AN EVALUATION OF THE FACTORS INFLUENCING PARTICIPATION IN THE NATIONAL SCHOOL LUNCH PROGRAM (NSLP) FOR LATINO STUDENTS DURING MIDDLE SCHOOL AND HIGH SCHOOL YEARS

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Master of Science
In
Agriculture

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Adriana Lopez
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SIGNATURE PAGE

PROJECT: AN EVALUATION OF THE FACTORS INFLUENCING PARTICIPATION IN THE NATIONAL SCHOOL LUNCH PROGRAM (NSLP) FOR LATINO STUDENTS DURING MIDDLE SCHOOL AND HIGH SCHOOL YEARS

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To my daughter Camila, thank you for serving as my constant source of inspiration and motivation. Your joyful spirit and unconditional love has given me all of the strength I need to get through any situation, no matter how challenging it may be. I have done all of this for you, to make you proud and to show you that you can accomplish anything you set your mind to. Thank you for sacrificing your time with me so that I could focus on finalizing my thesis. I promise Mommy will have a lot more free time to spend with you from now on! Te amo!

I would like to dedicate this work to the memory of my mother, Carmen Lopez, who joined the heavens when I was 4 years old. I know you are smiling down at me, proud of this accomplishment. I love you.
ABSTRACT

There is no published research available to explain the factors influencing participation in the National School Lunch Program (NSLP) for Latino students in Middle School and High School. Evidence exists that perceived social stigma, access to competitive foods, peer and parental influences all impact NSLP participation rates in the general student population. The purpose of this study was to evaluate the factors influencing participation in the NSLP for Latino students in middle school and high school years. Data was collected utilizing a 22-question survey tool. The independent variables investigated were: grade level, gender, ethnicity, perceived social stigma regarding NSLP participation, competitive foods served on and off campus, peer influences and parental influences. The dependent variable was participation in the NSLP. Study participants were a convenience sample of students (N= 232) enrolled at two high schools and two middle schools within ABC Unified School District in Southern California. Results indicated that Latino students were significantly different from non-Latino students in their participation rates in the NSLP. The significant predictors of NSLP participation for Latino students were meal eligibility, parental level of education, frequency of family meals, and frequency of fast food consumption. Meal eligibility was the only significant predictor of participation in the NSLP for Latino students who are low-participators. Latino students are clearly different from non-Latino students in the factors that influence their participation in the NSLP. More research is needed to further
clarify the exact factors impacting Latino NSLP participation and the degree of impact each of these factors has.
TABLE OF CONTENTS

Signature Page..................................................................................................................ii

Acknowledgements..........................................................................................................iii

Abstract...............................................................................................................................v

List of Tables..................................................................................................................... ix

List of Figures .................................................................................................................... x

Chapter 1: Introduction................................................................................................... 1

Chapter 2: Literature Review ........................................................................................ 8

Chapter 3: Methodology..................................................................................................35

Chapter 4: Results ........................................................................................................ 46

Chapter 5: Discussion ....................................................................................................59

Chapter 6: Conclusion ................................................................................................... 68

References.......................................................................................................................69

Appendix A: IRB Approval Memorandum ................................................................. 80

Appendix B: Informed Consent Forms .......................................................................81

Appendix C: Memorandum of Protocol Addendum and Extension....................... 83

Appendix D: Study Survey Tool ................................................................................. 84
Appendix E: Mock Survey Tool................................................................. 87

Appendix F: Assent Form for Consented Study Participants ..................... 90

Appendix G: Assent Form for non-Consented Students ............................ 91

Appendix H: General Assent Script........................................................... 92

Appendix I: Summary of Articles On Factors Influencing NSLP Participation .. 93

Appendix J: Summary of Articles on NSLP and Student BMI & Diet Quality .... 97

Appendix K: Journal Article for Manuscript Submission ............................ 101
LIST OF FIGURES

Figure 1  Percentage of Children not Consuming Recommended Amounts of Food Groups. .......................................................... 15
CHAPTER 1
INTRODUCTION

Background

The National School Lunch Program (NSLP) was established under the National School Lunch Act of 1946 with the primary goal of ensuring that school children do not go hungry and have access to nutritious meals and snacks that support normal growth and development (USDA, 2012a). The Healthy Hunger-Free Kids act of 2010 required that the U.S. Department of Agriculture update school meal nutrition standards in order to reflect the dietary recommendations outlined in the 2010 Dietary Guidelines for Americans (DGAs) (USDA, 2012b). The DGAs provide evidence-based food and beverage recommendations with the goal of promoting health, preventing chronic disease and helping people reach and maintain a healthy weight (Office of Disease Prevention and Health Promotion, 2016). Currently, meals served through the NSLP are designed to provide participating school children with a well-balanced, low-fat meal containing one-third of their daily nutrient requirements (USDA, 2012a). Evidence shows that meals served through the NSLP provide adequate nutrition and support student health (USDA, 2012a; Hanson & Olson, 2013; Taber, Chriqui, Powell and Chaloupka, 2013; Briefel, Crepinsek, Wilson & Gleason, 2009). Moreover, participation in the NSLP has the potential to help decrease childhood obesity rates (Taber et al., 2013).

Literature suggests that Latino students are the most at risk for food insecurity and obesity (Ogden, Carroll, Kit & Flegal, 2014; USDA, 2016a).
According to recent figures, approximately 30.5 million school children participated in the NSLP nationwide in 2015, 72.6% of which received free or reduced price meals (USDA, 2016b). In California alone, approximately 3.2 million students participated in the NSLP in 2015 (USDA, 2016c). Latino students account for approximately 25% of all students enrolled in U.S. public schools and about one-third of the total students eligible for free or reduced meals through the NSLP (National Center for Education Statistics, 2016). Additionally, Latino students make up 53.97% of all public school students in California (California Department of Education, 2016a). Currently, Latinos represent the largest ethnic group in California at 38.6% of the total population, a number that is expected to continue to grow (United States Census Bureau, 2015). Latino students will continue to grow as a target population for the NSLP, especially in California. Thus, it is crucial to elucidate the factors influencing their participation in the NSLP in order to help increase their participation rates.

Participation rates in the NSLP have been dropping in recent years decreasing from 31.8 million in 2011 to 30.5 million in 2015 (USDA, 2016b). Additionally, NSLP participation rates are drastically lower for students at higher grade levels: 66% for elementary students compared to 54.5% for middle school students and 40.5% for high school students (Gleason, 1995). Decreased NSLP participation during middle school and high school years is concerning since these are years of marked growth and increased dietary needs (California Department of Public Health, 2013).
Previous research has demonstrated the significant effect of school lunch price, access to competitive foods, perceived social stigma, peer influences and parental/home influence on NSLP participation in the general population of school children (Akin, Guilkey, Popkin & Wyckoff, 1993; Bhatia, Jones & Reicker, 2011; Gleason, 1995; Long, Henderson & Schwarts, 2010; Maurer, 1984; Miller, 2011; Snelling, 2007, Mirtcheva & Powell, 2009). There are no published studies that examine the factors influencing participation in the NSLP specifically for Latino students during middle and high school years. Latino students comprise the largest student population in California yet no studies have been published to investigate the factors that may be influencing their participation in the NSLP.

Statement of the Problem

There is no data available to explain the factors that influence participation in the National School Lunch Program specifically for Latino students during Middle School and High School years.

Purpose of the Study

The purpose of this study was to examine the factors influencing participation in the NSLP for Latino school children at middle school and high school grade levels. The overall goal for this study is to provide guidance and suggestions to school food service professionals to help increase NSLP participation by Latino students.
Significance of the Study

It is necessary elucidate the factors that may be causing a drastic decline in student participation in the NSLP during middle school and high school years, particularly among Latino students. Results from this study can aid school districts in making necessary changes to increase NSLP student participation rates among all students. Latino students stand to benefit tremendously from participation in the NSLP since they are afflicted by obesity at a much higher rate than their peers. The results of this study will add to previous research by providing a focused analysis of the factors influencing participation in the NSLP for the Latino population. Furthermore, the results of this study could potentially help increase NSLP participation for Latino children by providing a deeper understanding of the factors that influence their decision to consume school meals.

Objectives

Objective #1
To understand the factors that influence Latino students’ decision to participate in the NSLP.

Objective #2
To understand the effect of grade level, parent/home influences, social stigma/peer influences and competitive foods on students’ likelihood of participating in the NSLP.
Objective #3

To gather data that could help guide school nutrition professionals in their effort to increase NSLP participation.

Hypotheses

The hypotheses to be tested in this study are as follows:

Null Hypotheses

H01: There is no significant difference in NSLP participation between Latino and non-Latino students.

H02: There are no significant predictors for participation in the NSLP for Latino Students.

H03: The factors that serve as significant predictors of NSLP participation are the same for Latino and non-Latino students.

H04: The significant predictors of NSLP participation for Latino students who participate at low rates in the NSLP (low participators) are the same as those predicting participation for Latino students who participate at high rates in the NSLP (high participators).

Research Hypotheses

HA1: There is a significant difference in NSLP participation between Latino and non-Latino students.
HA2: There will be significant predictors of participation in the NSLP for Latino students, specifically: perceived social stigma and parental influences.

HA3: The factors that serve as significant predictors of NSLP participation are different for Latinos than for non-Latino students.

HA4: The significant predictors for NSLP participation for Latino students who participate at low rates in the NSLP (low participators) are different than those predicting participation for Latino students who participate at high rates in the NSLP (high participators).
## Definition of Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td><strong>Hispanic</strong></td>
<td>A person who comes originally from an area where Spanish is spoken and especially from Latin America (CDC, 2010).</td>
</tr>
<tr>
<td><strong>Latino</strong></td>
<td>A person who was born or lives in South America, Central America, or Mexico or a person in the U.S. whose family is originally from South America, Central America, or Mexico (CDC, 2010).</td>
</tr>
<tr>
<td><strong>NHANES</strong></td>
<td>National Health and Nutrition Examination Survey. A program of studies designed to assess the health and nutritional status of adults and children in the United States. The survey is unique in that it combines interviews and physical examinations (CDC, 2015).</td>
</tr>
<tr>
<td><strong>NSLP</strong></td>
<td>National School Lunch Program. A federally assisted meal program operating in public and nonprofit private schools and residential child care institutions. It provides nutritionally balanced, low-cost or free lunches to children each school day. The program was established under the National School Lunch Act, signed by President Harry Truman in 1946. (USDA, 2016d)</td>
</tr>
<tr>
<td><strong>USDA</strong></td>
<td>United States Department of Agriculture. A government organization that provides leadership on food, agriculture, natural resources, rural development, nutrition, and related issues based on public policy, the best available science, and effective management. (USDA, 2016e)</td>
</tr>
</tbody>
</table>
There are no published studies that examine the factors influencing participation in the NSLP specifically for Latino students during middle and high school years. In our study, we chose to focus on the Latino population because they are the largest and fastest growing ethnic group among public school students in California and because Latino students are impacted by childhood obesity at a much higher rate than their peers. (CDE, 2016a; Ogden et al., 2014; US Census Bureau, 2015).

This literature review focuses on: Background of the NSLP, childhood obesity among Latinos, food insecurity and the NSLP, overview of current child dietary trends, studies on the relationship between the NSLP and student health, and an overview of the proposed factors that influence NSLP participation.

Background on the NSLP

The primary goal of the NSLP is to help safeguard the health of our nation’s school children. NSLP meal patterns were revised in 2012 in an effort to produce healthier school meals and help combat childhood obesity and hunger (Academy of Nutrition and Dietetics (AND), 2012). These changes were implemented in an effort to increase availability of lean meats, fruits, vegetables, whole grains and fat-free and low-fat milk, reduce levels of sodium and saturated fat and meet specific calorie range requirements for children at different grade levels (AND, 2012). Overall, the goal of those changes was to help improve the
dietary habits of school children and protect their lifelong health (AND, 2012). It is likely that current NSLP guidelines will change in accordance with the most up-to-date dietary science presented in the latest Dietary Guidelines for Americans published in 2015.

School meals are highly regulated in order to ensure the healthiest meals are being served to program participants. Most school districts operate the NSLP program under an “offer versus serve” concept through which students must be offered a total of 5 meal components (food groups): Grains, Meat/Meat Alternative, Milk, Fruits and Vegetables. In order for a student meal to be considered a “reimbursable” (complete) meal, students must select at least 3 out of the 5 meal components, one of which must be a fruit or a vegetable (USDA, 2014). Although these rules may seem unnecessary to some, they ensure that students are served a variety of food groups and encourage variety in a student’s diet.

Since the conception of the NSLP, participation has increased from 7.1 million children in 1946 to 30.5 million children in 2015 (USDA, 2016b). The impact of the NSLP is far reaching, operating in 94 percent of all schools in the United States (USDA, 2012a). In fiscal year 2015 alone, the NSLP provided approximately 5 billion school lunches to participating students (USDA, 2016b). In the 2009-2010 school year, approximately 63% of all students enrolled in public schools participated in the NSLP (USDA, 2012a). Student participation rates in the NSLP have been steadily declining in recent years (USDA, 2016b). Participation in the NSLP has decreased from 31.8 million children in 2011 to
30.5 million children in 2015 (USDA, 2016b). A continued drop in NSLP participation is a concern because this is an indication that an increasing number of school children are not consuming school meals and may not be receiving the nutrients necessary to develop normally. Additionally, these children may be at a greater risk of becoming obese.

