating practices in children over the life course (Bartrina and Pérez-Rodrigo 2006; Uauy 2002). When planning successful school food and nutrition education programs, three dimensions need to be addressed: the nutritional components of food, the educational value of the program, and the social characteristics of lunchtime (Bartrina and Pérez-Rodrigo 2006). Achieving a balance between these elements is critical to an effective program (i.e., providing children with healthy foods that they enjoy eating, teaching healthy eating habits, and making school lunchtime a fun and safe environment). In essence, although the components of effective nutrition and school lunch programs vary, effective interventions combine increasing healthy foods and nutrition education in schools with the goal of healthy behavior promotion and/or modification (Lakshman et al. 2010). In Chile, as in other countries, schools have been identified as a key site for nutrition intervention and education.

[4] Although schools play a critical role in teaching children healthy eating, to date there is no evidence of schools in Chile incorporating parents into its nutrition education component. Parents have the unique potential to reinforce what children learn in schools, and can help create consistent patterns between the home and school.

Children Eat and Learn in Schools

Even though eating habits develop during childhood, eating behaviors are easily modified at a young age. In particular, children who are overweight are more easily influenced by environmental factors and display increased consumption when food is present (Santos et al. 2011). The ability to change behaviors and food preferences at a young age can go in either a healthy or unhealthy direction. Promoting healthy eating and active living in schools can aid in developing healthy eating patterns, as well as ensuring that children do not develop unhealthy behaviors that will last throughout their life course. Once people become adults and eating habits are more strongly established, they are difficult to change. Thus teaching healthy eating to children is especially important to ensure an overall healthy life (Pyle et al. 2006).

Since Chilean children spend most of their days at school and may eat up to three meals a day there, schools can serve as a protected niche in which to instill healthy eating and physical activity behaviors (Procter et al. 2008). School food can play a critical role in educating children about healthy eating practices, since the food provided to them can serve as an example for what to eat. Because adiposity and eating habits are socialized in children beginning at a young age and can predict obesity over a lifetime (Pyle et al. 2006), establishing healthy nutrition and eating habits at a young age is critical for ensuring long term health. Since children attend school with the main purpose of learning, schools have a unique opportunity to effectively teach healthy habits to children. In fact, research indicates that institutions such as schools are the ideal location for nutrition education (Pyle et al. 2006).

Social Implications

Promoting healthy eating and active living is important for the proper development of children, and positive school lunch programs actually aid in healthy development as well as

positive self-esteem, improved performance at school, and combatting diet related chronic diseases (Bartrina and Pérez-Rodrigo 2006). In Chile, much of the food that children of low socioeconomic status consume each day comes from school breakfasts and lunches. Thus, schools can promote healthy eating by incorporating nutrition education into the curriculum and also by providing students with healthy food options, perhaps thereby combatting obesity (O'Toole et al. 2007).

A major problem that health promotion programs in schools face is that snacks and beverages sold in schools that are not part of the official school program are generally unhealthy; these are referred to as competitive foods.[5] The children who can afford to buy these competitive foods do not necessarily rely on the free food in school, and thus school lunches may be stigmatized since the wealthier children have more freedom to choose what to eat. Moreover, if children learn the importance of healthy nutrition in the classroom but then have the opportunity to purchase unhealthy competitive foods at school, they may not fully understand the value of healthy eating, thus devaluing the nutrition education program (O'Toole et al. 2007).

Since unhealthy behaviors are being instilled in people at young ages, it is necessary to target obesity interventions at all levels, including individual behaviors (Flynn et al. 2006). Moreover, school-based interventions to improve the health and nutrition of children need to be implemented over the long-term to ensure deep understanding of the importance of adopting a healthy lifestyle (Lakshman et al. 2010). Understanding how school-based nutrition interventions and school food programs play a role in overall childhood nutrition, as well as understanding children's food preferences and concepts of nutrition will be examined further in this research.

[5] The Centers for Disease Control and Prevention (CDC) defines competitive foods as foods that are available to students within the school environment, generally from vending machines or stores. They are called competitive foods because they compete with school meals. In general, these foods are high in added sugars, fat, and sodium (CDC 2013).

CASE STUDY: *PROGRAMA DE ALIMENTACION ESCOLAR* – CHILE'S SCHOOL FOOD PROGRAM

The *Programa de Alimentación Escolar* (PAE), Chile's school food program, was established in 1965 and has three major goals: to reduce school dropout rates, decrease absences in schools, and contribute to the positive nutritional status of students. Over one million students around the country receive at least one meal per day (Evaluación de Impacto 2006), and the program provides food to those schools deemed to be most needy. Qualification for the program is based on the general socioeconomic status of schools' students, and the program provides students with what is judged to be an appropriate number of calories per meal for elementary and middle school students. Based on need, schools may serve only lunches, or up to three meals per day (Bustos Zapata, INTA). Private companies are contracted by the government to prepare and serve food in schools. A government-sponsored evaluation of PAE conducted in 2006 found that most students in the program ate at least two meals per day in schools -- generally, these include breakfast and lunch (Evaluación de Impacto 2006). Although not the main focus of this paper, it is important to note that physical activity, an important component of a healthy lifestyle, is incorporated into the Chilean education system.

When the school food program was established in Chile in 1965, undernutrition was the main nutritional issue, and thus a goal of the program was to provide children with sufficient calories per day (Vio et al. 2000). Ultimately, Chile was quite successful at combatting undernutrition, partly through this school feeding program (Uauy & Kain 2002). However, as the nutritional status of the country changed, the program has not adjusted to the current nutritional problems of the nation (Vio et al. 2000). In fact, by initially addressing undernutrition alone, and

not dealing with proper nutrition and a more active lifestyle, Chile's school feeding program may have contributed to the rise in obesity (Uauy & Kain 2002).

Despite failing to combat rising obesity, PAE effectively provides students in Chile with food. The program is structured such that children of varying ages are provided with the government's established proper amounts of calories per meal per day, and the program attempts to provide a range of food groups, including dairy products, cereals, meat, eggs, salads, legumes, and desserts. Specifically, the typical foods served by PAE include: rice, legumes, chicken, ham, turkey, beef, bread, potatoes, pastas, and fruit -- mainly apples and oranges (Bustos Zapata, INTA). The program provides students with a total of eight salads per month as well as dessert with most lunches (JUNAEB 2011). Thus, it is clear that PAE does attempt to provide students with a balanced diet. The present research will attempt to more fully understand the realities of what types and quantities Chile's school food program serves, as well as how it is perceived from the point of view of those involved in the program.

SCHOOL FOOD PROGRAMS AROUND THE WORLD

Identifying successful interventions in other school food programs worldwide helps to place Chile's program within a global context, and much can be learned by identifying and comparing positive programs. Following is a description of successful interventions from a number of countries around the world.

The United Kingdom

The United Kingdom has developed various school food interventions to target the country's rising obesity rates. The *National School Fruit Scheme* was implemented between 2000-2002, and provided school children with free fruit. After the intervention, fruit consumption among schoolchildren significantly increased (Sharma 2006). Another intervention,

Be Smart, targeted children between five and seven years of age, and included both nutrition and physical activity. The program increased nutrition knowledge as well as fruit and vegetable consumption, but it had no significant impact on overweight or obesity prevalence (Sharma 2006). Another program, the *Peer Modelling and Rewards Program,* was implemented in elementary-age classrooms, and involved children viewing videos of older role models eating fruits and vegetables. This intervention resulted in increased fruit and vegetable consumption at lunchtime, snack time, and at home (Sharma 2006). Another intervention used card games involving nutritional information to teach healthy eating behaviors to children, and resulted in enhanced understanding of nutrition by the end of the school year (Lakshman et al. 2010).

Germany

The *Kiel Obesity Prevention Study* helped children develop nutrition knowledge, self-monitor their behaviors, and increase self-esteem among children. The intervention resulted in increased nutrition knowledge, increased physical activity, decreased sedentary behaviors (i.e. television watching), and decreased prevalence of overweight compared with control schools (Sharma 2006). *Germany's STEP TWO Programme* targeted overweight and obese children by serving them healthier meals with more fruits and vegetables. The program also urged them to engage in more physical activity (60-90 minutes per day). The intervention resulted in a slower increase in obesity rates and lower blood pressure levels when compared with control groups (Sharma 2006).

Sweden

Sweden's *Stockholm Obesity Prevention Programme (STOPP)* reduced students' intake of fat and sugar in schools by banning sweets and sugar-sweetened beverages. It effectively decreased the country's prevalence of childhood overweight and obesity (Lakshman et al. 2010).

Singapore

Singapore is well known for its successful school lunch program, *Trim and Fit*. Nutrition education was incorporated into school curriculum and food and drinks sold in schools were more strongly regulated; healthy options were more regularly served, and unhealthy options were severely limited. Children were also encouraged to drink water instead of other beverage alternatives. Between 1992-2000, obesity rates significantly decreased among primary and secondary school students (Sharma 2006).

The United States

The United States' *National School Lunch Program* (NSLP) was established in 1946 and, similar to Chile, the program was designed to reduce malnutrition among poor children. Amidst a general growing obesity epidemic, the NSLP has not effectively reduced childhood obesity prevalence in the United States (Harris 2002), although it has provided needy children with subsidized or free meals. In 2012, the NSLP guidelines changed, such that schools now are required to provide children with increased servings of fruits and vegetables and more whole grain options, as well as decrease the amount of saturated fat, trans fat, and sodium in food (Final Rule Nutrition Standards 2012). Future impact evaluations of the new NSLP guidelines will determine the effectiveness of these changes in combatting the United States childhood obesity epidemic.

IMPLICATIONS

Though similar in some ways to other industrialized countries, Chile's current nutritional status is distinctive in that it went through its nutrition transition so rapidly (Albala et al. 2002). Undernutrition declined extremely rapidly, from 16% of the population in 1985 to less than 1% in 1995. At the same time, obesity rates increased threefold over the past 15 years (Santos et al.