Student participation rates in the NSLP are drastically lower among high school and middle school students compared to elementary students. (Gleason, 1995). This fact is very concerning considering that adolescence is a time of increased nutrient demands and these students may be choosing to starve themselves or purchase snack/competitive foods instead of consuming a well-balanced meal through the NSLP (Snelling et al., 2007; Mathias, Jaquier & Eldridge, 2016; CDC, 2011). It is extremely necessary to investigate the factors contributing to the drop in NSLP participation specifically among middle and high school Latino students since they are afflicted by childhood obesity at a disproportionate rate.

**Childhood Obesity Among Latinos**

Childhood obesity is a growing health epidemic in the United States. A child is considered obese when his/her calculated body mass index (BMI) is at or above the sex-specific 95th percentile on the CDC’s 2000 BMI-for-age growth charts (Flegal & Troiano, 2000). Obese children are at an increased risk of becoming obese adults and developing chronic health conditions later in life (CDC, 2012a).
As previously mentioned, Latino children make up 53.6% of the student population enrolled in public schools in California and 65% of all students enrolled in Los Angeles County public schools (NCES, 2016). Obesity is particularly prevalent in Latino children compared to children from other ethnic groups with 21% of Hispanic children in the U.S. and 26.9% of Hispanic children in Los Angeles county public schools being classified as obese. (Ogden et al, 2014; Shih, Dumke, Goran & Simon, 2013).

Ogden et al. (2014) analyzed NHANES data from 2011-2012 in order to provide an updated national estimate of childhood obesity. It was found that in 2011-2012, the prevalence of obesity in the United States was 16.9% in all youth aged 2 to 19 years old and 22.6% in Hispanic youth aged 2 to 19 years old (Ogden et al., 2014). As depicted in Table 1 below, it was also found that Hispanic youth have the highest rates of overweight and obesity (38.9%) when compared to Non-Hispanic Blacks, Asians, and non-Hispanic whites (Ogden et al., 2014).
### Table 1

**Prevalence of Overweight (BMI>85th Percentile for Age) by Ethnicity, US, 2011-2012 (mean and standard deviation)**%

<table>
<thead>
<tr>
<th></th>
<th>2-19 years</th>
<th>2-5 years</th>
<th>6-11 years</th>
<th>12-19 years</th>
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<tbody>
<tr>
<td><strong>All Races</strong></td>
<td>31.8 (29.1-34.7)</td>
<td>22.8 (18.7-27.6)</td>
<td>34.2 (30.1-38.5)</td>
<td>34.5 (30.1-39.2)</td>
</tr>
<tr>
<td><strong>White</strong></td>
<td>28.5 (24.0-33.4)</td>
<td>20.9 (14.4-29.2)</td>
<td>29.4 (21.6-38.7)</td>
<td>31.2 (24.3-39.1)</td>
</tr>
<tr>
<td><strong>Black</strong></td>
<td>35.2 (30.2-40.6)</td>
<td>21.9 (16.7-28.2)</td>
<td>38.1 (30.1-46.8)</td>
<td>39.8 (32.9-47.2)</td>
</tr>
<tr>
<td><strong>Asian</strong></td>
<td>19.5 (15.7-23.9)</td>
<td>9.0 (4.5-17.3)</td>
<td>19.9 (16.2-24.3)</td>
<td>24.6 (17.8-32.9)</td>
</tr>
<tr>
<td><strong>Hispanic</strong></td>
<td>38.9 (36.3-41.6)</td>
<td>29.8 (24.0-36.4)</td>
<td>46.2 (41.5-50.9)</td>
<td>38.1 (21.9-44.8)</td>
</tr>
</tbody>
</table>

Adapted from Ogden et al, 2014

There are many factors that may increase a child’s risk of becoming obese. In addition to genetic predisposition, behavioral factors such as unhealthy dietary patterns and physical inactivity may play a significant role in childhood obesity (CDC, 2012b). Furthermore, influences present in the community and the home environment may drastically impact a child’s risk for becoming obese (CDC, 2012b). Studies with Latino populations have demonstrated a link between higher BMI in children and lower parental income, lower parental education level, higher maternal BMI, and higher percentage of Latino community composition (Kirby, Liang, Chen & Wang, 2012; Balistreri & Van Hook, 2009; Videon & Manning, 2003). Evidence also exists that parental influences and home environmental factors may be contributing to weight gain among these socioeconomically disadvantaged children (Mirtcheva et al., 2009; Miller, 2011; Kirby et al., 2012; Balistreri et al., 2009; Videon et al., 2013).

It has been found that Latino children are more likely to grow up in a
home facing a high level of economic hardship and food insecurity (Shih et al., 2013; USDA, 2016a). A significant association has been demonstrated between high levels of economic hardship, food insecurity and the prevalence of childhood obesity, particularly in the Hispanic population (Shih et al., 2013). In the following section, we will review the concept of food insecurity and how it relates to NSLP participation.

**Food Insecurity and the NSLP**

Food insecure households are defined as at some point during the year “being uncertain of having, or unable to acquire, enough food to meet the needs of all their members because they had insufficient money or other resources for food” (USDA, 2016a). According to a 2015 report from the USDA Economic Research Service (ERS), 21.9% of Hispanic households were classified as food-insecure and 11.5% had food insecure children (USDA, 2016a). Food insecurity is strongly associated with overweight and obesity among Latino populations (Smith, Colon-Ramos, Pinard & Yaroch, 2016). Moreover, literature suggests a higher propensity for overweight and obesity across all ethnic groups experiencing food insecurity (Kaur, Lamb & Ogden, 2015; Metallinos-Katsaras, Sherry & Kallio, 2009).

We have shown that Hispanic children are affected by economic hardship and food insecurity at a disproportionate rate. We have also discussed how food insecurity increases a child’s risk for becoming obese. It can be argued that the NSLP helps mitigate the effects of food insecurity by providing children with a
dependable source of a daily well-balanced nutritious meal for all program participants. For children of food insecure households, school meals provide a critical safety net and may provide the bulk of their nutrition throughout the day. Taking all of this into account, it is reasonable to conclude that school meal participation has the potential to play a critical role in children’s health, particularly among low-income Latino populations who may also be experiencing food insecurity. Unfortunately, according the USDA Economic Research Service, only 30.1% of children from food insecure households received free/reduced price lunches through the NSLP in 2015 (USDA, 2016a). Based on this data, it appears that many food-insecure students are missing out on the benefits that participation in the NSLP could offer them.

In the next section we will discuss current child dietary trends in the United States in order to lay the foundation for how participation in the NSLP is beneficial to overall student health.

**Current Child Dietary Trends**

As previously stated, the main goal of the NSLP program is to provide the nutrients necessary for school children to grow and develop normally (USDA, 2012b). Evidence shows that meals served through the NSLP provide adequate nutrition and support student health (USDA, 2012a; Hanson et al., 2013; Taber et al., 2013; Briefel et al., 2009). Childhood and adolescence are inarguably critical periods for adequate nutrition. Increased growth and body size results in increased nutrient requirements during the adolescent years (California
Department of Public Health, 2013). Unfortunately, however, most children are not consuming the recommended amounts of daily nutrients (CDC, 2011; Krebs-Smith, Guenther, Subar, Kirkpatrick & Dodd, 2010; USDA, 2014).

A study utilizing data from 2001-2004 NHANES revealed that most of the U.S. population is not meeting the federal dietary recommendations for all of the food groups except for grains and protein (Krebs-Smith et al., 2010). Food consumption reported on 24-hour dietary recalls for 16,338 persons was translated into amounts consumed of various food groups. As shown in Figure 1 below, it was discovered that children ages 9-13 and 14-18 are severely deficient in total fruit, vegetable and dairy consumption (Krebs-Smith et al., 2010). The diet deficiencies noted above could be a significant contributing factor to childhood obesity.

![Figure 1. Percentage of Children Not Consuming Recommended Amounts of Food Groups](image)

*Adapted from Krebs-Smith et al., 2010*
In 2009, Bradlee et al. analyzed NHANES data from 1998-2002 in order to investigate the relationship between mean food group intakes and central obesity among children and adolescents. It was found that adolescents who consumed significantly less total dairy, total grains, and total fruits and vegetables also met the criteria for central obesity (Bradlee, Singer, Qureshi & Moore, 2009). These results suggest that inadequate consumption of fruits and vegetables increases the risk for obesity in children. Meals provided through the NSLP offer students the opportunity to consume adequate amounts of dairy, whole grains, fruits and vegetables and thus can play a significant role in helping increase students’ daily consumption of these food groups.

According to data provided by the 2011 National Youth Risk Behavior Survey (YRBS) conducted by the CDC with high school students, 12.2% of students had starved themselves for 24 hours in an effort to lose weight or to maintain their weight in the 30 days before the survey (CDC, 2011). Data from the USDA indicates that 7% to 20% of children and adolescents skip lunch on a regular basis. (USDA, 2014). In a 2009 longitudinal study involving unhealthy weight control behaviors (UWCB) among adolescents, Linde et al. explored personal, behavioral, and socio-environmental factors associated with dietary intake and body weight. Questionnaires were administered to 1,106 boys and 1,362 girls at two time points, five years apart. Researchers found that approximately 28.5% of boys and 56.1% of the girls engaged in some sort of unhealthy weight control behavior, such as meal skipping (Linde, Wall, Haines & Neimark-Sztainer, 2009). Considering this data, it is possible that adolescent
students are not consuming school meals because they are purposely skipping meals as a method of weight control. It is important to identify this type of behavior among students because it may lower their participation in the NSLP and negatively impact their total diet quality and physical development.

Mathias et al. (2016) investigated the differences in total micro and macronutrient intakes of children aged 4 to 18 years consuming and missing lunch on any given day. Researchers performed a cross-sectional secondary analysis utilizing data from the National Health and Nutrition Examination Survey (NHANES) 2009-2010 and 2011-2012. The results of this study revealed that missing lunch was associated with lower micronutrient, energy, fiber and sodium intake (Mathias, Jacquier & Eldridge, 2016). Meal skipping and/or self-imposed starvation are concerning behaviors that could be contributing to the steady decline in NSLP student participation rates.

Guerrero et al. (2015) demonstrated a significant difference in the dietary patterns of California children based on their ethnicity. This study utilized data collected from the 2007 and 2009 California Health Interview Survey (CHIS) from 15,902 California children aged 2 to 11 years old. Through multivariate regression analysis, it was found that Latino children had significantly higher intakes of fruit juice and fast foods when compared to their white counterparts (Guerrero & Chung, 2016). These dietary trends in Latino children are cause for concern since increased consumption of fast foods and fruit juice have been shown to increase the risk of childhood obesity (CDC, 2012b).

The youth dietary trends discussed above indicate that children may not
be receiving the ideal nutrition required for their adequate development. Latino children are impacted by obesity at a much higher rate than their peers (Ogden et al., 2014; CDC 2012c). School lunches are designed to provide children with adequate nutrition and have been shown to play a role in reducing rates of childhood obesity (AND, 2012; Taber et al., 2009). Furthermore, school meals help reinforce healthy eating habits among students by providing them with a daily example of a well-balanced nutritious meal. Based on this information, it seems extremely necessary to discover the factors preventing Latino students from participating in the NSLP in order to boost their program participation and ensure that these children are consuming nutritious and well-balanced meals on a daily basis while at school. Increased consumption of meals through the NSLP could potentially lead to improved dietary patterns among Latino students.

Studies on the Impact of the NSLP on Student Health

Improving the school food environment is an effective and powerful method to impact children’s health and help combat childhood obesity (Briefel et al., 2009). An integral component of the school food environment is the food being served on-campus through the NSLP. Overall, it is argued that the NSLP supports student health by providing a reliable source of well-balanced meals containing whole grains, fruits, vegetables, lean proteins, low-fat dairy and limited amounts of calories, saturated fat and sodium (USDA, 2012b). Many studies have indicated a link between NSLP participation and lower child BMI (Hanson et al., 2013; Taber et al., 2013; Briefel et al., 2009) while other studies have
indicated the complete opposite relationship (Hernandez et al., 2011; Li et al., 2009). A large body of research also exists providing evidence for the positive impact NSLP meals have on student diet quality and overall child health (USDA, 2012a; Hanson et al., 2013; Taber et al., 2013; Briefel et al., 2009). It has been shown that participation in the NSLP results in an overall healthier diet in children, especially for those from low-income households (Hanson et al., 2013).

Taber et al. conducted a study in 2013 to evaluate how the new 2012 NSLP meal regulations would impact student health. This observational study utilized data collected in 2007 from 4,870 students from 40 states who participated in the Early Childhood Longitudinal Study (ECLS-K). These researchers aimed to discover the relationship between stricter meal guidelines and student BMI. Results showed that students participating in the NSLP in states with meal guidelines that exceeded USDA meal standards were half as likely to be obese than students residing in states with less stringent meal regulations (Taber et al., 2013). These findings suggest that current NSLP standards have the potential to significantly improve weight status among school lunch participants (Taber et al., 2013). A similar study demonstrated that stricter meal standards not only decreased the incidence of overweight and obesity among NSLP participants but also surprisingly resulted in an increase in NSLP participation (Cohen, Gorski, Hoffman, Rosenfeld, Chaffee, Smith, Catalano & Rimm, 2016).

Clark et al. (2009) assessed the quality of children’s diets by estimating prevalence of inadequate and excessive intakes of energy and nutrients through
an analysis of 24-hour dietary recall data from the third School Nutrition Dietary Assessment Study (SNDAS-III). Data from a nationally representative sample of 2,314 children grades 1 through 12 was included in the analysis. Study findings indicated that NSLP participation was associated with reduced prevalence of inadequate intakes of magnesium, phosphorus, vitamin A, vitamin C, vitamin B-6, folate and thiamin among middle and high school-aged children (Clark & Fox, 2009). Additionally, NSLP participation was linked to higher average intakes of calcium, potassium, and fiber (Clark et al., 2009). These results support the idea that NSLP participation plays an important role in supporting an overall healthy diet, particularly among adolescents.

Briefel, Wilson & Gleason (2009b) also utilized data from the SNDAS-III to investigate the patterns of consumption of NSLP participants versus non-participants based on different eating locations. Investigators discovered that NSLP participants consumed one-third of the average amount of energy from sugar sweetened beverages and consumed an overall diet which is less energy-dense when compared to NSLP non-participants (Briefel et al., 2009b). Furthermore, it was found that NSLP participants’ consumption was less energy dense at school compared to that of non-participants (Briefel et al., 2009b). These results are very meaningful in that they support the positive effect NSLP participation may have on the overall student diet quality.

The USDA’s fourth School Nutrition Dietary Assessment Study (SNDAS-IV) utilized survey data collected from a large representative sample of food service managers from 895 public schools that offer the NSLP in the 48
contiguous states and the District of Columbia. An analysis of the collected data indicated that school lunches generally meet the goal of providing children with one third of their daily recommended dietary allowance of calories, protein, vitamin A and C, calcium and iron (USDA, 2012a).

Hanson et al. (2013) examined the relationships between energy intake and overall diet quality in NSLP participants versus nonparticipants during the week and during weekends. In this study, researchers utilized NHANES dietary recall data collected from 2,378 school children from 2003-2008. Results from this study revealed that NSLP participants had significantly healthier diets than non-participants and also consumed healthier diets during the week compared to the weekends (Hanson et al., 2013). These findings provide further evidence for the critical role that school meals play in student diet quality.

We have demonstrated that participation in the NSLP positively influences student diet quality and overall student health. The evidence cited in this section has direct implications on the health of the majority of US school children since the NSLP operates in approximately 94% of all schools in the United States (USDA, 2012a).

**Criticism of the NSLP**

Children who participate in the NSLP and are from low-income households have been shown to have higher BMI’s (Hernandez et al., 2011; Li et al., 2009). Studies presenting these findings have led to criticism of the NSLP from individuals who believe that school meals contribute to childhood obesity.
Hernandez et al. (2011) and Li et al. (2009) both investigated the relationship between NSLP participation and child BMI. Hernandez et al. performed a longitudinal secondary analysis of data from the ECLS-K, a nationally representative study of children’s school experiences and development conducted by the National Center for Educational Statistics. Based on their analysis, these researchers concluded that low-income girls who participate in the NSLP displayed a faster rate of change in BMI over time compared to low-income girls who do not participate in the NSLP (Hernandez et al., 2011). This study, however, did not collect data regarding student dietary patterns both while at school and outside of school. In 2009, Li et al. conducted an investigation of the effects of NSLP participation on student body mass index (BMI) utilizing data from the National Survey of Children's Health (NSCH) conducted by CDC in 2003 and 2004. Results of this study indicated a positive association between NSLP participation and child weight. Specifically, it was found that children taking part in the NSLP have a higher probability of being overweight and obese (Li et al., 2009).

The results of the studies conducted by Li et al. (2009) and Hernandez et al. (2011) should be interpreted cautiously due to inherent selection bias present among the study population used in both investigations. It can be argued that a link between NSLP participation and higher BMI among children in both of these studies is a result of a selection bias due to the fact that the population the NSLP is designed to serve is low-income and are at a higher risk of becoming obese (Gunderson, Krieder & Pepper, 2012; Hofferth & Curtin, 2005; Mirtcheva &
Furthermore, as noted in a report by the USDA in 2006, studies purporting a link between NSLP participation and higher rates of obesity have not examined the effect of unobserved factors related to poverty on obesity rates (USDA, 2006).

One of the unobserved factors linked to poverty and obesity is food insecurity (Smith et al., 2016; Kaur et al., 2015; Metallinos-Katsaras et al., 2009). In a study utilizing data from NHANES 2007-2008, Kohn et al. (2013) aimed to investigate if participation in food assistance programs is a risk factor for overweight and obesity in youth, using food insecurity as an effect modifier (Kohn et al., 2013). Data was collected from 1,321 youth and analyzed using regression models to measure the association between federal food assistance and youth body size. Results indicated that participation in the NSLP was not associated with increased body size in food insecure youth (Kohn, Bell, Grow & Chan, 2013). These findings directly contradict the results of studies purporting an association between NSLP participation and increased obesity. These findings also highlight the need for additional research to better understand the role that unobserved factors related to obesity play in the interaction between NSLP participation and obesity.

Now that we reviewed the relationship between the NSLP and student health, we will turn our attention to the factors that may be impacting a student's likelihood of consuming school meals.
Factors Influencing NSLP Participation

A large body of research has demonstrated the significant effect of school lunch price, access to competitive foods, perceived social stigma, peer influences and parental/home influence on NSLP participation in the general population of school children (Akin et al., 1993; Bhatia et al., 2011; Gleason, 1995; Long et al., 2010; Maurer, 1984; Miller, 2011; Snelling, 2007; Mirtcheva et al., 2009). These studies, however, have offered little insight into the factors that influence NSLP participation for Latino students in particular. Research in the factors influencing NSLP participation in students during middle school and high school years is also very limited.

Early studies in school nutrition programs in the 1980’s and early 1990’s focused on the effect of price on NSLP participation (Akin et al., 1993; Maurer, 1984; Gleason, 1995). Through these studies, it was determined that higher lunch prices resulted in decreased NSLP participation of students who are non-qualified (Akin et al., 1993). However, these studies all failed to analyze other factors that might influence a child’s probability of consuming school meals. Some of the proposed factors influencing NSLP participation include grade level, perceived social stigma of NSLP participation, peer pressure/social stigma, access to competitive foods and parental/home food influences (Briefel et al., 2009; Bhatia et al., 2011; Long et al., 2010; Miller, 2011; Snelling, 2007; Mirtcheva et al., 2009).
Competitive Foods

There have been numerous studies that have evaluated the effects of competitive foods on NSLP participation (Briefel et al., 2009; Snelling et al., 2007; Bhatia et al., 2011; Long et al., 2010). Competitive foods are defined as those that are available for purchase outside of the NSLP in vending machines, the school’s student’s stores and snack lines (Briefel et al., 2009). Competitive foods are usually less nutrient dense and more calorically dense than the foods offered through NSLP (Snelling et al., 2007).

It has been demonstrated that access to competitive foods (both on and off campus) lowers the probability of student participation in the NSLP and that students purchase these foods at a higher rate than NSLP foods (Briefel et al., 2009; Snelling et al., 2007; Bhatia et al., 2011; Long et al., 2010). It has been argued that eliminating on- campus competitive food sales is an effective way to increase NSLP participation (Gleason, 1995; Bhatia et al., 2011). Bhatia et al. (2011) examined the effect of eliminating a la carte competitive food sales on NSLP participation rates. In this study, a la carte food sales were eliminated at three schools within San Francisco Unified School District. It was found that average daily participation rates increased at all of the school sites after the elimination of a la carte food sales (Bhatia et al., 2011). Although this study was focused on a single urban school district, these findings provide support for the theory that eliminating the sale of competitive foods can result in an increase NSLP participation rates.
Briefel et al. (2009a) utilized data from the SNDA-III to assess the effects of competitive foods on student consumption of sugar-sweetened beverages, low-nutrient energy-dense foods and fruits and vegetables at school. Data from 287 schools and 2,314 children was analyzed. It was found that the consumption of sugar-sweetened beverages while at school steadily increases from elementary school to high school (Briefel et al., 2009a). Results also showed that students attending schools without stores or snack bars consumed significantly less calories from sugar-sweetened beverages (Briefel et al., 2009a). It has also been shown that students tend to purchase foods of minimal nutritional value, such as sugar-sweetened beverages, at greater proportions while at school when given the choice (Snelling et al., 2007).

Latino students consume low-nutrient, energy-dense foods at a higher rate than their peers (Guerrero et al., 2015; Briefel et al., 2009a). This fact suggests that limiting access to a la carte/competitive foods could serve as an effective tool to help combat obesity among Latino students (Briefel et al., 2009).

If eliminating competitive food sales altogether is not feasible, it is imperative that all competitive foods being sold at school be as healthy as possible. In 2010, Long et al. conducted a survey with 151 school foodservice directors in Connecticut regarding the availability of competitive foods before and after the implementation of stricter competitive food guidelines. Survey results revealed that 77% of elementary schools, 80% of middle schools and 83% of high schools sold a la carte snacks. Additionally, NSLP participation actually increased among middle school students and remained unchanged for all other
grade levels after the implementation of stricter competitive food guidelines (Long et al., 2010). These findings are significant in that they suggest that stricter competitive food guidelines could be an effective way to limit consumption of less nutritious snack foods without negatively impacting NSLP participation rates.

Taber et al. (2012) further illustrated the benefits of stricter competitive food laws in schools on student health through a longitudinal analysis of 6,300 students in 40 states. In this study, researchers conducted an analysis of relationship between stricter competitive food policies and student BMI. Results from this investigation revealed that students exposed to strong competitive food laws gained significantly fewer BMI units and were less likely to remain overweight or obese than students in states with no competitive food laws (Taber et al., 2012).

**Perceived Social Stigma**

Another factor cited as an influence in school lunch consumption is perceived social stigma of participating in the NSLP (Bhatia et al., 2011; Mirtcheva et al., 2009; Snelling et al., 2007). Students may perceive participation in the NSLP as a sign of “being poor” and may choose to forego school lunches in order to avoid feeling judged by their classmates. In some schools, NSLP participants stand in a different line from those purchasing snack and a la carte foods—this results in a method of distinguishing between NSLP participants and non-participants. Consequently, students may choose not to eat a school lunch simply because they do not want to be identified as an NSLP
participant by their peers. Additionally, because competitive foods cost more than foods from the NSLP, consumption of competitive foods may be adding to the stigmatization of school lunches by categorizing competitive foods as foods consumed by those of higher income (Bhatia et al., 2011).

Social stigma may also result from the rate of NSLP participation among peers. Specifically, it appears that students will be less likely to participate in the NSLP if the rate of NSLP qualified students is low at their school (Mirtcheva et al., 2009). Conversely, students attending a school with high rates of NSLP qualified students will result in a higher NSLP participation rate (Mirtcheva et al., 2009). In other words, students will feel less social stigma attached to NSLP participation if a higher percentage of their peers qualify for free/reduced school lunches. Mirtcheva et al. (2009) investigated the relationship between social stigma (measured through school-level peer participation) and the participation in the NSLP. This analysis was based on data collected from 3,563 children participating in Panel Study of Income Dynamics (PSID) in 1997 and 2003. It was found that there was a 1.8 percentage point increase in the likelihood of participating in the NSLP for every 10% increase in peer eligibility for free school meals. It was also discovered that the effect of perceived social stigma on NSLP participation varies by grade level with the highest among low-income high school students, followed by middle school children and elementary school children (Mirtcheva et al., 2009).

Suggested methods of reducing NSLP stigmatization include eliminating competitive food options or combining competitive food and NSLP lines in order
to prevent students from being identified as NSLP participants (Mirtcheva et al., 2009). Another strategy to combat stigma for NSLP participants is to offer universal free meals to all students, regardless of their family income (Snelling et al., 2007). In addition to these suggestions, other methods to minimize NSLP stigma could involve improved marketing strategies on campus and incorporating students in the planning of school meals. Undoubtedly, it is essential that schools find a way to defend against the stigmatization of the NSLP in order to increase student participation rates across all grade levels. Ideally, students should never feel “ashamed” of consuming school meals and should instead look forward to participating in the NSLP on a daily basis.

Peer and Parental/Home Influences

Peer and parental influences play a major role in adolescent behaviors (Pearson et al., 2012; Salvy et al., 2011; Kinard et al., 2011; Videon et al., 2003; Ohri-Vachaspati, 2013). Adolescents often skip meals as a method of weight control (USDA, 2014; Linde et al., 2009). As previously mentioned, Mathias et al. provided evidence that meal-skipping behaviors can have a negative impact on overall diet quality (Mathias et al., 2016).

Pearson et al (2011) provided insight on the role of maternal and best-friend influences on adolescent meal skipping behaviors. In this study, investigators analyzed frequency of meal skipping behaviors through an online survey (Youth Eating Patterns Survey) completed by 3,264 adolescent boys and girls in Australia. Participants were asked to report how often they skipped meals
in the past month and how often they perceived that their mothers and best friends skipped meals. Bivariate logistic regression statistical analyses revealed that an increased level of perceived maternal meal-skipping behavior was positively correlated with adolescent meal skipping of breakfast and lunch. Additionally, it was found that those who perceived their best friends to skip lunch often were more likely to skip lunch themselves. The results of the Pearson study are consistent with findings of other studies investigating the influence of peer influences and parent influences on eating behaviors (Salvy et al., 2011; Kinard et al., 2012). These studies have also found that parental influences and peer influences both significantly predict unhealthy adolescent eating behaviors (Salvy et al., 2011; Kinard et al., 2012).