2011). Targeting this problem will be difficult because unhealthy behaviors (i.e., overconsumption of energy-dense foods and sedentary lifestyles) have permeated Chilean life so deeply. Combatting obesity and other diet related chronic diseases in present day Chile will require interventions at a systems level as well as more traditional health education interventions. At the macro-level, understanding the socio-economic repercussions of the epidemiological, demographic, and nutrition transitions in Chile is an important precursor to improving the health of its citizens.

The present research examines aspects of the complexities of nutrition education and school food programs. Nutrition interventions too often fail to keep up with the constantly evolving health problems of a population, thus allowing space for unhealthy behaviors to become normative. Since children are easily influenced by environmental factors in terms of their food consumption (Pyle et al. 2006), targeting the sociocultural and policy influences on individual behavior is important. Chile in particular has a recent history of undernutrition and simultaneously high rates of overconsumption and subsequent diet-related chronic diseases, and therefore provides an interesting case study into understanding the current realities of the global obesity epidemic and individual preference for unhealthy foods. Understanding how Chile's school food program is implemented on a national and local level and how it is perceived by government officials, private food providers, and its schoolchildren is important and can provide insight into how school-based nutrition interventions can positively impact overall population health.

METHODOLOGY

The preceding sections described the past and current health status of Chile, and how proper school lunches and nutrition interventions are critical to maintaining a healthy population. The following sections employ a micro-level of analysis to better understand nutrition and eating practices in Chilean schools, and how school-based interventions can promote improved health. As part of a micro-level of analysis, subsequent sections describe the results of a series of observations, surveys, and interviews. Each of these methodological tools addresses the present research's main goals, which include understanding Chile's national school food program, *El Programa de Alimentación Escolar,* how the program is implemented at national and local levels, and how it operates and is perceived from the perspective of government officials, private food providers, and children who participate in the program.

RESEARCH DESIGN

The present research adopted a three-pronged methodological approach to obtain data about Chile's school feeding program and schoolchildren's food preferences and concepts of health and nutrition. This approach included observation, surveys, and semi-structured interviews. Once the Emory University Institutional Review Board approved the research with expedited status, the primary research was carried out during November 2011 and subsequent research was conducted between January and February 2013.

The major site of data collection was School X, a municipal elementary and middle school located in Arica, Chile. In order to maintain privacy, the specific school in which research was conducted will remain confidential. School X is located in one of the poorest and most vulnerable areas of Arica, with most students coming from low socioeconomic status families. The school had a population of 324 students as of November 2011, and it reported that most

students at the school chose to receive the free breakfasts and lunches most days of the week. Since the majority of the schoolchildren relied on the school's free breakfasts and lunches as their main source of food during the week, healthy and nutritious school food is of upmost importance. A small, focused sample such as this research contains allows for an in-depth understanding of the major concepts at hand.

DATA COLLECTION

Ethnographic Observation

One week of school lunches at School X was observed and photographed, in order to capture the types and quantities of food served. The type of food, as well as the amount consumed and wasted was documented. The general layout of the school's cafeteria and the interpersonal interactions during the lunch period were also noted in order to understand the environmental aspects of school lunches at the school in Chile. These observations contributed a glimpse into how Chile's school food program operated on a local level.

Survey

Thirty-three schoolchildren at School X between the ages of 12 to 15 were surveyed in order to understand their food preferences and concepts of health and nutrition (see Table 1 for a list of questions included in the survey). These surveys contained both quantitative and qualitative questions, and took approximately thirty minutes to complete. Children's weight and height were also measured so that the sample group's average health status could be attained.

Table 1
Consumption Patterns, Food Preferences, and Concepts of Nutrition Survey for Chilean Schoolchildren

- Gender:
- Age:
- Weight:
- Height:
- How many days per week do you eat breakfast in school?
- How many days per week do you eat lunch in school?
- If you do not eat lunch in school, why not?
- If you do not eat lunch in school, where do you eat?
- If you do not eat lunch in school, what do you eat?
- How many days per week do you buy food from the kiosk?
- If you buy food from the kiosk, what do you like to purchase and why?
- What food would you like the kiosk to have that it doesn't now have?
- Select one from the following (Check one):
  - ____ Usually eat all (or most) of the food served at lunch
  - ____ Usually eat about half of the food served at lunch
  - ____ Usually eat a few bites of the food served at lunch
  - ____ Usually don't eat any food served at lunch
- Do you think you are (Check one)
  - ____Average weight
  - ____Underweight
  - ____Overweight
- What is your favorite food you eat lunch in school?
- What is your least favorite food you eat at lunch in school?
- What is your favorite food in general?
- What is your least favorite food in general?
- What is your favorite vegetable and how do you like it prepared?
- What is your favorite fruit and how do you like it prepared?
- Rank in order of your preference:
  - ____ Meat
  - ____ Bread
  - ____ Vegetables
  - ____ Fruit
  - ____ Dessert
- What do you think are the healthiest foods to eat?
- What do you think are the least healthy foods to eat?
- What do you think about when you hear "healthy food"?
- What do you think about when you hear "unhealthy food"?
- Can you name some foods that contain protein?
- Can you name some foods that contain carbohydrates?

Interviews

Semi-structured interviews were conducted in November 2011with the owners of the school's kiosk and a government official who works for PAE. The interview with the kiosk owners provides information about how school food and PAE is perceived by private food providers, and the interview with the government official aims to better identify the nature of PAE, how the program is implemented, and how it is perceived by a particular governmental official. These interviews lasted between thirty minutes and one hour, with interview questions based on the questions presented in Table 2 and Table 3.

In addition, experts in the field of childhood nutrition and school food programs were interviewed in the United States between January and February 2013. These supplemental interviews were conducted in order to place Chile's nutrition status and school food program within a broader framework. Questions asked during these interviews were based on those presented in Table 4. These interviews were designed provide additional information about the policies and procedures of Chile's school food program. In addition, they aid in understanding how children acquire food in school help explore the current importance of school food in Chile and around the world.

Table 2
Interview Questions for Kiosk Owners

• About how many students purchase food from the kiosk?
• What are the most popular items that you sell? The least popular items?
• On average, how much to the various foods cost?
• What do you think are the healthiest food options?
• Would you like to offer healthier food? Why or why not?

Table 3
Interview Questions for JUNAEB Official

• How does JUNAEB decided on the menu that is served in schools?

- Are the lunches required to provide children with a certain number of nutrients each day? If so, how is this decided?
- Do you serve students breakfast and dinner, or only lunch?
- During summer when school is not in session, is there a program that provides children with food?
- How is the program funded? Are there appropriate funds?
- Do you offer salads? What are the rules regarding vegetables?
- Does JUNAEB have any manner in which to determine whether children's food preferences align with the food served?
- Has the program dealt with the rising obesity epidemic in the country? If so, how?
- How are the kiosks that sell food in schools regulated?
- What do you think could be improved about Chile's school food program?

Table 4
Interview Questions for Experts in the Field

- How did you become interested in these issues and what is on your mind these days related to health, childhood nutrition, and school food?
- What are some current key challenges you think the field now faces and what are your thoughts about how best to address these challenges?
- As you think about the various nutrition-related interventions that can be used to promote individual and population health, what are your thoughts about how best to design and implement these interventions?
- What are the advantages and disadvantages of school lunch programs in promoting child and adolescent health?
- Should children's food preferences play into the formation of school lunch programs? Have there been any effective ways of using children's food preferences to aid in improving school food programs?
- What do you think should be the government's role in targeting healthy childhood nutrition? Can food policy be a tool to ultimately improve population health status?
- Are there any key issues related to nutrition, food policy and school lunch programs that we haven't talked about that you think I should investigate?

RESEARCH FINDINGS

The goals of the present research are to explore Chile's national school food program, *El Programa de Alimentación Escolar,* describe how it is implemented at national and local levels, and identify how the program operates and is perceived by government officials, private food providers, and children who participate in the program. Findings from the observations, survey, and interviews are presented in two main sections. The first section describes Chile's school food program, and the second section describes the implementation of the program at a school in Arica. Also included in this section are findings from on-site observations of school lunches, survey results, and information regarding the kiosk operation on the school grounds. A general summary of interviews with experts in the field of nutrition and school food is presented at the end of this section.

CHILE'S SCHOOL FOOD PROGRAM

In order to understand Chile's school food program and how it is implemented, a government official who works for the program was interviewed. The findings from this interview provide a general insight into the policies surrounding the program.

Program Description

The interview with the JUNAEB employee took place at the JUNAEB office in Arica, Chile. The employee, whose identity is confidential, worked for the *Programa de Alimentación Escolar*, Chile's school feeding program. The program is housed in Chile's National Board of Student Aid and Scholarships (JUNAEB). He reported that the regular school food program served over two million meals to students around the country each day. In general, participating schools offered breakfast and lunch, though some high schools offered dinner as well. Even

though the program was established to provide students with food during the 190-day school year, a special summer program was created that offered food to students in certain schools.

The food that PAE provides to children had a range of minimum and maximum amounts of protein, carbohydrates, fat, and sodium in order to provide children with balanced meals. Although private contractors prepared the food, its preparation was standardized, and cooks were given recipes and preparation techniques for certain foods, including mashed potato and bean dishes. The quantity of food served was also regulated; the number of calories served varied with students' ages and the type of meal.

Schools participating in Chile's school food program were required to serve a main course, a dessert, a side item (usually white bread), and eight salads per month for lunch. Two salads had to contain eggs, one salad had to include tuna, and the other five salads had no restrictions or specific additions. These salads could be raw or cooked, at the discretion of each school.

Since Chile is such a diverse country with staple food items varying by region, the food served in schools reflected local preferences. For example, rice was served in northern Chile but not in the south, where the main staple food item was potatoes. Despite cultural dietary differences, the amount of grains, beans, and other food items was standardized across the country.

When asked what changes should be made to improve the school food program, the JUNAEB official reported that the contracted kitchen workers needed to improve their culinary techniques and offer children more attractive trays of food. He cited the visual aspects of food as most important in attracting young children to meals.

Kiosks in Schools

Although the majority of the interview with the JUNAEB official focused on the regulations of PAE, it also touched on how the government, as well as the kiosks, dealt with providing healthy options in schools. The JUNAEB official reported that the kiosks that sold competitive food in schools were privately owned. The owners were required to enter into two-year contracts with JUNAEB and, as part of the contract, agreed to sell healthy food options. However, JUNAEB recognized that this has generally failed; most kiosks rarely offered healthy options and when they did, they only offered whole fruits, not fruit salads or cut-up fruit. The JUNAEB official believed that children were less likely to purchase whole fruits than cut up fruit salad, since whole fruits are harder to eat and thus less palatable.

IMPLEMENTATION OF PAE IN ARICA

In order to understand how Chile's school food program actually operates on a local level, one week of school lunches was observed in School X, in Arica, Chile. A survey conducted with a group of children provides insight into their general consumption patterns, food preferences, and overall concepts of health and nutrition. Lastly, School X's kiosk owners were interviewed in order to attain information on how it operates at the school.

Observation of Lunches

The lunch period at School X lasted for 45 minutes and was divided into two sections; the younger students ate lunch from 1:00 p.m. until 1:20 p.m., and the older students ate lunch between 1:25 p.m. and 1:45 p.m. Of the school's 324 students, approximately 230 students ate lunch at school on a regular basis. The school had three cooks who prepared the food according to JUNAEB's guidelines. The food that the school offered is detailed below in Table 5.

The cafeteria was located at the center of the school and had two long tables down the length of the room. The kitchen staff prepared the trays of food before the lunch period to save time once the period began. Students picked up their tray of food from one end of the long room and had the option of adding a piece of white bread from a large basket; most students chose to eat the bread, and many of them took two servings. Students then proceeded to the tables and ate their lunch while teachers roamed the lunchroom, urging students to eat all of their food. Although most children ate the majority of their meals, many were instructed by teachers to eat more than they preferred. Although teachers urged the schoolchildren to eat at least some of each food item on their trays (and some students were urged to eat an overall higher quantity of food), there was still a considerable amount of food waste after the lunch period ended. After finishing eating, students dumped the waste into a trashcan and were free to go outside for the remainder of the lunch period, to either play in the courtyard or purchase food from the kiosk.

Table 5
School Lunch Menu

	Salad	Main Course	Dessert	Extra
Monday	None	Pork and white rice	Caramel flan	White bread
Tuesday	None	Pasta and beans	Fruit jello	White bread
Wednesday	None	Hardboiled egg and mashed potatoes	Dried plum compote	White bread
Thursday	Potatoes and onions	Chicken and pasta	Rice pudding	White bread
Friday	None	Tuna croquet and white rice	Fresh, whole orange	White bread

Survey Results

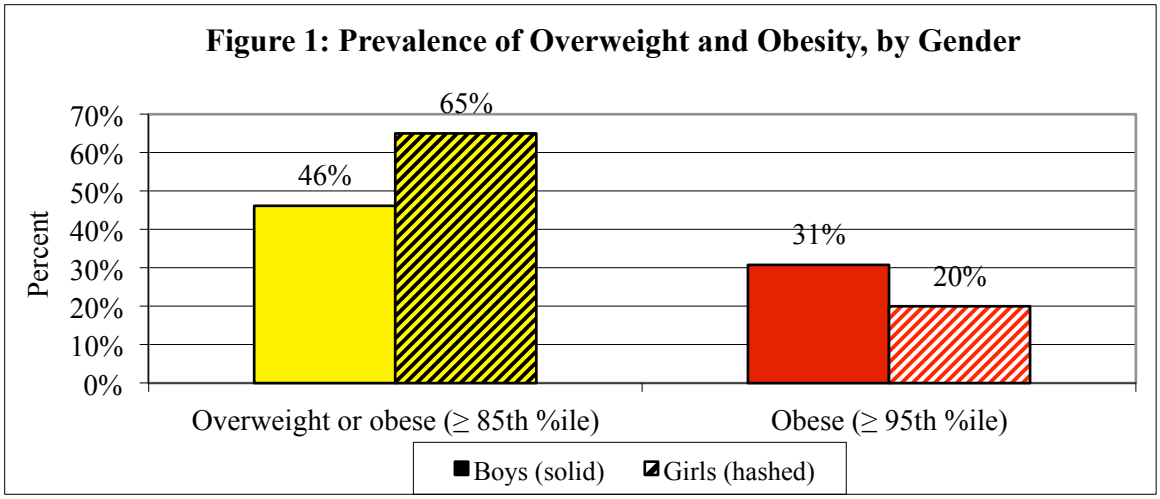
A main goal of the present research is to understand how its consumers, the schoolchildren, perceive Chile's school food program. To this end, a group of students at School X were surveyed to understand their general consumption patterns, food preferences, and concepts of health and nutrition.

General Consumption Patterns

A total of 33 students between the ages of 12-15 completed the survey, which took roughly 15 to 30 minutes. Twenty students were female and 13 were male. Upon completion of the survey, students were individually guided into a private office, where their weight and height were recorded in order to calculate their Body Mass Index (BMI), a measure of overweight and obesity. Students' BMI's and percentiles were calculated using the Centers for Disease Control and Prevention (CDC)'s Children's BMI Tool for Schools. The spreadsheet, which is free to download online, calculates children's body mass indexes according to their age and computes BMI percentiles for each child, in addition to providing an overall summary of the group data, presented below.

Table 6: Summary of Children's BMI-for-Age

	Male	Female	Total
Number of Children Assessed	13	20	33
Underweight (<5th %ile)	0%	0%	0%
Normal BMI (5th – 85th %ile)	54%	35%	42%
Overweight or obese (>85th %ile)	46%	65%	58%
Obese (>95th %ile)	*31%*	*20%*	*24%*



As part of the survey, one group of questions addressed students' general consumption patterns in the school. See Table 7.

Table 7: Consumption Patterns at School

# Days per week	# Students who eat:		
	Breakfast	Lunch	From kiosk
0	7 (21%)	4 (12%)	13 (40%)
1	1 (3%)	3 (9%)	5 (15%)
2	2 (6%)	2 (6%)	6 (18%)
3	2 (6%)	4 (12%)	5 (15%)
4	3 (9%)	5 (15%)	3 (9%)
5	18 (55%)	15 (46%)	1 (3%)

When asked how often they ate lunch at school, close to half of the children responded that they ate lunch every day at school (46%); only four students responded that they never ate lunch at school (12%). Breakfast was more widely consumed, with over half of the students responding that they ate breakfast every day in school (55%); only seven students reported that they never ate breakfast in school (21%). When asked about how often they purchased foods from the kiosk, 40% of students responded that they never purchased food from the kiosk.

In summary, the data indicate that 64% and 61% of the children reported that they ate breakfast and lunch, respectively, at the school 4-5 times per week, whereas only 24% and 21%

stated that they had these meals at the school never or only once per week. It is interesting to note that 55% of children purchased food from the kiosk never or only once per week, and very few did so on a regular basis of 4-5 times per week (12%).

Food Preferences

Survey results regarding the sample of schoolchildren's food preferences are detailed in the following table.

Table 8: Food Preferences

	Favorites (most common responses)	Least favorites (most common responses)
Lunch in school	Tuna croquet with white rice	Legumes (beans, lentils, chickpeas)
Food in General	Chicken, pasta, french fries, rice with meat	Beans and lentils
Vegetables	Lettuce, tomatoes, carrots, cauliflower, potatoes	N/A
Fruits	Apples, bananas, apricots, oranges, strawberries	

When students were asked about their favorite lunch served at school, the most common response was tuna croquet with white rice; however, there were a wide array of responses, including pasta, mashed potatoes, and meat dishes. The most widely disliked lunch in school (by 60% of students) was anything that included legumes (i.e., beans, lentils, and chickpeas). The most commonly reported favorite foods in general were chicken, pasta, french fries, and rice with meat. Once again, the majority of students most strongly disliked beans and lentils, even when these items were served outside of the school. Favorite vegetables for most students were lettuce, tomato, carrots, cauliflower, and potatoes. The majority of students also reported preferences for fruits such as apples, bananas, apricots, oranges, and strawberries.

The survey also asked students to rank meat, bread, vegetables, fruit, and dessert in order of preference. See Table 9.

Table 9: Ranked Food Preferences

	Preference:				
Food	#1	#2	#3	#4	#5
Meat	8 (25%)	2 (6%)	9 (27%)	5 (15%)	9 (27%)
Bread	3 (9%)	4 (12%)	6 (18%)	11 (33%)	9 (27%)
Vegetables	4 (12%)	7 (21%)	6 (18%)	9 (27%)	7 (21%)
Fruit	10 (30%)	13 (40%)	4 (12%)	2 (6%)	4 (12%)
Dessert	8 (24%)	7 (21%)	8 (25%)	6 (18%)	4 (12%)

Fruit was most preferred, with 70% of the children ranking fruit as their first or second preference, and only 18% describing fruit as least favored (preferences 4 and 5). Dessert was also well liked, with 45% of the students ranking this item high (preferences 1 and 2) and only 30% ranking dessert as least preferred. Meat, bread, and vegetables were ranked lower than the other options, with 42%, 60%, and 48% of students least preferring them, respectively.

Concepts of Health and Nutrition

When asked about their knowledge of what foods were healthy, the majority of students responded that fruits and vegetables were the healthiest food options (76%). Answers to what students believed to be the unhealthiest foods ranged widely but included junk food, red meat, and chicken. In general, most students' responses about individual components of food (i.e., protein and carbohydrates) reflected a lack of nutritional knowledge, since most did not know what those food components were or what foods contained them (76% did not know about protein; 64% about carbohydrates).

The Role of Kiosks in the School Setting

School X, similar to other public schools in Chile, had privately owned kiosks located on the school site. In general, kiosks sell processed, competitive foods to schoolchildren. School X's kiosk owners were interviewed in order to understand how the kiosks fit into the school food setting.