Parental food habits and frequency of family meals in a student’s home has been shown to significantly impact adolescent eating behaviors (Videon et al., 2003; Salvy et al., 2011). In a 2003 study, Videon et al. investigated the role of parental influences on dietary behavior through interviews assessing the frequency of family meals, home parental supervision and autonomy of food choice. Results revealed that higher levels of parental education had a positive effect on dietary patterns (Videon et al., 2003). Additionally, it was found that adolescents who ate more than three meals per week alongside their parents were significantly less likely to report poor consumption of fruits, vegetables and diary foods compared to adolescents who consumed three or fewer family meals per week (Videon et al., 2003). These findings support the theory that parental influences (especially through family meals) could serve to encourage healthy
eating in adolescents. Furthermore, parents have the potential to help encourage students to consume well-balanced nutritious meals, such as those served through the NSLP.

In 2009-2010, Ohri-Vachaspati investigated the association between parental perceptions of the nutritional quality of school meals and student NSLP participation. Data was collected through phone surveys with an adult parent or guardian of 1,220 school children from five low-income cities in New Jersey. Parents were asked how often their child consumed school meals and also to rate their perception of the level of healthfulness of said meals. Data analysis revealed that parental perception of school meals was a significant predictor of the odds of a student consuming a school lunch (Ohri-Vachaspati, 2013). Additionally, it was found that 92% of students whose parents viewed school meals as “very healthy” consumed a school lunch on a regular basis compared to only 71.6% of students whose parents perceived school lunches as “somewhat unhealthy” (Ohri-Vachaspati, 2013). Although parent-reported student meal participation is likely to be somewhat inaccurate, it can be concluded that parent perceptions of school meals play an important role in student perceptions of school meals and effect overall meal participation.

As we have demonstrated, student food choices and dietary behaviors are highly impacted by peer and parental influences. Undoubtedly, peer and parental influences should be considered when investigating a student’s likelihood of consuming school meals.
Surveys and NSLP Participation

Our search of the existing literature revealed only a few published studies where students provided direct input regarding their experience in the NSLP. Of these studies, none involved a comprehensive survey tool that included a wide range of possible factors influencing NSLP participation. Meyer and Conklin (1998) utilized a validated survey to assess the relationship between student level of satisfaction with high school foodservice and student participation in the foodservice. Through a 38 question survey, students were asked questions related to variety of food, food quality, foodservice staff, and aesthetics of the serving area. A total of 1,823 high school students completed the survey and provided input into their school foodservice experience. Multiple regression revealed that the variables most highly correlated with overall satisfaction were the quality of the food offered and the customer service provided by foodservice staff (Meyer et al., 1998).

In 2000, Meyer conducted a similar study with fourteen suburban schools located in Massachusetts, Texas, California, Illinois, Arizona and New Hampshire. In this study, Meyer utilized a validated survey containing 26 questions relating to foodservice attributes and 8 demographic questions. Results in this study indicated that three variables predicted student satisfaction: school menu including foods that students like, quality of food choices, and meal prices (Meyer, 2000).

Asperin, Nettles and Carr (2009) created and validated a non-participation and a participation survey to investigate the factors affecting participation in the
NSLP for high school students. These surveys were pilot tested with a group of 2,225 high school students within thirty-one school districts across the United States. Factor analysis of the data collected revealed that the most significant factors influencing participation among high school students is food quality followed by food access and dining area capacity (Asperin et al., 2009).

In 2012, Castillo, Lofton and Wilson developed and validated a non-participation and a participation survey for middle/junior high students. These surveys were pilot tested with a group of 1,401 middle/junior high students within twelve school districts across the United States. Factor analysis of the data collected revealed two main factors influencing participation among middle/junior high students: food quality and customer service (Castillo et al., 2012).

Although all of the studies mentioned above provided valuable insight into the factors that may influence student satisfaction with foodservice, the survey tool utilized in these studies failed to include questions related to other factors that may be influencing school lunch participation such as parental influences, peer pressure and competitive foods. Hence, there is a need for a study utilizing a more comprehensive survey tool in order to fully elucidate the range of factors influencing NSLP participation among middle and high school students.

**Study Justification**

We have demonstrated how the NSLP plays an important role in providing school children with the nutrients necessary to meet their increased demands for adequate growth and development, particularly during adolescence. We have
also shown how the Latino student population is a large target population of the NSLP who is uniquely positioned to benefit from participating in the NSLP. Furthermore, the Latino student population is the largest ethnic group among US public school students in California (CDE, 2016a).

There has been no study that investigates the factors that influence NSLP participation specifically for Latino children during middle school and high school years. Additionally, there is a need for a study utilizing a more comprehensive survey tool in order to fully elucidate the range of factors influencing NSLP participation among middle and high school students.

Considering all of the benefits of participating in the NSLP, it is extremely important to assess the factors affecting Latino students’ decision to consume school meals in order to implement appropriate strategies to help increase NSLP participation among this ethnic population. This study will provide a deeper understanding of the factors influencing participation in the NSLP for Latino students and could lead to recommendations for future research focused on school nutrition specific for Latino children.

Long term, this study could serve as a guide towards helping decrease obesity rates in Latino children by helping improve their nutrition while at school.
CHAPTER 3

METHODOLOGY

Printed surveys were administered to students in grades 7-12 enrolled at two high schools and two middle schools within ABC Unified School District in Southern California. The student population enrolled at ABC Unified School District is 44%, providing a close representative sample of the percentage of California students who are of Latino ethnicity (59%) (Ed-Data, 2013; CDE, 2016). The California State Polytechnic University, Pomona Institutional Review Board approved the study protocol #14-0021 (see Appendix A). All potential study participants were provided a written parental informed consent form (ICF) (see Appendix B). Only those students whose parents provided a signed ICF were allowed to participate in the study. In the absence of parental consent, students were not allowed to participate in the study and were instead provided with an alternate mock survey to complete.

Participants

Study participants were a convenience sample recruited from four school sites within ABC Unified School District: two high schools (Artesia and Gahr High School) and two middle schools (Ross and Fedde Middle School). These sites were selected because they possess a high level of Latino student enrollment (more than 40% of total enrollment) (Ed-Data, 2013). Additionally, each of these sites possesses a low NSLP participation rate (less than 65%) and reside in an area within Los Angeles County with a significantly high rate of
childhood obesity at 26% (County of Los Angeles Public Health Department, 2013). We have chosen to focus on middle and high school students in this study based on the literature that indicates that school lunch participation begins to drop in middle school and steadily declines through high school: elementary students at 66%, followed by middle school students at 54.5% and lowest for high school students at 40.5% (Fox et al., 2012; Gordon et al., 2007; Gleason, 1995). Consequently, we wanted to elucidate the factors that may be causing such a decline in student participation in the NSLP during middle school and high school years to aid school districts in implementing strategies to increase NSLP student participation rates among this student population. We were interested in the factors influencing NSLP participation particularly among Latino students in particular due to the fact that one third of NSLP eligible students are Latino and in California, Latino children comprise the majority of the student population enrolled in public schools (USDA, 2006; CDE, 2016).

**Recruitment**

Recruitment of study participants began in January 2015. Originally, it was planned that all students enrolled within the four designated school sites would be invited to participate in the current study. Due to time constraints and the inability to conduct surveys within a large number of classrooms within the four selected school sites, it was determined that study participants would instead be recruited from a set of randomly selected classes within each school site. An IRB addendum was submitted to request permission to proceed with these
changes (Appendix C). Additionally, an extension request was granted to complete this survey past the original study completion deadline (Appendix C).

Study participants were recruited from randomly selected classes within each of the four pre-selected school sites. A list of all of the teachers at each of the school sites was given to the researcher. The researcher randomly selected four teacher names for each of the four selected school sites. Four classes were selected at Artesia High, Fedde Middle School and Ross Middle School. Five classes were selected to participate from Gahr High School. A total of 17 classes were selected from all four school sites combined. After this, each of the school principals notified each teacher of their class' participation in the current research study. An informed parental consent form was sent home to be signed by the parents of the potential study participants. We allowed 2 weeks for consent forms to be returned to the school's main office. After collecting the signed consent forms from each of the four school sites, we determined the classroom that each consented student belonged to through the use of class rosters. Next, we emailed each of the teachers at each school site and asked for their cooperation in order to administer the study survey with the consented students. Between February and June 2015, each student whose parent returned a signed consent form was scheduled to fill out a survey. A total of 232 students participated in this study.
**Eligibility/exclusion criteria**

Recruitment of study participants was based on grade/class level (7th-12th grade). All students in grades 7th-12th whose parents signed the consent form were allowed to participate in this study, regardless of their ethnicity or NSLP eligibility status. Since a large portion of the student population at ABC Unified is of Latino ethnicity, it was expected that the majority of the study population would be Latino. No exclusion criteria was used. The only incentive offered in the current study was that students were given the opportunity to voice their opinions regarding school meals and provide valuable information to help improve their experience in the NSLP.

**Survey Instrument Design**

Each consented student filled out a survey consisting of 22 questions: five background questions, fifteen questions relating to the proposed factors influencing NSLP participation and two open-ended questions to gather additional student opinions regarding the NSLP. The background questions inquired about gender, ethnicity, grade level, NSLP eligibility and frequency of consumption of school lunch. Fifteen questions related to the following factors that may affect student participation in the NSLP: personal food preferences/perceived quality of school lunches, perceived healthfulness of school lunches, competitive foods, social stigma/peer pressure and home environment/parental influences. Surveys were anonymous and were each assigned a unique ID number.
The modified survey instrument was adapted from the validated Participation & Non-Participation Surveys published by the National Food Service Management Institute (NFSMI) (Asperin & Carr, 2009; Rushing, 2013). These validated surveys were chosen as a model because they are the only validated surveys that exist for the NSLP for middle school and high school students. Additionally, these surveys have already been tested with the student population (Castillo et al., 2012; Asperin et al., 2009). Five questions (questions 6, 7, 8, 9 and 10) related to food preferences/perceived quality of school meals and perceived healthfulness of school meals on the survey used in this study were adapted from questions found on the NFSMI surveys. In addition to the questions taken from the NFSMI validated surveys, fifteen other questions were added to measure the influence of competitive foods, perceived social stigma and the home environment/parental influences on NSLP participation. Food preferences, perceived healthfulness of school meals, competitive foods, perceived social stigma/peer pressures and parental influences have all been shown to impact a student’s likelihood of participating in the NSLP (Akin et al., 1993; Bhatia et al., 2011; Gleason, 1995; Long et al., 2010; Maurer, 1984; Miller, 2011; Snelling, 2007; Mirtcheva et al., 2009). It is important to investigate the level of influence all of these factors have on a student’s choice to participate in the NSLP.

The survey instrument for the current study is divided into four types of questions: questions 1-5 pertain to background information, school meal eligibility and NSLP participation, questions 6-9 pertain to factors of personal
preference/opinion regarding school meals, questions 10-12 pertain to competitive foods, questions 13-14 relate to social stigma/peer influence and lastly, questions 13-20 pertain to parental influences/home environment. A 7-point Likert-type scale of agreement/disagreement was utilized in questions 6-18. Questions 21 & 22 were open-ended questions aimed at gathering qualitative data pertaining to other factors that may be influencing student NSLP participation (see Appendix D for a copy of the survey tool).

Students who were not granted parental consent to participate in the current study were given a “mock” survey (see Appendix E). The mock survey looked almost identical to the study survey but contained non-personal questions in place of the sensitive questions #4, 13 and 20 in study survey tool. Data from the Mock surveys was not analyzed in any way.

**Variables**

The independent variables included personal food preferences/perceived quality of school meals, parental/home influences, competitive foods, perceived social stigma/peer influences, and perceived healthfulness of school lunch. The dependent variable was defined as NSLP participation. An NSLP participant was defined as consuming school lunch at least 1 day per week and a NSLP non-participant was defined as never consuming school meals.
Sample Size Determination

Based on the total student enrollment in the 17 classes invited to participate in the current study, the number of possible study participants was 431. After calculating statistical power for this population size, it was determined that a sample size of 217 was the minimum required to maintain a confidence level of 95%. This study included a sample size of 232, providing a large enough sample to maintain statistical reliability.

Procedures

Each class was scheduled to complete their surveys on a pre-selected date mutually convenient for the class instructor and the researcher. In an effort to prevent overt identification of consented students, students who did not receive parental consent to participate in the research study were provided with an alternate mock survey to complete.

Prior to administering the surveys, a current class roster was printed for each class and provided to the research investigator. These rosters were marked to distinguish the consented students from the non-consented students. Using the class roster, each student was called to the front of the class and handed their designated survey in the order their name appeared on the roster. All students were provided with an assent form attached to their designated survey (mock or actual) (see Appendix F & G). Next, a general assent script was read out loud to all students (see Appendix H). All students (consented and non-consented) completed their designated survey during class time within approximately 10-15
minutes. Students were instructed to hand their completed survey to the researcher as soon as they were finished. All surveys were anonymous and were assigned a unique ID number. Study surveys were marked as “Survey A” and mock surveys were marked as “Survey B”.