The kiosk was located at the center of the school courtyard, across from the cafeteria. A middle-aged married couple that had a contract with the school to sell food to children every day of the school year owned and managed it. It was only open during lunch hours and sold foods ranging from gum, chocolates, and other candies to ham and mayonnaise sandwiches on white bread, ice cream, sodas, and juice. The owners believed white bread sandwiches to be the most popular food sold at the kiosk.

When asked what healthy items were for sale, the owners expressed concern with selling fruit. They explained that they had sold fruit in the past, but ceased to do so because children did not purchase it. In order to make a living, they were forced to stop offering fruit. Without fruit, the healthiest items they then sold were gum, juice, and a cereal bar. However, as with fruit, the cereal bar had been offered for months and no one had yet purchased it. Though the owners expressed concern that children were consuming unhealthy food items, they explained that they were in the business of selling food, and so offering unhealthier options was necessary from an economic standpoint. The food they sold was relatively inexpensive, with most items costing on average the equivalent of US10-60 cents. Since the food was so low-priced, the owners estimated that 80% of students purchased food from the kiosk on a regular basis, at least once per week.

GENERAL IMPORTANCE

To better understand how Chile's school food program fits into the country's broader nutritional status, as well as with current global trends, three semi-structured interviews were conducted with food and childhood nutrition experts. Specifically, interviewees included a professor well known for her contributions to studies of school food, a child hunger expert, and a pediatrician who works closely with childhood obesity. The results of these interviews provide insight into the complexities surrounding school food and school-based nutrition interventions,

as well as highlight the importance of proper nutrition beginning at a young age. Following is a summary of the major points derived from the interviews:

- Healthy eating, especially beginning during childhood, is important in ensuring an overall healthy life. However, with the influx of processed and fast foods in the current food environment, children and adults are faced with distorted food preferences and difficulty in accessing nutritious foods at low prices.
- Advertising for the least healthy food options heavily influences children's food preferences. Subsequently, children enter the school environment without an understanding of how to eat healthy food, and also have preferences for unhealthy foods.
- A major challenge of the current food environment is a need to balance eating sufficient food while maintaining a healthy diet. Among children who cannot afford to eat healthy food, fighting overweight and obesity is secondary to eating enough food every day.
- Schools are appropriate sites for nutrition interventions, since children both eat and learn in schools. However, in order to achieve a sustainable improvement in consumption patterns, parents need to get on board with healthy eating so that children are surrounded by healthy food both at school and at home.
- Although nutrition education is critical to reversing current overweight and obesity trends, it is not enough alone. Systematic change is necessary so that children are fed healthy foods both at home and at school, and also are not constantly targeted by unhealthy media campaigns.
- Despite barriers against healthy eating among children, there have been pockets of success in terms of healthy eating programs. Thus with appropriate programs, children are able to learn to eat and even prefer healthier food options.

Discussion and Analysis

As context for the discussion to follow, several key findings should be kept in mind: first, most children who attended School X ate at school. Specifically, over half of the sample surveyed ate both breakfast and lunch at least four times per week, and few students reported never eating meals in school. These data emphasize the value of Chile's school food program in providing children with the majority of their daily food intake in school. Second, a somewhat contradictory finding is that the kiosk owners reported that 80% of students purchased food from the kiosk on a regular basis. However, only 60% of students reported purchasing food from the kiosk and 40% reported that they never did. As discussed below, this discrepancy in the data raises questions about the validity and the possible reasons behind students' and vendors' self-reports. Third, a surprising finding is that fruit ranked highest among children's food preferences, but fresh fruit was rarely served in School X. In fact, oranges served during one lunch were the only fresh fruit available during the entire week of observation.

The following section presents a discussion of the implications of the research results, divided into four main sections. First, Chile's school food program is generally discussed. This is followed by an analysis of the food that PAE serves to children, as well as the role the kiosk plays in the school environment. Students' nutritional status, consumption patterns, food preferences, and concepts of health and nutrition are then considered. Finally, the section concludes with a discussion of the general themes that emerged from the research, along with a discussion of the limitations of the present study and suggestions for future research.

THE PROGRAM

Chile's comprehensive school food program successfully addressed undernutrition from the onset of the program, which is evident by the fact that current rates of undernutrition are

significantly lower than five decades ago (Albala et al. 2001). PAE reaches up to 50% of schoolchildren (according to the JUNAEB official) daily. The large number of students participating in the school food program increases governmental responsibility for setting forth a positive and healthy example of proper nutrition, and also increases the potential for the government to use the program as an educational tool. However, as is clear from the research findings, the program does not adequately serve as an example of healthy eating since it rarely offers fresh produce, nor does it successfully teach children the importance of proper nutrition since School X did not offer nutrition education.

The regulations established by the government regarding the types and quantities of foods served are quite comprehensive and assure appropriate types and quantities of foods according to the country's nutritional guidelines. Furthermore, the program successfully takes into account the cultural aspects of food. So doing allows children to have foods to which they are culturally accustomed, an important component of the program. As further discussed below, although PAE specifies the general amount and type of foods served, using independent contractors to prepare and serve food on site results in unequal variation in food quality among schools.

An important component of the program is that schools are required to serve eight salads per month. In theory, this requirement allows students the opportunity to consume some recommended servings of vegetables and thus is extremely important from a health perspective. However, the absence of a requirement to serve fresh vegetables allows for considerable variability among schools. Serving boiled potatoes and onions as one of eight monthly salads, as was found in School X, is not only unhealthy in that it did not provide students with fresh or colorful vegetables, but it also devalued one of the most positive aspects of PAE, the salad requirement. In this sense, the *Five a Day* program that the Chilean government uses to promote

consumption of five servings of fruits and vegetables per day seems to be ignored in the school setting, as is clear by the lack of fresh fruits and vegetables offered in the school.

With reference to the kiosks that sell competitive foods in the school environment, the two-year contracts that the government enters into with the vendors are positive in that they allow for some quality control and turnover if the government deems it necessary. The contract's requirement for vendors to sell healthy options to children (i.e. fresh fruits) is important in assuring that students are offered healthy foods; however, few kiosks actually sell fruit to children. Indeed, there seems to be no push by the government to promote healthy options in kiosks, and the potential to use kiosks to promote healthy eating is lost.

As Bartrina and Pérez-Rodrigo (2006) note, successful school food programs must take into account the nutritional components of foods, the educational value of the program, and the social characteristics of lunchtime. These social characteristics are important and often overlooked; however, they can provide important insight into the effectiveness of a program. At School X, the lunch period was relatively short; students had 20 minutes to pick up their food, eat the meal, and dump their waste and trays. Having pre-made trays of food ready for students to pick up was efficient and provided students with more time to eat. However, many of them still seemed to eat rapidly. This was particularly true for younger children who ate at the beginning of the lunch period, since once they finished eating they were allowed to play outside. As a result, many of the younger children in particular hurried through their meals in order to maximize their time outside. Mintz (1985) reinforces this notion of changing time allocations for meals. He writes that along with the modernization of the food system came an increased sense that time is limited, and that people ought to maximize their enjoyment while minimizing the time it takes. The older children who ate their lunch after having time to play did not seem to

rush through their lunches quite as much as the younger ones. Subsequently, they ate more of their food without being prompted to do so by teachers. This difference may be attributable to the structure of the lunch period itself, but also may be a result of age differences among students. That is, since the portion sizes of meals for all students were equal, it is possible that older children ate more of their food because they generally have larger appetites than younger children.

The cafeteria's long tables allowed for a sense of community during lunchtime. It seemed as though the large tables protected against the formation of small groups, as all students were, in a sense, forced to eat together. Students also were required to pick up their own food, clear their trays, and dump their waste after finishing eating. This process may have helped younger students, who likely have less independence than their older counterparts, develop a sense of maturity during lunchtime. Overall, even though Mintz argued that modern consumption trends have "desocialized eating" (1985, p. 202), the lunch period seemed to be an effective socialization time for children, and provided them with a time to develop proper social skills.

THE FOOD

PAE

Each lunch served at school was fairly balanced and included varying types of protein (i.e., meat, fish, legumes), bread, other staple starches, and desserts. The sizes of the dishes seemed to be appropriate for children; although there was some amount of food waste, the schoolchildren seemed to consume much of the food they were served. Of the food wasted, it was clear that children often disliked and subsequently avoided eating the legumes -- in particular beans, lentils, and peas.

The availability of white bread at School X reflects cultural norms of consumption, since bread is a popular food item among Chileans. That is, Chileans as a whole consume some of the highest levels of white bread worldwide (US Wheat 2011), most Chileans eat white bread for breakfast and dinner (Estudio Obesidad 2011), and schoolchildren in School X also consumed one to two servings of bread served by PAE at lunchtime. Therefore, consumption of white bread is likely to be extremely high among Chilean schoolchildren. It is clear that it is not always the case that a country's staple food products have a positive impact on health. Indeed, cultural norms of consumption may play an important role in the types of foods people consume, but they may not always positively impact people's health outcomes.

As previously discussed, during the week of lunch observations, only one salad was served, consisting of boiled potatoes and onions. There was not one fresh vegetable served during the entire week, nor was there anything green on the menu. In fact, the food served was not at all colorful, which some regard as a positive indicator of a healthy balanced diet (Poppendieck 2010). Furthermore, the only fresh fruit available throughout the entire week was one orange. Prune compote and fruit jello were also served as desserts, but most children ended up throwing away the compote, and the jello was likely high in added sugar. Thus, both fruits and vegetables were rarely served in the school.

It is important to note that the Chilean government has a *Five a Day* initiative, which promotes consumption of five servings of fruits and vegetables per day. Taking into account this initiative, students in School X were unable to consume the government-recommended fruits and vegetables, since most students consumed two-thirds of their daily food intake in the school and there were rarely fruits or vegetables offered. Therefore, while PAE provides students with sufficient calories, protein, and starches, it may act as a barrier against appropriate fruit and

vegetable consumption. As discussed during the interviews with childhood nutrition and school food experts, healthy eating of a balanced diet is necessary for proper childhood development, and healthy nutrition in schools can also serve as a positive example of what to eat through the life course. Consequently, because the food served in Chilean schools lacked appropriate fruits and vegetables, it may not sufficiently provide a positive example of healthy eating, which in turn may have a long-term impact on the health of the children.