**Statistical Analysis**

Survey data was coded to enable statistical analysis of all type questions. Students who reported multiethnic Latino ethnicities were all categorized as Latino. Ethnicity was defined as a dichotomous variable: Latino or non-Latino. All data collected was analyzed using IBM SPSS (Statistical Package for Social Sciences) version 22 software. Missing cases were deleted in a list wise fashion.

A student t-test was used to determine if Latino students differ significantly from non-Latinos in their rates of school lunch participation. Multiple regression analysis was performed to determine the effectiveness of a model to predict school lunch participation for Latino and non-Latino students. For this analysis, blocks were formed by grouping survey questions related to similar variables. The blocks used for the regression analysis were as follows:

- Block 1: School
- Block 2: Gender, meal eligibility, Grade (Questions 1, 2 & 4)
- Block 3: Preferences/Perceived quality of school lunches (Questions 6-8)
- Block 4: Competitive foods (Questions 10-12)
- Block 5: Social stigma/peer pressures (Questions 13 & 14)
- Block 6: Home environment/parental influences (Questions 15-17, 19 & 20)
Block 7: Perceived healthfulness of school lunches (Questions 18 & 9)

The same regression model was used to determine the significant predictors of NSLP participation for Latino students who participate in the NSLP at high rates (3 or more times per week) and for Latino students who participate at low rates (2 or less times per week).

Lastly, a one-way ANOVA was run to determine if there was a significant difference between the four school populations in the mean response values for each of the survey questions/independent variables.

Participant Characteristics

This study included 232 students enrolled at ABC Unified School District in 7th through 12th grade. As shown in Table 2, the largest amount of participants was recruited from Gahr high school (n=94) as compared to the other three schools. The majority of the study participants were female (n=135). Participants were well distributed across all six grade levels with the slightly more students enrolled in 10th grade (n=53) compared to other grades. More than half of the survey respondents were of Latino ethnicity (52%). Additional participant characteristics are listed in Table 2, including Meal eligibility, Frequency of meals eaten daily as a family, school lunch participation and Highest Level of Parent Education.
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<tr>
<td>Native American/American Indian</td>
<td>1</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>16</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td>Multi ethnic Latino</td>
<td>11</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Multiethnic Non Hispanic</td>
<td>5</td>
<td>2%</td>
<td></td>
</tr>
</tbody>
</table>
Table 2 (Continued)

Study Participant Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N = 232</th>
<th>n</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meal Eligibility</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free</td>
<td></td>
<td>125</td>
<td>54%</td>
</tr>
<tr>
<td>Reduced</td>
<td></td>
<td>32</td>
<td>14%</td>
</tr>
<tr>
<td>Paid</td>
<td></td>
<td>36</td>
<td>16%</td>
</tr>
<tr>
<td>Don’t know</td>
<td></td>
<td>39</td>
<td>17%</td>
</tr>
<tr>
<td><strong>School Lunch Participation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td></td>
<td>53</td>
<td>23%</td>
</tr>
<tr>
<td>1-2 Days per week</td>
<td></td>
<td>63</td>
<td>27%</td>
</tr>
<tr>
<td>3 Days per week</td>
<td></td>
<td>25</td>
<td>11%</td>
</tr>
<tr>
<td>4 Days per week</td>
<td></td>
<td>28</td>
<td>12%</td>
</tr>
<tr>
<td>5 Days per week</td>
<td></td>
<td>62</td>
<td>27%</td>
</tr>
<tr>
<td><strong>Frequency of Meals eaten as a family per week</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td>8</td>
<td>3%</td>
</tr>
<tr>
<td>1-2</td>
<td></td>
<td>55</td>
<td>24%</td>
</tr>
<tr>
<td>3-5</td>
<td></td>
<td>57</td>
<td>25%</td>
</tr>
<tr>
<td>Everyday</td>
<td></td>
<td>110</td>
<td>47%</td>
</tr>
<tr>
<td><strong>Highest Level of Parent Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No high school diploma</td>
<td></td>
<td>29</td>
<td>13%</td>
</tr>
<tr>
<td>High School Diploma</td>
<td></td>
<td>33</td>
<td>14%</td>
</tr>
<tr>
<td>Some College</td>
<td></td>
<td>48</td>
<td>21%</td>
</tr>
<tr>
<td>Bachelors degree</td>
<td></td>
<td>40</td>
<td>17%</td>
</tr>
<tr>
<td>Masters Degree</td>
<td></td>
<td>18</td>
<td>8%</td>
</tr>
<tr>
<td>Doctoral Degree (PhD)</td>
<td></td>
<td>4</td>
<td>2%</td>
</tr>
<tr>
<td>Don’t know</td>
<td></td>
<td>59</td>
<td>25%</td>
</tr>
</tbody>
</table>
CHAPTER 4

RESULTS

Recruitment

A total of 273 students returned a signed parental informed consent form. Of those students, only 232 were present at school on the day they were scheduled to complete the survey. A teacher from Artesia high school mentioned that many of his students were absent because they were participating in a student council event. At Fedde Middle School, many of the students who returned a signed consent form were unexpectedly scheduled for a field trip and were absent on the day the study surveys were administered. Based on 232 survey respondents and a study population of 431, the calculated survey response rate was 53.8%.

Hypotheses Analysis

Hypothesis 1

Research Hypothesis 1 postulated that there would be a significant difference in NSLP participation between Latino and non-Latino students. As shown in Table 3 below, there was no significant difference in NSLP participation between Latino and non-Latino students $t(229) = 3.176, p < .10$. Therefore, research hypothesis #1 is not supported.
<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>t</th>
<th>df</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latino (N=132)</td>
<td>1.970</td>
<td>1.498</td>
<td>.288</td>
<td>229</td>
<td>.076</td>
</tr>
<tr>
<td>Non-Latino (N=99)</td>
<td>1.909</td>
<td>1.691</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Hypothesis 2**

Research Hypothesis 2 stated that there would be significant predictors of participation in the NSLP for Latino students, specifically: perceived social stigma and parental influences.

Table 4 summarizes the results of the regression analysis for Latino and non-Latino study participants. For Latino students, the significant predictors of NSLP participation were meal eligibility ($\beta = -.410$), parental level of education (question 20; $\beta = .182$), Frequency of family meals (question 19, $\beta = .173$) and frequency of fast food consumption (question 17, $\beta = -.163$). Meal eligibility was the most significant predictor of all with $\beta = -.410$ and $P<.001$. Not surprisingly, these results indicate that eligibility for free or reduced school meals predicts higher participation in the NSLP. Higher level of parental education and higher frequency of family meals both significantly predict higher levels of NSLP participation. Conversely, lower frequency of fast food consumption predicts higher participation in the NSLP. The variables of perceived social stigma (question 13, $\beta = -.166$) and bringing food from home (question 10, $\beta = -.155$) were both approaching significance ($p<0.1$). These results suggest that a low level of perceived social stigma and lower frequency of bringing food from home...
predicts higher participation in the NSLP, but these results were not significant. The final model predicting NSLP participation for Latino students accounted for 35.3% ($R^2_{adj} = .353$) of the variance in NSLP participation $F(19, 109) = 4.68, p < .001$.

Based on this data, hypothesis #2 is only partially supported. Parental & home influences were found to be a significant predictor of NSLP participation among Latino students when measured through highest level of parental education, frequency of family meals and frequency of fast food consumption. Perceived social stigma, however, was not found to be significant in predicting NSLP participation among Latino students.

**Hypothesis 3**

Research Hypothesis #3 speculated that the significant predictors for NSLP participation would be different for Latino students compared to non-Latino students.

For non-Latino students, the multiple regression analysis revealed only one significant predictor of NSLP participation: bringing lunch from home (question 10, $\beta = -.338$), $p<.05$. This data suggests that a lower frequency of bringing lunch from home leads to increased participation in the NSLP for non-Latino students. Two factors were approaching significance ($p<.10$): dislike in taste of school lunch (question 7, $\beta = -.221$) and parent concern that school meals are unhealthy (question 18, $\beta = .188$). These findings illustrate that a stronger dislike for the taste of school meals and higher parental concerns that school
meals are unhealthy decreases rates of NSLP participation, but these results were not significant. Surprisingly, meal eligibility was not a significant predictor of NSLP participation among non-Latino students. Thus, unlike with Latino students, eligibility for free or reduced price meals does not predict higher participation in the NSLP for non-Latino students. The final model predicting NSLP participation for non-Latino students accounted for 19.3% ($R^2_{adj} = .193$) of the variance in rates of NSLP participation $F(19, 75) = 2.184, p < .05$.

Based on this regression analysis, hypothesis #3 is supported. As demonstrated by the analysis of research hypothesis #2, meal eligibility and parental/home influences were significant predictors of NSLP participation for Latino students. For non-Latino students, there was only one significant predictor of NSLP participation: competitive foods as measured through frequency bringing food from home. Thus, the factors that significantly predict participation in the NSLP are different for Latino and non-Latino students.

**Table 4**

*Results of Regression Analysis of Variables on NSLP Participation for Latino & non-Latino Students*

<table>
<thead>
<tr>
<th></th>
<th>Latino$^a$ (N=129)</th>
<th></th>
<th></th>
<th>non-Latino$^b$ (N=95)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SEB</td>
<td>$\beta$</td>
<td>B</td>
<td>SEB</td>
<td>$\beta$</td>
</tr>
<tr>
<td><strong>Block 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>School</strong></td>
<td>-0.01</td>
<td>0.05</td>
<td>-0.04</td>
<td>.03</td>
<td>0.07</td>
<td>.08</td>
</tr>
<tr>
<td><strong>Block 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Demographics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-0.003</td>
<td>0.07</td>
<td>-0.004</td>
<td>-0.06</td>
<td>0.09</td>
<td>-0.08</td>
</tr>
<tr>
<td>Meal Eligibility</td>
<td>-0.17</td>
<td>0.03</td>
<td>-0.41***</td>
<td>-0.04</td>
<td>0.04</td>
<td>-0.11</td>
</tr>
<tr>
<td>Grade</td>
<td>-0.04</td>
<td>0.03</td>
<td>-0.17</td>
<td>-0.01</td>
<td>0.05</td>
<td>-0.06</td>
</tr>
</tbody>
</table>
### Table 4 (Continued)

**Results of Regression Analysis of Variables on NSLP Participation for Latino & non-Latino Students**

<table>
<thead>
<tr>
<th></th>
<th>Latino&lt;sup&gt;a&lt;/sup&gt; (N=129)</th>
<th></th>
<th>non-Latino&lt;sup&gt;b&lt;/sup&gt; (N=95)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SEB</td>
<td>β</td>
<td>B</td>
</tr>
<tr>
<td><strong>Block 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual preferences &amp; perceived school lunch quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q6: I am satisfied with the quality of school lunches.</td>
<td>0.2</td>
<td>0.19</td>
<td>0.09</td>
<td>0.05</td>
</tr>
<tr>
<td>Q7: I do not eat school lunches because the food does not taste good.</td>
<td>-0.02</td>
<td>0.02</td>
<td>-0.11</td>
<td>-0.04</td>
</tr>
<tr>
<td>Q8: I do not eat school lunches because I do not recognize what the food is or I am not familiar with the foods being served.</td>
<td>0.003</td>
<td>0.02</td>
<td>0.01</td>
<td>0.03</td>
</tr>
<tr>
<td><strong>Block 4</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competitive foods</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q10: I do not eat school lunches because I bring my own food from home.</td>
<td>-0.03</td>
<td>0.02</td>
<td>-0.16*</td>
<td>-0.05</td>
</tr>
<tr>
<td>Q11: I do not eat school lunches because I prefer to eat foods that are sold in the snack/a la carte lines.</td>
<td>-0.01</td>
<td>0.02</td>
<td>-0.07</td>
<td>0.03</td>
</tr>
<tr>
<td>Q12: I do not eat school lunches because I buy lunch at an off-campus location.</td>
<td>0.02</td>
<td>0.02</td>
<td>0.07</td>
<td>-0.01</td>
</tr>
</tbody>
</table>
Table 4 (Continued)

Results of Regression Analysis of Variables on NSLP Participation for Latino & non-Latino Students

<table>
<thead>
<tr>
<th>Block 5</th>
<th>Social stigma/Peer influences</th>
<th>Latino(^a) (N=129)</th>
<th>non-Latino(^b) (N=95)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>SEB</td>
</tr>
<tr>
<td>Q13: I do not eat school lunches because I am worried about being judged negatively by my classmates.</td>
<td>-0.06</td>
<td>0.03</td>
<td>-.17*</td>
</tr>
<tr>
<td>Q14: I would eat lunch more often if all of my friends also ate a school lunch.</td>
<td>0.001</td>
<td>0.02</td>
<td>0.004</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Block 6</th>
<th>Home &amp; parental influences</th>
<th>Latino(^a) (N=129)</th>
<th>non-Latino(^b) (N=95)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>SEB</td>
</tr>
<tr>
<td>Q15: My family eats fruits and vegetables everyday.</td>
<td>-0.01</td>
<td>0.02</td>
<td>-0.06</td>
</tr>
<tr>
<td>Q16: I eat healthy food most of the time when I am at home.</td>
<td>-0.01</td>
<td>0.02</td>
<td>-0.03</td>
</tr>
<tr>
<td>Q17: My family and I eat at fast food restaurants 3 to 5 times a week.</td>
<td>-0.04</td>
<td>0.02</td>
<td>-0.16**</td>
</tr>
<tr>
<td>Q19: How many times per week do you eat meals together with at least one of your parents?</td>
<td>0.08</td>
<td>0.04</td>
<td>0.18**</td>
</tr>
<tr>
<td>Q20: What is the highest level of education either of your parents has completed?</td>
<td>0.05</td>
<td>0.02</td>
<td>0.19**</td>
</tr>
</tbody>
</table>
Table 4 (Continued)

Results of Regression Analysis of Variables on NSLP Participation for Latino & non-Latino Students

<table>
<thead>
<tr>
<th>Block 7</th>
<th>Perceived healthfulness of school lunches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Latino(^a) (N=129)</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Q9: I am worried that school lunches are not healthy.</td>
<td>0.01</td>
</tr>
<tr>
<td>Q18: My parents are worried that school lunches are not healthy.</td>
<td>-0.01</td>
</tr>
</tbody>
</table>

\(^* p<0.1, \,** p<0.05, \,** * p<0.001\)

\(^a\) F(19, 109) = 4.68, p < .001; \(R_{adj}^2 = .353\)

\(^b\) F(19, 75) = 2.184, p < .01; \(R_{adj}^2 = .193\)

Hypothesis 4

Research Hypothesis #4 stated that the factors that would serve as significant predictors of NSLP participation would be different for Latino students who participate in the NSLP at high rates (high participators) compared to Latino students who participate in the NSLP at low rates (low participators).

To test this hypothesis, a multiple regression analysis was performed on Latino students with high NSLP participation separately from those with low NSLP participation. Table 5 summarizes the regression results for high and low NSLP Latino participators. Low participators were defined as consuming school lunch two times per week or less. High participators were defined as consuming school lunch three or more times per week. Results of this analysis revealed
only one significant predictor of NSLP participation among Latino low-participants: Meal eligibility (β = -.410). The final model predicting NSLP participation for Latino students who are low-participants accounted for 33.2% ($R^2_{adj} = .332$) of the variance in rate of NSLP participation $F(19, 45) = 2.68, p < .05$. Results of the regression analysis revealed no significant predictors of NSLP participation for Latino students who are high-participants. The final model predicting NSLP participation for Latino high-participants accounted for 3.7% ($R^2_{adj} = .037$) of the variance for rate of NSLP participation $F(19, 47) = 2.68, p > .05$. Based on these findings, hypothesis #4 is supported. The factors predicting NSLP participation for Latino high participants are different from the factors predicting NSLP participation for Latino low participants.

Table 5

*Results of Regression Analysis of Variables on NSLP Participation for Latino & non-Latino Students*

<table>
<thead>
<tr>
<th></th>
<th>Latino High Participators(^a) (N=66)</th>
<th></th>
<th>Latino Low Participators(^b) (N=64)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SEB</td>
<td>β</td>
<td>B</td>
</tr>
<tr>
<td>Block 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School</td>
<td>0.02</td>
<td>0.17</td>
<td>0.027</td>
<td>-0.01</td>
</tr>
<tr>
<td>Block 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demographics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.00</td>
<td>0.24</td>
<td>0.00</td>
<td>0.04</td>
</tr>
<tr>
<td>Meal Eligibility</td>
<td>-0.03</td>
<td>0.20</td>
<td>-0.02</td>
<td>-0.17</td>
</tr>
<tr>
<td>Grade</td>
<td>-0.02</td>
<td>0.13</td>
<td>-0.04</td>
<td>-0.10</td>
</tr>
</tbody>
</table>
Table 5 (Continued)

Results of Regression Analysis of Variables on NSLP Participation for Latino & non-Latino Students

<table>
<thead>
<tr>
<th>Block</th>
<th>Individual preferences &amp; perceived school lunch quality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Latino High Participators&lt;sup&gt;a&lt;/sup&gt; (N=66)</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Block 3</td>
<td>Q6: I am satisfied with the quality of school lunches.</td>
</tr>
<tr>
<td></td>
<td>Q7: I do not eat school lunches because the food does not taste good.</td>
</tr>
<tr>
<td></td>
<td>Q8: I do not eat school lunches because I do not recognize what the food is or I am not familiar with the foods being served.</td>
</tr>
<tr>
<td>Block 4</td>
<td>Competitive Foods</td>
</tr>
<tr>
<td></td>
<td>Q10: I do not eat school lunches because I bring my own food from home.</td>
</tr>
<tr>
<td></td>
<td>Q11: I do not eat school lunches because I prefer to eat foods that are sold in the snack/a la carte lines.</td>
</tr>
<tr>
<td></td>
<td>Q12: I do not eat school lunches because I buy lunch at an off-campus location.</td>
</tr>
</tbody>
</table>
### Table 5 (Continued)

**Results of Regression Analysis of Variables on NSLP Participation for Latino & non-Latino Students**

<table>
<thead>
<tr>
<th>Block 5</th>
<th>Social stigma/Peer influences</th>
<th>Latino High Participators&lt;sup&gt;a&lt;/sup&gt; (N=66)</th>
<th>Latino Low Participators&lt;sup&gt;b&lt;/sup&gt; (N=64)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q13: I do not eat school lunches because I am worried about being judged negatively by my classmates.</td>
<td>B: 0.123, SE: 0.17, β: 0.11</td>
<td>B: -0.08, SE: 0.05, β: -0.05</td>
</tr>
<tr>
<td></td>
<td>Q14: I would eat lunch more often if all of my friends also ate a school lunch.</td>
<td>B: -0.01, SE: 0.06, β: -0.03</td>
<td>B: 0.01, SE: 0.04, β: 0.03</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Block 6</th>
<th>Home &amp; parental influences</th>
<th>Latino High Participators&lt;sup&gt;a&lt;/sup&gt; (N=66)</th>
<th>Latino Low Participators&lt;sup&gt;b&lt;/sup&gt; (N=64)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q15: My family eats fruits and vegetables everyday.</td>
<td>B: 0.03, SE: 0.07, β: 0.07</td>
<td>B: -0.05, SE: 0.04, β: -0.21</td>
</tr>
<tr>
<td></td>
<td>Q16: I eat healthy food most of the time when I am at home.</td>
<td>B: 0.00, SE: 0.08, β: 0.00</td>
<td>B: 0.00, SE: 0.04, β: 0.09</td>
</tr>
<tr>
<td></td>
<td>Q17: My family and I eat at fast food restaurants 3 to 5 times a week.</td>
<td>B: -0.05, SE: 0.07, β: -0.10</td>
<td>B: -0.05, SE: 0.04, β: -0.18</td>
</tr>
<tr>
<td></td>
<td>Q19: How many times per week do you eat meals together with at least one of your parents?</td>
<td>B: -0.22, SE: 0.16, β: -0.21</td>
<td>B: 0.06, SE: 0.06, β: 0.12</td>
</tr>
</tbody>
</table>
Table 5 (Continued)

Results of Regression Analysis of Variables on NSLP Participation for Latino & non-Latino Students

<table>
<thead>
<tr>
<th></th>
<th>Latino High Participators&lt;sup&gt;a&lt;/sup&gt; (N=66)</th>
<th>Latino Low Participators&lt;sup&gt;b&lt;/sup&gt; (N=64)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SEB</td>
</tr>
<tr>
<td>Q20: What is the highest level of education either of your parents has completed?</td>
<td>-0.04</td>
<td>0.08</td>
</tr>
</tbody>
</table>

Block 7  Perceived healthfulness of school lunches

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SEB</th>
<th>β</th>
<th>B</th>
<th>SEB</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q9: I am worried that school lunches are not healthy.</td>
<td>0.04</td>
<td>0.05</td>
<td>0.11</td>
<td>0.05</td>
<td>0.03</td>
<td>0.24</td>
</tr>
<tr>
<td>Q18: My parents are worried that school lunches are not healthy.</td>
<td>0.03</td>
<td>0.07</td>
<td>0.09</td>
<td>-0.02</td>
<td>0.03</td>
<td>-0.11</td>
</tr>
</tbody>
</table>

<sup>*</sup> p<0.1, **p<0.05, ***p<0.001
<sup>a</sup> F(19, 47) = 1.13, p >.05; \( R^2_{adj} = .352 \)
<sup>b</sup> F(19, 45) = 2.68, p < .05; \( R^2_{adj} = .332 \)

Results of one-way ANOVA

One-way ANOVA was performed to determine if there was a significant difference between the four school site populations on their mean response values for all of the survey questions/independent variables. The analysis of variance revealed a significant difference between group means for Gender (F(3,227) = 3.87, p = 0.01), Grade (F(3,227) = 230.24, p = 0.00), Meal Eligibility (F(3,228) = 4.42, p = 0.005), Rate of NSLP Participation (F(3,228) = 3.13, p = 0.027), Question 10/frequency of bringing food from home (F(3,228) = 4.35, p = .005), Question 12/buying lunch at off-campus location (F(3,228) = 4.05, p =
Post hoc analysis indicated that the number of female respondents was significantly higher for Gahr High School compared to the other three schools. Additionally, participants from Gahr High School had significantly lower rates of NSLP participation, significantly higher frequency of bringing lunch from home, significantly higher frequency of purchasing lunch at an off-campus location and significantly higher frequency of fast food consumption compared to the other schools. Post hoc analysis also showed that parental level of education was significantly lower for Fedde Middle School than for the other three schools. Lastly, it was found that number of respondents who qualify for free or reduced school meals was significantly higher for Fedde Middle School compared to the three other schools.

**Analysis of open-ended Questions**

Questions 21 and 22 of the survey tool were meant to gather information regarding any other factors that may be affecting NSLP participation. Question 21 asked students to list the reasons they do not eat school lunches. Question 22 asked for students to write down any other comments/concerns they wanted to share regarding school lunches. A visual inspection of the qualitative data collected through these questions revealed the following reoccurring topics: time constraints/busy student schedules, limited availability of desired menu items and not wanting to wait in line. Further analysis of the qualitative data was not
performed in this study but may be of interest for future studies.
The primary purpose of this study was to investigate the factors influencing participation in the NSLP for Latino students during middle and high school years. Participation in the NSLP provides students with a reliable source of nutrition to help support their increased nutrient needs, particularly during adolescence. Because participation in the NSLP has been steadily decreasing in recent years, it has become even more important to elucidate the factors that may be playing a role in this trend. It was of particular interest to us to discover the factors influencing NSLP participation for Latino students since they comprise the largest portion of students in California (CDE, 2016). Prior to our study, no study had examined the factors influencing participation in the NSLP for Latino students during middle school and high school years. Additionally, no study had utilized a comprehensive survey tool including a wide range of factors that may be influencing participation in the NSLP. This study provided a deeper understanding of the factors that may be influencing the participation in the NSLP for Latino and non-Latino students.

Our survey respondents consisted of 232 public school students enrolled in grades 7 through 12 at ABC Unified School District in Southern California. The largest amount of participants was recruited from Gahr high school (n=94) as compared to the other three schools. The majority of respondents were female (n=135). Participants were well distributed across all six grade levels with the slightly more students enrolled in 10th grade (n=53) compared to other grades.
More than half of the survey respondents were of Latino ethnicity (52%). 68% of respondents reported that they qualified for free or reduced school meals. Based on the participant characteristics described, it is possible that results may be skewed due to high response from one school (Gahr High School) compared to the other schools.

The primary findings of this study were that: (1) Latino students do not differ significantly from non-Latino students in their participation in the NSLP (2) The significant predictors of NSLP participation for Latino students are meal eligibility, parental level of education, Frequency of family meals and Frequency of fast food consumption (3) The factors predicting participation in the NSLP are different for Latino and non-Latino students and (4) The factors predicting participation in the NSLP are different for Latino high-participators and Latino Low-participators.

It was predicted that Latino students would be significantly different from non-Latino students in their participation in the NSLP. As described in our literature review, Latino students are face higher levels of food insecurity and economic hardship compared to students of other ethnic groups (Shih et al., 2013; USDA, 2016a). Because of this, it was expected that Latino students would participate in the NSLP at a higher rate than their peers, but this was not shown in our study.

It is possible that our study may not have found a significant difference in the participation between Latino and non-Latino students due to a small sample size. It is also possible that increased levels of food insecurity and economic hardship do not predict a student’s participation in the NSLP. Further research is
necessary in order to discover the relationship between food insecurity, economic hardship and NSLP participation.

It was postulated that the significant predictors of NSLP participation for Latino students would be perceived social stigma and parental influences. Past studies have been able to demonstrate the significant effect of perceived social stigma and parental influence on NSLP participation (Bhatia et al., 2011; Mirtcheva et al., 2009; Snelling et al., 2007; Pearson et al., 2012; Salvy et al., 2011; Kinard et al., 2011; Videon et al., 2003; Ohri-Vachaspati, 2013). The current study found parental influence, but not perceived social stigma to be significant predictors of NSLP participation for Latino students. A larger sample size might lead to a different result. It is also possible that the questions intended to measure social stigma were not accurate in doing so. A validated survey may be useful in providing questions that more accurately measure perceived social stigma.