The Kiosk

School X's kiosk, located in the middle of the school's courtyard, was easy to access and offered children a readily available location to purchase competitive processed foods at low prices. The kiosk's central location added to its appeal, since children's consumption habits are easily influenced by advertisements and contact with food (Albala et al. 2002). Although the kiosk owners reported that approximately 80% of students purchased food from the kiosk, only 60% of children reported purchasing food at least once per week, and 40% reported never purchasing kiosk food. The discrepancy in the data raises questions of the validity of reporting, both by the children who answered the survey and the kiosk owners in their interview. It is possible that the children underreported use of the kiosk in order to come across as healthier -- especially since most children realized that the kiosk sold mainly unhealthy options. Or, it is also possible that in order to build up the success of their business, the kiosk owners over-reported the number of students who purchased from them. Either way, the kiosk played an important role in the school food environment in that all schoolchildren were exposed to competitive unhealthy food options foods on a daily basis. Furthermore, both 60% and 80% are significant portions of the student body, so even if the true number were at the lower end of the spectrum, more than half of the students would have purchased from the kiosk regularly.

The kiosk only offered processed snacks and candies, as well as sugar-sweetened beverages and sandwiches on white bread. The vendors reported sandwiches to be the most popular food sold. Thus, some students may have consumed up to two servings of white bread during the PAE-served lunch, and more white bread sandwiches purchased from the kiosk. Coupled with high bread consumption at breakfast and dinner, as reported by Nestle's obesity study (2011), depending on students' preferences, daily white bread intake may be overwhelmingly high in Chile. Children's preference for white bread directly ties back to cultural norms of Chile. That is, white bread is a commonly consumed food throughout the country, not just in schools. Indeed, since peoples' tastes in food reflect their personal identity, social class, and culture (Mintz 1985; Bourdieu 1984), and individual associations with food can influence consumption habits among people subconsciously (Kessler 2010), it is clear that despite the poor health outcomes associated with its overconsumption, white bread plays an important role in Chileans' individual food preferences as well as the overall food landscape of Chile.

Similar to the PAE menu, the kiosk did not offer any fresh fruits or vegetables. The owners indicated that they did not sell these items because students did not purchase them. Although contrary to PAE policies, and although the vendors understood the importance of healthy eating, the kiosk owners adopted a strategy that would make their business viable; this is economically understandable from a business perspective, but is unsatisfactory from a health perspective and according to the PAE policy guidelines.

As discussed in more detail below, although schoolchildren reported high preferences for fruit, the kiosk owners claimed that students did not purchase fruit when they offered it for sale. This may be a result of the appeal of fast, processed foods that compete with healthy foods -- a point discussed in interviews conducted with experts in the field. That is, since processed foods'

appeal is so high among youth, fruit may not compare with unhealthy processed snacks when sold side by side at comparable prices. If this is, in fact, the case, serving more fresh fruit during the free school lunches may be a way to promote its consumption and prevent competition between foods served in school and in the schools' kiosks. Indeed, this is the case in other countries; those interventions that offered free fruit during school lunches (i.e., the United Kingdom's *National School Fruit Scheme* and Germany's *STEP TWO Programme*) effectively increased children's consumption of fruits, likely because the fruit was free and thus did not compare monetarily with other processed snacks sold in schools.

THE CHILDREN

Nutritional Status

The nutritional status of the sample of 33 children at School X, characterized by high rates of overweight and obesity, equates with Chile's overall rising rate of overweight and obesity. When the children's BMI's were compared to averages for their particular ages, none of the children were underweight; rather, the majority of them (58%) were overweight or obese. These data reflect Chile's changing nutritional status through the nutrition transition. That is, as rates of undernutrition and underweight declined, being overweight and obese became more prominent, especially in Arica, and particularly among youth (Diagnóstico Nutricional 2010; Estudio Obesidad 2011). Moreover, since many of the children who attended School X were from low-income families, these high rates of overweight accurately reflect the income disparities associated with weight; namely, the obesity epidemic plagues people of low socioeconomic statuses more than it affects the wealthy (Albala et al. 2002).

Since the sample of schoolchildren was predominantly overweight or obese, there is a greater need to balance out school meals in order to improve the health of those children on both

sides of the spectrum. That is, it is critical to achieve a balance of the food offered at school so that the children who are normal weight maintain a healthy weight, while at the same time those children who are overweight or obese work to achieve a healthier diet and body weight. Focusing on children on both ends of the spectrum is especially important since most of the children at School X were of low socioeconomic status, and therefore relied heavily on school food as their main source of consumption. As discussed in the interviews with experts in the field, among those children whose families may not be able to afford healthy food, providing them with proper meals at school is essential. Furthermore, it is clear that children who are overweight or obese are more easily influenced by environmental factors, and display increased consumption when food is present (Santos et al. 2011). Thus, it is clear that the centrality of the school's kiosk may also play a role in the school's high rates of overweight and obesity.

Consumption Patterns

The majority of children in School X were found to consume both breakfast and lunch on a fairly regular basis in schools. As previously mentioned, most children reported that they did not purchase food from the kiosk on a daily basis; nevertheless, 60% of students stated that they purchased food from the kiosk at least once per week. This number may be higher, depending on whether the kiosk owners' estimate of 80% is correct. Despite this discrepancy in data, it is clear from these data that most children's consumption habits are certainly impacted by the kiosk's central presence on the school grounds.

When children's responses to questions regarding their consumption habits are analyzed individually, there seems to be no association between those who purchased from the kiosk and those who ate school food. Thus, those children who purchased from the kiosk ranged from eating all their meals in school everyday to never eating the school breakfasts or lunches. This

lack of association means that of the 60-80% of children who purchased food from the kiosk, some ate the relatively balanced meals provided by PAE and supplemented them with competitive food from the kiosks, whereas those children who never ate school food likely only ate processed food from the kiosk for lunch. The first situation reflects a pattern of overconsumption, and the second suggests that some children are not consuming any government-regulated or nutritious foods. A handful of students – those who never purchased from the kiosk and always ate the school food – were the only children who solely consume food served by PAE and thus were the only children appropriately targeted by the program.

Choice in food also plays a role in schoolchildren's patterns of consumption. That is, at the cafeteria, children did not have the agency to decide what or how much food to eat. However, at the kiosk, they had the freedom – and probably some degree of social incentive – to independently choose, purchase, and consume their own desired food choices. Since much of the appeal of processed foods in the modern food industry are rooted in seeking new experiences, acting independently, and enhancing personal interest (Botonaki and Mattas 2010), children took advantage of the kiosk's role in providing them with the opportunity to act independently and make their own decisions regarding consumption.

Food Preferences

The relatively complicated patterns of consumption of both the PAE-provided food and the kiosk's snacks at School X are even more complex when children's food preferences and the food that they waste is taken into consideration. Indeed, since food preferences, especially those that are established during childhood, are established "within the rules of their society and culture," (Mintz 1985, p. 4), understanding these schoolchildren's food preferences can provide insight into general consumption trends among Chileans in Arica. The majority of children stated

that their least favorite foods – both in school and in general – were legumes, which include beans, peas, and lentils. The food that the children wasted reflected their low preference for these foods; on the day that pasta and beans were served, most children ate the pasta but threw away the beans. Because beans are a healthy source of protein and nutrients, children lost many of the positive aspects of the lunch by not consuming them. Preparing and serving legumes in innovative ways may promote their consumption.

The children's favorite fruits and vegetables, which included lettuce, tomatoes, apples, and bananas, are generally extremely accessible, relatively inexpensive, and fairly easy to transport when compared with other fruits and vegetables. However, fruits and vegetables as a whole are more perishable than packaged foods, and also must be consumed within a relatively short window of time. It is interesting to note that potatoes, which ranked fifth among the most popular vegetables, were the only vegetable offered for lunch during the week of observation. Lettuce, which was the most preferred vegetable, was not served at all. Serving a fresh salad comprised of lettuce, tomato, and other inexpensive vegetables instead of the boiled potato salad we found in School X would align more closely with the schoolchildren's most preferred vegetables. Contrary to popular belief, these data show that children might actually prefer to eat fresh salads to cooked, starchy ones.

When the children ranked their preferences for meat, bread, vegetables, fruit, and dessert, it became clear that they overwhelmingly preferred fruit and desserts to meat, bread, and vegetables. Dessert, which was highly preferred, was served for lunch on a daily basis; fresh fruit, also highly preferred, was only offered once during the week. Low-preference vegetables were rarely offered; in particular, fresh vegetables were not served at all. Meat was moderately preferred and was served somewhat often. Bread, which was consistently offered as part of the

school lunches, was offered most often, up to two servings at lunchtime and even more when the kiosk is taken into consideration.

There appear to be inconsistencies between what the children say that they prefer to eat, what they choose to eat, and what they are served. This distinction is most evident for fruit and bread. Namely, children seemed to want to eat fruit but were not offered it, whereas they did not necessarily want to constantly eat bread but nonetheless did just that. It is likely that this discrepancy is due to an issue of availability. That is, bread was readily available in school and therefore consumed in larger quantities than fruit, which was rarely available and therefore rarely consumed. These inconsistencies may also be due to misreporting by the children. It is possible that, in order to come across as preferring healthy foods, especially to an outsider from another country, the sample of schoolchildren reported a higher preference for fruit, which is generally accepted to be a healthy food group. That is, it is likely that the schoolchildren knew that they should prefer to eat fruit to other unhealthy options and answered accordingly in order to seem healthier and more knowledgeable.

The culture of food in Chile is one that promotes consumption of some unhealthier food options (namely white bread) and fails to encourage eating of healthier options (namely beans, fruits, and vegetables). Since children's tastes in food serve as an indicator of their class and upbringing (Bourdieu 1984) it is clear from its high levels of consumption that bread plays an important role in Chilean cuisine, particularly among individuals from low-income households. These children's habitus' are deeply ingrained and constantly influence their decisions – including those with regard to food (Bourdieu 1990) – thus, eating bread is likely to be culturally ingrained in these children from a young age, both at school and particularly in the home, where it is commonly found. That is, since bread is generally served in the home at both breakfast and

dinner (Estudio Obesidad 2011) and fruit is less commonly found in the home setting particularly among low-income households (Albala et al. 2001), children are likely most accustomed to consuming bread on a daily basis whereas they rarely consume fruit either at home or at school. In fact, since fruit is generally more expensive than bread, it is likely that in low-income households, fruits are served on special occasions or as a treat and thus are considered to be more special food items. Indeed, the home environment is a constant influence on consumption habits within the school environment and may serve as an important line of inquiry for future research.

Without necessarily consciously thinking about it, these children may have a deeply rooted culture-based preference for bread as a result of the influence of food in the home -- even though they expressed a low preference for this food item at school. In fact, bread may have become so prevalent that it is seen as a standard accompaniment to meals. As Mintz (1985) stated, people's food preferences are central to their sense of self and may be difficult to identify overtly. Nonetheless, it is clear that understanding the nature of these food preferences – both those that the children express and those that they act upon – shed light on the culture of food in Chile.

The children could benefit from PAE offering more fruit at lunch, which they would likely eat, instead of fruit competing with processed snacks sold at the kiosk. Interviews with experts in the field also suggest that there are important barriers against healthy eating by children (i.e., media promoting undesirable foods, unhealthy food environments in the home, distorted food preferences, etc.). However, considering the successful interventions outlined previously, it is clear that there have been successful healthy eating programs in schools in other countries. With appropriately targeted interventions, Chilean children would likely be able to learn to eat, and even prefer, healthy foods.

Concepts of Health and Nutrition

Most children at School X understood the importance of consuming fruits and vegetables, even though these items were not often provided at lunches. Furthermore, most children recognized that junk foods, including the competitive foods sold by the kiosk, are unhealthy; however, they still chose such unhealthy, processed foods. This inconsistency between students' knowledge and actual consumption habits may reflect low motivation to eat healthfully, especially since they lacked nutrition education and may not have fully realized the importance of healthy eating. The inconsistency may be also be affected by the high appeal of junk food that is attractive, palatable, and readily available in the school environment. In addition, there may be an issue of simple availability. That is, although children may understand the importance of healthy eating, schools are restricted spaces and there were actually few opportunities to consume fresh fruits or vegetables on the school grounds. This issue ties back to Chile's food landscape changing from one that is characterized by more traditional foods, to one that is saturated with processed snacks. Availability of foods is directly influenced by the large-scale economic and political patterns that promote production and consumption of commodity goods. These broad level practices in turn dictate availability and consumption on an individual level – including which foods are available to children in schools. Furthermore, the price of foods is important. When processed snacks are offered to children at low prices, they may easily disregard knowledge of healthy eating in favor of consuming those unhealthier foods that are heavily advertised and therefore more appealing.

Taking into account these issues, it is clear that there is a definite distinction between what children know to be healthy and what they actually consume. That is, although they lacked specific knowledge of healthy nutrition, the schoolchildren generally understood what types of

foods to eat to remain healthy, as well as the overall importance of eating healthfully. However, they lacked the motivation to enact this knowledge. It is likely that this is a common reality among people worldwide. As the food industry transforms and unhealthy options increase in availability, processed foods become more popular. Subsequently, people are increasingly surrounded by unhealthy, albeit appealing and heavily advertised, options. At the same time, people with a reasonable level of education are likely to recognize the importance of consuming a healthy diet and yet nonetheless choose to eat unhealthy foods. Indeed, along with a recent transformation of the food system, people's food preferences have changed and people's tastes in food reflect a higher preference for more modern, processed foods, despite their overall negative health impact. It seems as though as societies progress, people are socialized to a general urgency in action and in gratification.

Underlying this paradox of healthy knowledge and unhealthy actions is the concept of immediacy of reward. That is, as children are surrounded by unhealthy food options everyday in school, they disregard their nutritional knowledge and, fairly consistently, choose to consume unhealthy options that provide them with instant gratification (i.e., the appealing taste of processed snacks, the social aspects of purchasing from the kiosk, etc.). Especially since negative health outcomes associated with unhealthy eating are generally distant and can take years to manifest, delayed gratification is particularly difficult to recognize and value with regard to food, health, and consumption. An individual may know what to eat to remain healthy, but values the moment and places an emphasis on immediacy of reward.

The trend toward immediacy of reward as opposed to concern for long-term outcomes seems to apply to many domains and is not necessarily restricted to Chile. It is evident in other aspects of life that people claim to understand certain ideas on a theoretical level, but when it

comes to individual action, they disregard their knowledge. Aside from food and consumption, other examples within which this phenomenon is visible include smoking (for many people, the positive feelings and the real addiction associated with smoking tobacco products outweighs their knowledge that smoking can lead to cancer or other diseases), climate change (understanding the realities of global climate change is not necessarily enough for people to change individual behaviors), and cellphone use while driving (it is general knowledge that talking on the phone or texting while driving is unsafe, but nonetheless many people use their phones in the car and disregard their background knowledge).

There seems to be a definite consistency throughout many domains of life that although people may understand the negative outcomes associated with an action, they value instant gratification. In the case of consumption, smoking, and other phenomena, the focus on an immediate reward is a far more powerful motivation than the ambiguous, long-term outcomes of poor heath and even early death. It is likely that although people understand that unhealthy behaviors are associated with illness, many believe that negative effects from unhealthy behaviors could not possibly happen to them personally, on an individual level. Furthermore, the immediate, reinforcing reward associated with consuming processed foods is deliberately made difficult to avoid by the food industry. That is, processed foods have immediate, complex, and multisensory impacts on the body, which make it difficult for people to realize or care when they are full. Corporate food companies purposefully manufacture foods that provide people with instant feel-good sensations, since people are more likely to continuously consume those food items (Kessler 2010). Taking all of this into consideration, the phenomenon of immediacy of reward underlying the contradiction between schoolchildren's nutritional knowledge and actions

is important to consider when attempting to understand how their food preferences, consumption patterns, and concepts of health and nutrition play into the current school food environment.

Although the schoolchildren understood generally which foods are healthy, the survey indicated that they had little understanding of individual food components and why they are important (i.e., protein and carbohydrates). It is not necessarily of extreme importance to know the individual nutritional components of foods, but consuming a balanced diet is necessary to an overall healthy life. Furthermore, without understanding individual components of foods, food labels are made unimportant, which may have implications for future eating patterns. That is, once these children become adults and make their own consumption decisions outside of the school setting, without a general knowledge of nutrients, eating healthy may be increasingly difficult. This is clearly an area for future education.

All of the data presented in this study support the notion that it is important, and quite necessary, to take a holistic and interdisciplinary perspective in the study of food. From their interconnectedness in nature, it is evident that culture, social class, self-identity, family, the home environment, media and advertising, food availability, individual personality and preference, politics, economics, agriculture, religious traditions, and even the food system as a whole affect food – from its creation, to its consumption, to the manner in which it is perceived, to its lasting health impact. For example, a region's geographic location determines its agricultural practices and output, which in turn impacts the economics of the region as well as the social structure of families and communities. A family's income level influences the way in which parents raise their children, which impacts the types of food served in the home environment. The foods that children are accustomed to eating in the home can impact their development of food preferences (for example, white bread is a common food item found in low-income Chilean homes, and

children are accustomed to consuming it). The availability of certain foods in a community, which is partly impacted by the food system and demand for certain foods, influences the types of food people are accustomed to eating. In addition, cultural norms surrounding what foods are typical or have special meaning influence what people choose to consume.

It is clear from these examples that one cannot separate eating behavior from these other domains, since food is so central to the human experience and can only be understood in relation to these spheres (Aguirre et al. 2010; Caplan 1997; Mintz 1985; Sobo 1997). Together they form a unity, and one must consider these intimate links when attempting to understand the significance of food (Caplan 1997). Warde (1997, p. 10) says that consumption conveys messages about people to others and thus is a central defining factor of people's self-identities. In addition, taste is "socially embedded," and thus people experience and perceive food in certain ways because of the complex interrelationship between these factors. Therefore, one cannot make observations about food alone without taking into consideration these other realms, and behaviors of children with regard to food must necessarily be linked with the family, social class, culture rituals, the realities of the physical environment, the availability of food, the home environment, and other domains, since each affects individual food behavior and is inseparable from the rest.

At its most basic level, food provides people with the nutrients necessary to live. However, beyond its biological necessity, food has cultural and social meanings, and is woven throughout all domains of life. Kingsolver (2007, p. 17) describes food cultures as arising out of "a place, a soil, a climate, a history, a temperament, a collective sense of belonging." Thus on a broad level, food and its meanings are deeply rooted in each of these domains of life. On an individual level, personal experiences give certain foods special meanings and an "emotional

charge" (Kessler 2010, p. 55), and thus one must recognize eating practices within the context of these other factors in order to gain a deep understanding of food and its connection to the human experience.

LIMITATIONS OF THE RESEARCH

Several important themes emerged from this research, including the importance of healthy school lunches as a tool for nutrition education, the integral role of nutrition education to change food preferences, the importance of receiving free school food among children of low socioeconomic status, and the need for improvements in food that PAE and kiosks offer children, to name a few. However, these empirical findings have several limitations. First, because of time and resource constraints, observations of school lunches only occurred in one school in a smaller Chilean city, and for only one week. More observations in Arica may yield a deeper understanding of what PAE serves children and how it operates in schools. In addition, extending the research and analysis into the culture of consumption within homes may help to identify how eating patterns in the homes compare with those in schools. Second, only thirty-three students between ages 12-15 were surveyed; thus, the sample may not be entirely representative of the school, which serves students between the ages of 5-16. Furthermore, some children may not have understood all questions because of language differences between the researcher and the participants, and because of the children's educational level. It would be beneficial to survey a wider variety of children of varying ages and in a broader range schools in order to achieve more generalizable results. Third, future research should gather information regarding eating customs in the home, cultural food preferences, parental knowledge about nutrition, media influences on home eating practices, and the like. Surveys, participant observation, and direct involvement in the home life of children will yield a broader socio-cultural perspective on eating patterns,

beliefs, knowledge, and cultural values and norms of families. Fourth, due to difficulty in making contacts with JUNAEB in Arica, only one government official was interviewed. Understanding how the program is perceived by a variety of sources would aid in a more comprehensive evaluation of the program. It would also be beneficial to replicate these methods in other areas of Chile in order to gain a deeper understanding of how the program operates around the country.