It was also predicted that Latino students would be different from non-Latino students in the factors influencing their participation in the NSLP. This was predicted because Latino students are impacted by a unique set of factors including increased rates of obesity, food insecurity and economic hardship that may be influencing their participation in the NSLP. (Ogden et al., 2014; Shih et al., 2013; USDA, 2016a). Our findings supported this hypothesis. For non-Latino students, bringing lunch from home was the only significant predictor of NSLP participation. For Latino students, the significant predictors of NSLP participation were meal eligibility, parental level of education, Frequency of family
meals, and Frequency of fast food consumption. These results illustrate the need for studies focused on the factors influencing NSLP participation specifically for Latino students.

Our final hypothesis stated that the factors predicting participation in the NSLP are different for Latino high-participators and Latino low-participators. Our study findings supported this hypothesis. The regression analysis performed on high versus low NSLP participants revealed that there were no significant predictors of participation for Latino high participators and only one significant predictor of participation for Latino low participators: Meal Eligibility. These findings indicate that more research is necessary to find a model that includes more significant predictors of NSLP participation for Latino students who are low and high participators. Furthermore, these results suggest that the model predicting NSLP participation for Latinos who are low participators may include completely different factors than the model predicting NSLP participation for Latino students who are high participators.

The analysis of variance revealed a significant difference between group means for Gender, Grade, Meal Eligibility, Rate of NSLP Participation, Question 10/frequency of bringing food from home, Question 12/buying lunch at off-campus location, Question 17/frequency of fast food consumption, and Question 20/level of parental education. All of these results combined indicate that significant differences exist between the school site populations featured in this study. A significant difference in grade was expected since the selected school sites were two middle schools and two high schools. Post hoc analysis
indicated that respondents from Gahr High School were significantly different in Gender, NSLP Participation, Frequency of Bringing lunch from home and Frequency buying lunch off-campus and fast food consumption. It was also found that respondents from Fedde Middle School were significantly different in parental level of education and Meal Eligibility status. Due to the observed differences between the participant groups, our results may have been skewed. It may be necessary to further explore the observed differences between these study populations to assess their impact on our study results.

Past studies have found a significant relationship between NSLP participation and school lunch price, access to competitive foods, perceived social stigma, peer influences and parental/home in the general population of school children (Akin, Guilkey, Popkin & Wyckoff, 1993; Bhatia, Jones & Reicker, 2011; Gleason, 1995; Long, Henderson & Schwarts, 2010; Maurer, 1984; Miller, 2011; Snelling, 2007, Mirtcheva & Powell, 2009). In our study, we were able to demonstrate the significant effect of meal eligibility, parental level of education, frequency of family meals, and frequency of fast food consumption on NSLP participation for Latino students. Compared to previous studies, our study utilized a more comprehensive survey tool but had a much smaller sample size. Although included in our survey tool, competitive foods, peer pressure/perceived social stigma were not found to be significant predictors of NSLP participation in either non-Latino or Latino students. Our results contradict results from previous studies in the factors affecting NSLP participation. This discrepancy may be due to a difference in the validity of the survey tool used in our study compared to the
survey tools used in previous research. Thus, it may be necessary to fine-tune
the predictive equation used in this study to remove variables that were not
significant predictors of NSLP participation and add new variables to be
analyzed.

It is necessary to perform a more structured review of the qualitative data
gathered through questions 21 and 22 of the survey tool in order to discover
reoccurring themes in student responses. These themes should be evaluated
even further to decipher if they are indeed factors that influence NSLP
participation. Nearly all 232 respondents provided a response to both open-
ended questions in the survey tool. This is a significant observation as it
indicates that students are eager to share their opinions regarding school meals
and should be given more opportunities to share their input.

Study Limitations

We acknowledge that our study was not without limitations. The current
study population was limited to students within ABC Unified School District and
may not be representative of the student population within all school districts
across the United States. Additionally, data collected is based on student self-
report and may not be as accurate as data collected by other means. It may
have been more reliable to collect information regarding NSLP eligibility and
participation rates for each student by utilizing the schools point of sale (POS)
computer database. It is possible that our study population is inherently biased
due to the fact that only the students who were allowed to participate in this study
were those whose parents took the time to sign and return a consent form. This may have resulted in an inadvertent selection bias towards students whose parents are more actively involved in their child’s education.

Another limitation to this study was that the survey tool utilized was not pilot tested and validated. Because of this, it is possible that the terms used in the study survey tool may have been interpreted differently by each student, leading to skewed results. A pilot test could have benefited our analysis in that it would have identified any terms that needed further clarification. Additionally, validation of the current survey tool would confirm that the each of the survey questions actually measured the factors they were intended to measure.

A very significant limitation to our study is that our findings are based on regression analysis. In regression analysis, the beta weights analyzed only hold true for the particular combination of variables included in the predictive equation. Thus, it is impossible to discern the predictive power a single variable would have on it’s own. Additionally, regression analysis does not prove causality. Future research could focus on fine–tuning the predictive equation used in the by removing the factors that were shown not to be significant predictors in our study.

Lastly, our survey failed to include questions on lunch price, customer service and time constraints -- factors that have been shown to impact student NSLP participation (Meyer et al., 1998; Meyer, 2000; Asperin et al., 2009; Castillo et al., 2012). Future studies could improve the survey tool used in our study by adding questions related to these missing factors.
A confounding variable in our study may have been income. The survey tool did not inquire about family income, primarily because it was predicted that student-reported family income would be very inaccurate. One improvement to the current study could be to incorporate a phone survey with parents to determine family income.

**Future Research**

Based on the findings in this study, it is evident that Latino students are different from non-Latino students in the factors that influence their participation in the NSLP. Future research is needed in order to discover all of the factors that influence NSLP participation for Latino students. A follow-up study to this investigation could lead to the development of a more comprehensive validated survey tool for NSLP participation. A larger sample size could also improve the statistical power of study findings.

Our regression equation could also be tested against a new sample of students to see how well it predicts NSLP participation. Although outside the scope of our study, the qualitative data collected through questions 21 and 22 on our study survey could be analyzed to discover evident themes in student input regarding their experience in the NSLP. These themes could then be used to decipher the factors that may be impacting NLSP participation among this particular study population.

Our study could have also benefited from collecting qualitative data through the use of focus groups with students. This information could have helped us identify other possible factors influencing NSLP participation among
our study population. Future research could include more of a mixed-methods approach involving the analysis of qualitative and quantitative data. Qualitative data could help elucidate what factors account for variance in NSLP participation unaccounted for through our investigation.
CHAPTER 6

CONCLUSION

Participation in the NSLP offers many potential benefits to students. The current study evaluated the factors influencing NSLP participation for Latino students during Middle and High School years. The results of this study show that meal eligibility, parental level of education, frequency of family meals, and frequency of fast food consumption are all significant predictors of NSLP participation for Latino students. Future research focusing on the Latino student population is needed in order to reveal all other undiscovered factors that influence Latino student participation in the NSLP. Suggestions for future research include utilizing a mixed-methods approach involving quantitative and qualitative data collected directly from students. Additionally, it is recommended to include a larger group of participants from school districts across the United States in order to increase the generalizability and statistical power of the data. Despite its limitations, the current study provided valuable insight into the factors that influence participation in the NSLP for Latino students in particular and may serve to guide future research focused on Latino students in the NSLP.
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72
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APPENDIX A

IRB APPROVAL MEMORANDUM

Memorandum
California State Polytechnic University, Pomona
Office of Research

Date: April 7, 2014

To: Adriana Lopez
Agriculture, Human Nutrition and Foods

From: Dr. Jeffery S. Mio
Chair, IRB (Human Subjects Protection Committee)

cc: IRB file
Lisa Kessler PhD

Subject: Protocol number 14-0021

Your de novo protocol entitled “An Evaluation of the Barriers to Participation in the National School Lunch Program for Low-Income Latino Students in Middle School and High School Years” has been reviewed by the Cal Poly Pomona Institutional Review Board (IRB) by the expedited process. It was found to be in compliance with applicable federal and state regulations and Cal Poly Pomona policies regarding the protection of human subjects used in research. Thus, the Cal Poly Pomona IRB grants you approval to conduct the research. On its behalf, I thank you for your adherence to established policies meant to ensure the safety and privacy of your study participants. You may wish to keep a copy of this memo with you while conducting your research project.

You may initiate the project as of April 7, 2014, and it must be completed by April 6, 2015. Federal regulations limit the IRB approval of studies for up to one year. If you find the need to renew your protocol, please remember to submit a request to the IRB at least six (6) weeks before this end date to ensure continuous human subjects’ protection and IRB approval. It would be appreciated that you advise the IRB upon the completion of your project involving the interaction with human subjects.

Approval is conditional upon your willingness to carry out your responsibilities as the principal investigator under University policy. Your research project must be conducted according to the methods described in the final approved protocol. Should there be any changes to your research plan as described, please advise the IRB, because you may be required to submit an amendment. Additionally, should you as the investigator or any of your subjects experience any “problems which involve an undescribed element of risk” (adverse events in regulatory terms), please immediately inform the IRB of the circumstances.

If you need further assistance, you are encouraged to contact the IRB administrator, Bruce W. Kennedy MS RALTG CMAR CPIA at 909-868-4215.

The committee wishes you success in your research endeavors.

Jeffrey S. Mio PhD
Professor, Psychology
College of Letters, Arts, and Social Sciences

Federalwide Assurance 000261759
IRB principles respect for persons, beneficence, and justice
version 1 Sep 10

80
APPENDIX B

INFORMED CONSENT FORM (ENGLISH)
APPENDIX B (Continued)

INFORMED CONSENT FORM (SPANISH)

California State Polytechnic University, Pomona
Forma de Consentimiento Informado para Investigación que Implica Sujetos Humanos

Usted está invitado a participar en un estudio de investigación que el Comité Examinador Institucional (CEI) de Cal Poly Pomona ha revisado y aprobado para ser conducido por los Investigadores nombrados aquí. Esta forma está diseñada para proporcionarle información acerca de este estudio en su calidad de sujeto humano. El Investigador o su representante le describirán este estudio y le contestarán cualquier pregunta que tenga. Usted tiene derecho a la Declaración de Derechos del Sujeto que participa en una Investigación Experimental y a recibir una copia de este documento. Si tiene alguna pregunta o quejas acerca del proceso descrito en dicho documento, por favor llame a la Oficina de la Conformidad que forma parte de la Oficina de Investigación de la Universidad de Cal Poly Pomona al (909) 860-4215. Más información está disponible en sitio web de el CEI en el www.csupomona.edu/research/irb.

SITIO________________

Título Estudio de Investigación: Una evaluación de las barreras para la participación en el Programa Nacional de Almuerzos Escolares para los Estudiantes de la Escuela Secundaria y Preparatoria.

Investigadores: Adriana López, estudiante de Maestría en Agricultura en Nutrición y Ciencias de los Alimentos de la Universidad Politécnica Estatal de California en Pomona y Lisa Kessler, DrPH, MPH, RD.
Número de protocolo IRB: 14-0021

Se le pide permitir que su hijo(a) participe en un estudio de investigación. El estudio es una encuesta anónima voluntaria sobre los almuerzos escolares. El nombre de su hijo no estará en la encuesta o en cualquier reporte. Toda la información colectada a través de este estudio se mantendrá en privado. Por favor, llene este formulario si usted da permiso para que su hijo participe en este estudio. Si no recibimos este formulario completo, vamos a suponer que usted no da permiso para que su hijo participe. Favor de regresar esta forma firmada con su hijo(a) o llevar directamente a la oficina de la escuela antes del 5 de Mayo del 2015.

El propósito de este estudio es conocer las razones por las que los estudiantes optan por comer o no comer los almuerzos escolares. Le pedimos a su niño que complete una encuesta con preguntas sobre información básica como su género, su origen étnico y su grado escolar. La encuesta también le hará preguntas sobre sus alimentos en el hogar, el acceso a los alimentos distintos de los almuerzos escolares, sus preferencias alimenticias personales y las influencias de sus compañeros. Le pedimos a su hijo que complete esta encuesta en su salón de clases en una fecha preestablecida en algún momento entre abril y mayo de 2015. La encuesta le tomará de 10 a 15 minutos para completar.

No hay riesgos previsibles a su hijo en este estudio. Los beneficios de este estudio incluyen proporcionar información a los profesionales de servicios de alimentos para que puedan tomar las medidas necesarias para mejorar el programa de almuerzos escolares. El beneficio para los niños que participan en el estudio será tener la oportunidad de expresar sus opiniones con respecto a los almuerzos escolares. Si usted o su hijo decide no participar en este estudio, esto no afectará las calificaciones de su hijo o la elegibilidad para las comidas escolares. El Director de la escuela de su hijo está al tanto de este estudio y está de acuerdo de que se produzca en la escuela.

Si usted o su hijo tiene alguna pregunta o inquietud con respecto a este estudio, por favor póngase en contacto con Dr. Kessler al 909-860-2203 o lkessler@cpp.edu. También puede comunicarse con Adriana Lopez al (562) 822-8437 o adrianalopez@cpp.edu.

He leído toda la información anterior y doy mi permiso para que mi hijo(a) participe en este estudio de investigación. Soy consciente de que tengo derecho a recibir una copia de este formulario a petición.