RECOMMENDATIONS

As obesity affects an increasing number of children, interventions that target obesity have emerged worldwide. For example, in the United States, First Lady Michelle Obama created a national initiative called *Let's Move*. The program promotes healthy eating and active living among children throughout the United States. President Obama subsequently signed a Presidential Memorandum that created a Task Force on Childhood Obesity, thereby putting childhood obesity on the national agenda. Its mission is to evaluate existing policies and programs, and develop a national plan to improve existing programs. The United States' National School Lunch Program has since received increased funding, and the push for healthy food in schools has dramatically increased.

Chile's school food program has resulted in several positive outcomes, including reduced levels of school dropouts and school absences, decreased rates of undernutrition, and providing vulnerable students with free food. However, there are gaps in the program, as shown by this research, especially with regard to obesity and the types of food served in the program. Assuming that the results of this study are generalizable, and based on the general understanding of the program as a whole, a number of further steps are needed to effectively implement the Chilean national program. Indeed, "transformations of diet entail quite profound alterations in people's images of themselves, their notions of the contrasting virtues of tradition and change, the fabric of their daily life" (Mintz 1985, p. 13). It is clear that food, personal identity, and culture are all inherently linked, since no one realm of life can be separated from the others, together they and all play into the human experience. However, analysis of food and culture within the context of public health is particularly relevant because of the complex relationship

between the fields. Thus, balancing public health interventions and maintaining the focus on the culture of food is a critical component to these recommendations.

Taking into account the interconnectedness between food and the human experience, the following section presents a series of recommendations to help improve Chile's school food program, based on this research and ideas drawn from intervention programs in the United States, Singapore, and various European countries. Although programs in other countries may provide useful ideas for improving school food programs, the cultural relevance and appropriateness of these examples for Chile must be taken into consideration. These recommendations target both the macro-policy level and the micro-level of local schools and individual/family behaviors. Although nutrition education is central to these recommendations, national policy-level changes are also crucial for promoting systematic and long-term improvements. The recommendations are fairly simple by nature, but have the potential to positively impact the program and overall public health on a large scale if appropriately applied. It is important to note that a cost analysis of these recommendations is beyond the scope of this project. However, any increase in funds necessary to comply with these recommendations is likely to outweigh the future costs of health care associated with obesity and other diet-related chronic diseases.

RECOMMENDATION 1: Improve National Policies and Governmental Involvement

As rates of overweight and obesity among Chilean youth increase, it is essential to reverse this trend and thereby minimize the onset of subsequent chronic diseases. Before creating new interventions, however, the Chilean government needs to conduct a thorough evaluation of the existing program in order to collect baseline data as to the current realities of the program and the children. As Mintz (1985) eloquently states, "we need to understand how [the world]

works in order to change it in socially effective ways." Thus, an evaluation program should address a number of issues regarding how the program operates, including what types of food are actually served in schools and kiosks, collection of data along the lines of our research (regarding students' food consumption at schools and kiosks, student perceptions, preferences and knowledge of food), and the degree to which local staff understand nutritional issues. Once this baseline data is collected, there should be regular governmental evaluations of PAE to assess any changes in the program. In addition, the government needs to monitor schools more closely to ensure that schools are acting in accordance with existing policies and regulations.

The three goals of Chile's school food program are to reduce school dropout rates, decrease school absences, and ensure proper nutrition. Since school dropout rates and absences have been effectively reduced, PAE needs to be emphasized as a tool to promote healthy eating and reduce the current childhood obesity epidemic. By including healthy eating as one of the main goals of the program, Chile will ensure PAE's role as promoting a healthy youth and providing students with healthy options to reverse the growing preference for energy-dense foods (Albala et al. 2002).

Following the United States' model of a national task force on childhood obesity may highlight the importance school-based nutrition interventions and place the issue on the national agenda. The establishment of a national task force would also help to address evaluation data, identify areas in which governmental action is required, target research programs to better implement the program, and make recommendations to the national government for further actions. It would also assist in identifying necessary funding to promote a more effective program. This task force should be composed of Chilean policy makers, academics knowledgeable in the area, and community and regional representatives, thereby insuring that

any recommendations be sensitive to the diverse perspectives and values of Chilean society and its multi-cultural heritage.

RECOMMENDATION 2: Ensure a Healthy School Food Environment

Promoting healthy eating, particularly in schools, is important for the proper development of children. Healthy school food programs aid in proper development, positive self-esteem, and improved performance at school, and can also help to prevent diet-related chronic diseases (Bartrina and Pérez-Rodrigo 2006). Therefore, assuring a healthy school food environment for children is critical in promoting overall health. However, Chile's current school environment is obesogenic, or promoting of unhealthy behaviors. Making schools sites for healthy eating, instead of obesogenic environments, is an important step toward a healthier population. Especially since overweight and obesity are more a problem of low-income populations (Albala et al. 2002), Chile has an opportunity to use its school food program as a tool to decrease socioeconomic disparities, by providing the neediest children with food options comparable to those of children from wealthier families. Following is a series of ways to improve the health of foods served in Chilean schools.

Increase Governmental Regulation

Chile is a step ahead of many other countries by serving free food to children in schools who qualify for the program. This aspect of PAE is extremely positive and seems to have decreased any stigma surrounding eating free school food. However, more regulation as to what foods are served in local schools and in kiosks is necessary. Based on this research in Arica, and studies by others (Pyle et al 2006), it is evident that children's consumption patterns are easily influenced by the availability of unhealthy foods in schools. Indeed, Rutz and Orlove (1989) point out that schooling can influence children's preferences -- both those preferences instilled in

them by their families as well as those preferences influenced by other external factors. Therefore, schools should be required to increase fruits and vegetables, and the government should evaluate whether schools are following this and other aspects of a more balanced diet. Such steps have been taken in other countries. For example, Sweden's *Stockholm Obesity Prevention Programme* successfully decreased childhood overweight and obesity by banning sweets and sugar-sweetened beverages in schools (Lakshman et al. 2010). Following Sweden's model may result in Chilean schoolchildren's consuming fewer processed snacks in schools, and improving their overall health status.

Increase Fruits and Vegetables

In line with Chile's *Five a Day* campaign, schools should increase the total number of fruits and vegetables offered daily so that students can comply with the goal of eating five servings of these items every day. As indicated in the interview with a JUNAEB official, students are more likely choose to eat fruits if they are cut up and easy to eat. Tutti frutti, which is simply chopped fruit salad sometimes served with yogurt or cream on top, is extremely popular among children, as are fruits in general. Along with other comparable items, from a health perspective, tutti frutti is far preferable to currently served desserts such as jello, flan, rice pudding, and other high-sugar desserts found at School X.

Offering more vegetables to children is equally important, and a first step toward doing so is to increase the number of required salads in schools from eight per month. Schools also need to focus on serving fresh vegetables in these salads instead of cooked potatoes, which are starchy and lack many of the healthy nutrients that fresh vegetables contain. To achieve this goal, the independent contractors who prepare food in schools should be required to serve fresh salads. In the United States, salad bars have become increasingly popular in public schools. As part of

Michelle Obama's *Let's Move* campaign, a new collaboration has emerged, entitled *Let's Move Salad Bars to Schools*. Not only have schools and students responded positively to these new salad bars, vegetable consumption has increased among students in participating schools.

Other countries have successfully increased fruit consumption among schoolchildren in a variety of ways, and Chile can learn from these successful interventions. In the United Kingdom, the *National School Fruit Scheme* provided children with free fruit in schools and, following the two-year intervention, fruit consumption was significantly higher (Sharma 2006). Germany's *STEP TWO Programme* served overweight and obese children more fruits and vegetables in their meals, and also promoted increased physical activity. The intervention was successful and resulted in a slower increase in obesity rates and lower blood pressure levels (Sharma 2006). Lastly, Singapore's school lunch health intervention, *Trim and Fit*, incorporated nutrition education in schools, as well as healthier food and drink options. The intervention successfully decreased obesity among primary and secondary school students over an eight-year period (Sharma 2006). From these case studies it is clear that increasing fruits and vegetables as part of the free food in schools can have positive behavioral and physical impacts.

Go Back to Basics

Including fewer processed foods in both the PAE menu as well as the kiosks will increase the number of healthy options in Chilean schools. Michael Pollan (2009), well-known food author and proponent of healthy, sustainable eating, writes that people ought to consume only foods that their great-grandparents would have recognized. This emphasis on consumption of non-processed, basic foods reflects the need to move away from processed foods that have become so prevalent and preferred in recent years. Although it is necessary to add healthier options to the school food menu, at the same time it is also necessary to decrease unhealthy

choices so that children eat fewer unhealthy calories. Consequently, processed foods that are generally unhealthy, but nonetheless preferred by students, need to be restricted in schools.

Limiting processed snacks for sale at kiosks is crucial, since this research found that the kiosk offered students many inexpensive packaged, processed foods. However, going "back to basics" also refers to the PAE menu, which serves children processed foods, including white bread. Instead of allowing children to eat up to two servings of white bread every day as part of the free school lunch, offering them whole grain bread is a healthier substitute and would likely be accepted by many as a positive change to the school food.

In her book *Free for All*, Poppendieck outlined a series of recommendations for improving school food in America. One recommendation that might be adopted by Chilean schools is to "eat your colors" (2010, p. 281). Simple to understand and see, eating foods of a variety of colors will incorporate fruits, vegetables, whole grains, and proteins in diets, and will decrease the consumption of processed foods, which are generally beige. This guideline complies with the ideas of the JUNAEB official who was interviewed, whose main idea to promote healthy eating and increase consumption of school food was to make foods more visually appealing.

RECOMMENDATION 3: Increase Nutrition Education in Schools

Nutrition interventions must also occur at the level of the individual, not just at national or school-levels. Thus an important aspect of these recommendations involves nutrition education to impact children's eating habits and concepts of health and nutrition. However, it is essential to couple nutrition education with changes in the school food environment, since neither will be entirely successful if implemented alone. For example, if children learn the importance of healthy eating in the classroom but are able to purchase unhealthy processed foods

at school, then the education process may be devalued (O'Toole et al. 2007). Since people's habitus' influence their decisions (Bourdieu 1990) and are likely to be a factor in children's high preference for processed snacks, it is important to limit the availability of unhealthy options in their environment so that they do not have the opportunity to be influenced by their deeply rooted preference for processed snacks. On the other hand, if students are presented with healthy foods but do not realize the importance of consuming them, they may not choose to eat them – especially if they have a preference for unhealthy foods. Therefore, incorporating nutrition education into school curriculum along with previously stated national recommendations is critical.

Most Chileans believe that the responsibility for providing nutrition education lies with the education system, but most also believe that schools are doing a poor job at nutrition education (Estudio Obesidad 2011). Therefore, it is necessary for schools to incorporate a regular course to promote healthy eating and active living. Teaching students about the importance of living healthfully is a necessary adjunct to their usual studies in math, history, language studies, etc. At the same time, introducing healthy eating and active living to children in fun and engaging ways is extremely important to assure that children will be interested in learning about food. Including experiential learning into nutrition lessons will help to solidify student interest. For example, students could learn about foods in the context of a) history and culture, in terms of where ingredients come from traditions and rituals associated with food, b) math, in terms of measuring ingredients, c) science, in terms of the interaction between ingredients and how bodies digest food, and d) nutrition, in terms of the health aspects of certain foods (Poppendieck 2010). In the process of learning about these foods, students might be given the opportunity to touch, smell, and ultimately taste different healthy foods, and perhaps become accustomed to healthy

options and become excited about consuming them. In addition, healthy eating in schools has proven to improve children's performance in school. That is, as students eat more healthy foods in schools, their attention and alertness in school increase (Golley et al. 2010).

Another way for students to learn about food and nutrition is to use games to teach about healthy foods. One intervention in the United Kingdom used card games involving foods and nutritional information to teach children about healthy eating behaviors. By the end of the school year the card game resulted in an enhanced understanding of healthy eating (Lakshman et al. 2010). Incorporating food into art may also aid in an increased understanding the importance of healthy eating. For example, including food themes into art class, or painting food and healthy eating guidelines in the school cafeteria, would not only add color to the cafeteria but would also surround students with pictures of healthy food.

Another way to promote healthy eating is to have celebrities or other role models support eating healthfully. Just as the *Got Milk?* campaign successfully harnessed celebrities' fame to promote milk consumption, famous role models in Chile could be used to promote the *Five a Day* campaign. In the United Kingdom, an intervention that involved young children viewing videos of older role models eating fruits and vegetables successfully increased consumption of fruits and vegetables both at school and at home (Sharma 2006).

In *Free for All*, Poppendieck (2010) provided readers with three easy to remember guidelines to help promote healthy eating. These included: a) consume five servings of fruits and vegetables per day, b) eat all parts of plants, and c) limit consumption of processed foods. Along with eating colorfully, these three recommendations promote consumption of whole, healthy foods, and place the focus on whole foods rather than their nutritional components. Although it is important to teach children about individual nutrients so that they have a baseline understanding

throughout their lives, learning about healthy eating and how to consume a healthy diet is important and easier to follow than specific nutrient recommendations.

These guidelines are not only easy to teach to students but are also a way to involve families into the education component of health. While schools may have the responsibility to teach children about healthy eating, families must reinforce what children learn by providing them with as many healthy options at home as possible. Engaging students and their families by sending home pamphlets with healthy eating guidelines, or even recipes for healthy, inexpensive meals, is an important step toward a healthier population. Encouraging parents to attend school events that focus on health diets through movie showings, recipe sessions, etc. may also be useful. Based on these recommendations, it is clear that nutrition education and promoting healthy eating in schools can work to disincentivize children from eating unhealthy foods.

In summary, schools serve as an important site for instilling positive and healthy habits among children. In fact, the importance of what children learn at home varies "according to the extent to which … cultural practices are recognized and taught by the educational system" (Bourdieu 1984, p. 2). Thus, depending on the thoughtfulness and cultural relevance of a school-based nutrition education program, schools may have a greater role than parents in teaching children healthy lifestyles. This section presented a series of recommendations that may aid in reversing Chile's growing childhood obesity epidemic by making improvements on the policy level, as well as the individual level. First, national policies and governmental involvement with regard to childhood obesity needs to improve. That is, a comprehensive evaluation of the current program and policies needs to be conducted, and healthy food and the fight against obesity need to be central aspects of PAE. Second, schools need to serve healthier foods. In this sense,

governmental regulation needs to increase so that there is consistency across the country. In addition, more fruits and vegetables need to be served in schools, and the amount of processed foods served in schools must be limited. Third, nutrition education needs to become of increased importance in schools. In this sense, schools should incorporate food into its curriculum with as much value as other subjects. Nutrition education needs to be a fun aspect of school, so that children pay attention to and adopt healthier lifestyles. In addition, it is important to include families in nutrition education and interventions undertaken at local levels in schools and communities.

Based on this research, and on the study of PAE and other nutritional programs around the world, it is evident that solutions to poor nutrition, obesity and chronic diseases associated with nutrition cannot be addressed solely by singular actions. Any solution must be multi-faceted, and must include macro-interventions at national and regional levels within a society, along with integrated interventions at local levels of schools, families and individuals. Furthermore, any interventions must be sensitive to and compatible with cultural values, beliefs, traditions and rituals -- because food and eating are central and defining aspects of any culture.

CONCLUDING REMARKS

The underlying purpose of this research was to identify Chile's changing patterns of consumption and understand the implications of those changes for overall health. Specifically, the present study aimed to 1) identify policy associated with *El Programa de Alimentación Escolar,* Chile's national school food program, 2) understand how the program operates on a local level, and 3) explore how government officials, private food providers, and schoolchildren perceived and functioned within the program. Of specific interest were children's eating habits at school, their food preferences, and their knowledge of nutrition. To understand these different facets of Chile' school food program, methods including ethnographic observation of school lunches for one week, a survey with a group of schoolchildren regarding their consumption patterns, food preferences, and concepts of health and nutrition, and interviews with a government official, private food vendors, and experts in the field of school lunches and childhood nutrition were conducted.

The prevalence of diet-related chronic diseases, including overweight and obesity, has increased worldwide, and Chile is no exception. Schools, whose main goal is to educate and help establish positive habits among children, serve as uniquely appropriate sites to combat the growing obesity epidemic. School food programs, in particular, have the opportunity to both serve children nutritious foods to promote a healthy development, as well as to set a positive example of consumption patterns so that children remain healthy over the life course.

The present study found that Chilean schoolchildren ate many of their meals in school cafeterias, thereby providing the government with ample opportunity to both offer nutritious foods and establish healthy habits. However, this research found that food served in schools generally lacked fresh fruits and vegetables. In addition, private food vendors operating kiosks in

schools sold unhealthy food to children at low prices, even though they were required by law to sell healthy foods. Furthermore, the kiosk was fairly popular, with over half of the children purchasing food from the kiosk on a regular basis.

These data also indicated that children understood what foods to eat in order to remain healthy, and many even reported a high preference for fruit. However, there was a clear disconnect between their knowledge and actions. That is, many children failed to eat healthy diets even when they understood what they should be eating from a health perspective. This is not an unusual pattern worldwide, with people's food preferences often reflecting an increasing trend toward processed foods and a decreasing preference for whole foods as part of well-rounded meals. Interviews with Chilean and United States-based food and childhood nutrition experts revealed the importance of healthy nutrition at a young age. Although advertising and the media play a role in children's preferences for unhealthy foods in Chile and around the world, nutrition interventions in schools can positively change children's eating patterns and improve health conditions.

Based on the findings of the present study, several simple changes to Chile's current school food system are recommended. These include increasing governmental involvement and improving policies, serving healthier foods and limiting unhealthy options, and including nutrition education in the classroom and community. Specifically, these recommendations entail more regulated evaluations and stricter policy surrounding Chile's school food program, with increased requirements for fresh fruits and vegetables and decreased white bread. In addition, increased nutrition education, using traditional and innovative techniques developed in other countries, will help to teach children the importance of healthy eating. Kiosks in schools need to offer students healthier options, so that what children learn in the classroom about proper

nutrition is reinforced throughout the school day. In this sense, consistency between what children learn in the classroom and what they are able to eat throughout the school environment is key. Increased parental involvement with regard to the nutrition education component, along with the use of a variety of media and teaching tools to highlight the importance and means for implementing proper nutrition in homes, will help to reinforce healthy habits among children.

Targeting children at a young age is important to assure healthy lifelong eating habits. Incorporating nutrition education and providing children with healthy and nutritious meals in schools is of upmost importance, especially with the current trend towards obesity and other chronic diseases. Schools, and in particular school food programs, have a unique opportunity to prevent the development of diseases among children simply by teaching them healthy habits beginning at a young age. By including more fruits, vegetables, and other healthy foods into nutritious and well-rounded school meals, and by including nutrition education into the school curriculum, Chile – and other school food programs around the world – can inspire the next generation to eat and live healthier. Systematically changing the food system from one that promotes production and consumption of unhealthy, processed foods to encouraging an overall healthy lifestyle is critically important today. Since food is so central to people's culture and identity, changing the school food movement towards one that fosters healthy habits among children has the potential to positively impact generations to come.

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