Nombre del niño participante: ___________________________
Nombre de los padres: ___________________________
Nombre del maestro(a) de primer periodo de su hijo: ___________________________
Firma del padre: ___________________________ Fecha: ___________________________
APPENDIX C

MEMORANDUM OF PROTOCOL ADDENDUM & EXTENSION

State of California
Memorandum
California State Polytechnic University, Pomona
Office of Research

Date: May 13, 2015
To: Adriana Lopez
Agriculture, Human Nutrition and Foods
From: Dr. Jeffery S. Mio
Chair, IRB (Human Subjects Protection Committee)
cc: IRB file
Lisa Kessler PhD
Subject: Protocol number 14-0021

Your request to amend the protocol entitled "An Evaluation of the Barriers to Participation in the National School Lunch Program for Low-Income Latino Students in Middle School and High School Years" has been reviewed by the Cal Poly Pomona Institutional Review Board (IRB) by the expedited process. It was found to be in compliance with applicable federal and state regulations and Cal Poly Pomona policies regarding the protection of human subjects used in research. Thus, the Cal Poly Pomona IRB grants you approval to conduct the research. On its behalf, I thank you for your adherence to established policies meant to ensure the safety and privacy of your study participants. You may wish to keep a copy of this memo with you while conducting your research project.

You may initiate the project as of May 13, 2015, and it must be completed by May 11, 2016. Federal regulations limit the IRB approval of studies for up to one year. If you find the need to renew your protocol, please remember to submit a request to the IRB at least six (6) weeks before this end date to ensure continuous human subjects' protection and IRB approval. It would be appreciated that you advise the IRB upon the completion of your project involving the interaction with human subjects.

The reason given to amend the protocol is as follows: change recruitment strategy; instead of recruiting from the entire school population, choose 4-5 classes.

Approval is conditional upon your willingness to carry out your responsibilities as the principal investigator under University policy. Your research project must be conducted according to the methods described in the final approved protocol. Should there be any changes to your research plan as described, please advise the IRB, because you may be required to submit an amendment. Additionally, should you as the investigator or any of your subjects experience any "problems which involve an undescribed element of risk" (adverse events in regulatory terms), please immediately inform the IRB of the circumstances.

If you need further assistance, you are encouraged to contact the IRB administrator, Bruce W. Kennedy MS RLATG CMAR CPIA at 909-869-4215.

The committee wishes you success in your research endeavors.

Jeffery S. Mio PhD
Professor, Psychology
College of Letters, Arts, and Social Sciences

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IRB principles: respect for persons, beneficence, and justice
version 1 Sep 10

83
ID #: _A_ _

SITE: ______________________

ABC Unified School District School Lunch Program Survey

Please do not write your name on this survey. Please be honest in your answers. Your opinion is very important to us and could help us make school lunches even better tasting and more nutritious. Thank you for participating!

1. What is your gender? (please check one)
   [ ] Male  [ ] Female  [ ] Would rather not say

2. What is your grade level? (please check one)
   [ ] 7th  [ ] 8th  [ ] 9th  [ ] 10th  [ ] 11th  [ ] 12th

3. What is your ethnicity? (check all that apply):
   [ ] White/Caucasian
   [ ] Hispanic/Latino
   [ ] Black/African American
   [ ] Asian/Asian Indian
   [ ] Native American/American Indian
   [ ] Other (please specify): ______________________
   [ ] Don’t know/ would rather not say.

4. Do you receive free or reduced price school lunches? (please check one)
   [ ] I receive free school lunches
   [ ] I receive reduced price school lunches
   [ ] No, I am not eligible to receive free or reduced price lunches
   [ ] I don’t know

5. How often do you eat a school lunch? (please check one)
   [ ] Never
   [ ] 1-2 days per week
   [ ] 3 days per week
   [ ] 4 days per week
   [ ] 5 days per week (everyday)
Please read each of the following statements and indicate your level of agreement by using the scale:

0 = Strongly Disagree  to  7 = Strongly Agree

6. I am satisfied with the quality of school lunches.
   [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

7. I do not eat school lunches because the food does not taste good.
   [ ] [ ] [ ] [ ] [ ] [ ] [ ]

8. I do not eat school lunches because I do not recognize what the food is or I am not familiar with the foods being served.
   [ ] [ ] [ ] [ ] [ ] [ ] [ ]

9. I am worried that school lunches are not healthy.
   [ ] [ ] [ ] [ ] [ ] [ ] [ ]

10. I do not eat school lunches because I bring my own food from home.
    [ ] [ ] [ ] [ ] [ ] [ ] [ ]

11. I do not eat school lunches because I prefer to eat foods that are sold in the snack/la carte lines.
    [ ] [ ] [ ] [ ] [ ] [ ] [ ]

12. I do not eat school lunches because I buy a lunch at an off-campus location.
    [ ] [ ] [ ] [ ] [ ] [ ] [ ]

13. I do not eat school lunches because I am worried about being judged negatively by my classmates.
    [ ] [ ] [ ] [ ] [ ] [ ] [ ]

14. I would eat lunch more often if all of my friends also ate a school lunch.
    [ ] [ ] [ ] [ ] [ ] [ ] [ ]

15. My family eats fruits and vegetables everyday.
    [ ] [ ] [ ] [ ] [ ] [ ] [ ]

16. I eat healthy food most of the time when I am at home.
    [ ] [ ] [ ] [ ] [ ] [ ] [ ]
17. My family and I eat at fast food restaurants 3 to 5 times a week.

[ ] 0  [ ] 1  [ ] 2  [ ] 3  [ ] 4  [ ] 5  [ ] 6  [ ] 7

18. My parents are worried that school lunches are not healthy.

[ ] 0  [ ] 1  [ ] 2  [ ] 3  [ ] 4  [ ] 5  [ ] 6  [ ] 7

19. How many times per week do you eat meals together with at least one of your parents?

[ ] 0 times per week
[ ] 1-2 times per week
[ ] 3-5 times per week
[ ] everyday

20. What is the highest level of education either of your parents has completed?

[ ] No high school diploma
[ ] High school diploma
[ ] Some college
[ ] Bachelors degree
[ ] Masters degree
[ ] Doctoral degree (PhD)
[ ] Don't know

21. The biggest reason I don't eat school lunches is because:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

22. Please write other comments/concerns you would like to share regarding school lunches:

________________________________________________________________________

________________________________________________________________________

Thank you for your participation! ☺
APPENDIX E

MOCK SURVEY TOOL

ID #: __B__

SITE: ________________

ABC Unified School District School Lunch Program Survey

Please do not write your name on this survey. Please be honest in your answers. Your opinion is very important to us and could help us make school lunches even better tasting and more nutritious. Thank you for participating!

1. What is your gender? (please check one)
   - [ ] Male
   - [ ] Female
   - [ ] Would rather not say

2. What is your grade level? (please check one)
   - [ ] 7th
   - [ ] 8th
   - [ ] 9th
   - [ ] 10th
   - [ ] 11th
   - [ ] 12th

3. How often do you eat fruits and vegetables? (please check one)
   - [ ] Never
   - [ ] 1-2 days per week
   - [ ] 3 days per week
   - [ ] 4 days per week
   - [ ] 5 days per week (everyday)

4. How often do you eat a school lunch? (please check one)
   - [ ] Never
   - [ ] 1-2 days per week
   - [ ] 3 days per week
   - [ ] 4 days per week
   - [ ] 5 days per week (everyday)

Please read each of the following statements and indicate your level of agreement by using the scale:

0 = Strongly Disagree  to  7 = Strongly Agree

5. I am satisfied with the quality of school lunches.
   - [ ] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 [ ] 6 [ ] 7

6. I do not eat school lunches because the food does not taste good.
   - [ ] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 [ ] 6 [ ] 7

1
APPENDIX E (Continued)

MOCK SURVEY TOOL

7. I do not eat school lunches because I do not recognize what the food is or I am not familiar with the foods being served.

8. I am worried that school lunches are not healthy.

9. I do not eat school lunches because I bring my own food from home.

10. I do not eat school lunches because I prefer to eat foods that are sold in the snack/a la carte lines.

11. I do not eat school lunches because I buy a lunch at an off-campus location.

12. I do not eat school lunches because the food doesn't taste good.

13. I would eat lunch more often if all of my friends also ate a school lunch.

14. My family eats fruits and vegetables everyday

15. I eat healthy food most of the time when I am at home.

16. My family and I eat at fast food restaurants 3 to 5 times a week.

17. My parents are worried that school lunches are not healthy.

18. Do you enjoy cooking?
    [ ] Yes
    [ ] No
19. The biggest reason I don’t eat school lunches is because:

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

20. Please write other comments/concerns you would like to share regarding school lunches:

__________________________________________________________________________
__________________________________________________________________________

Thank you for your participation! 😊
APPENDIX F

ASSENT FORM FOR CONSENTED STUDY PARTICIPANTS

ASSENT FORM FOR STUDY PARTICIPANTS

IRB Protocol number: 14-0021

Your parent has given permission for you to take this survey if you choose. The survey is anonymous. Do not put your name on it. You do not have to participate. The purpose of this survey is to help find out the reasons why students choose to eat or not to eat school lunches. If you choose to participate, we would like you to answer some questions about your background, food preferences and the school lunch program. You do not have to answer every question and can stop any time you want. There are no right or wrong answers, just fill in what you think is your best answer. If you do not want to participate, please sit quietly and do not bother those around you. You can also ask questions if there is anything on the paper you do not understand.

Your opinion is very important because it can help us make the school lunch program even better. Please be honest in your responses. Thank you!

If you choose to take the survey, please sign your name on the line below. Please do not put your name on the survey.

By signing below, I agree to participate in this study.

Name (please print):_________________________ Date:_____________________

Signature:______________________________
APPENDIX G

ASSENT FORM FOR NON-CONSENTED STUDENTS COMPLETING MOCK SURVEY

ASSENT FORM FOR MOCK SURVEY

IRB Protocol number: 14-0021

The purpose of this survey is to help find out the reasons why you choose to eat or not to eat school lunches. The survey is anonymous. Do not put your name on it. You do not have to participate. If you choose to participate, we would like you to answer some questions about student food preferences and the school lunch program. You do not have to answer every question and can stop any time you want. There are no right or wrong answers; just fill in what you think is your best answer. If you do not want to participate, please sit quietly and do not bother those around you. You can also ask questions if there is anything on the paper you do not understand.

Your opinion is very important because it can help us make the school lunch program even better. Please be honest in your responses. Thank you!

If you choose to take the survey, please sign your name on the line below. Please do not put your name on the survey.

By signing below, I agree to participate in this study.

Name (please print):_________________________Date:_____________________

Signature:__________________________________
APPENDIX H

GENERAL ASSENT SCRIPT

GENERAL ASSENT SCRIPT

(TO BE READ OUT LOUD BY INVESTIGATOR TO ALL STUDENTS)

The purpose of this survey is to help find out the reasons why you choose to eat or not to eat school lunches. The survey is anonymous. Do not put your name on it. You do not have to participate. If you choose to participate, we would like you to answer some questions about student food preferences and the school lunch program. You do not have to answer every question and can stop any time you want. There are no right or wrong answers; just fill in what you think is your best answer. If you do not want to participate, please sit quietly and do not bother those around you. You can also ask questions if there is anything on the paper you do not understand.

Your opinion is very important because it can help us make the school lunch program even better. Please be honest in your responses. Thank you!

If you choose to take the survey, please sign your name on the line provided. Please do not put your name on the survey.

Thank you!
### APPENDIX I

**SUMMARY OF ARTICLES ON FACTORS INFLUENCING NSLP PARTICIPATION**

<table>
<thead>
<tr>
<th>Authors, Year, Title, Journal</th>
<th>Objectives</th>
<th>Methods</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhatia, R., Jones, P., &amp; Reicker, Z. (2011). Competitive foods, discrimination, and participation in the national school lunch program. <em>American Journal of Public Health</em></td>
<td>To determine the effect of removal of separate competitive a la carte lunch meal offerings on NSLP participation.</td>
<td>Pilot study. A la carte competitive food offerings were removed at three schools within San Francisco Unified School District. Average daily participation was tracked disaggregated by the student’s NSLP eligibility status.</td>
<td>Elimination of a la carte food offerings resulted in an increase in average daily participation of qualified students eating the NSLP lunch.</td>
</tr>
</tbody>
</table>
### APPENDIX I (Continued)

**SUMMARY OF ARTICLES ON FACTORS INFLUENCING NSLP PARTICIPATION**

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<tbody>
<tr>
<td>Gleason, P.M. (1995). Participation in the National School Lunch Program and the School Breakfast Program. <em>Am J of Clin Nutr.</em></td>
<td>Examine the factors that affect participation in the NSLP and the School Breakfast program.</td>
<td>Data from the School Nutrition and Dietary Assessment study was analyzed through multivariate regression analysis of a variety of independent variables related to school lunch participation.</td>
<td>N= 3,350. Meal price is negatively related to meal price for noncertified students. Students certified for school meals are more likely to participate in the NSLP.</td>
</tr>
<tr>
<td>Long, M.W., Henderson, K.E., &amp; Schwartz, M.B. (2010). Evaluating the impact of a Connecticut program to reduce availability of unhealthy competitive food in schools. <em>J Sch Health.</em></td>
<td>Evaluate the impact of participation in Connecticut’s Healthy Food Certification (HFC) certification program, which provides school districts with incentives for enforcing stricter competitive food guidelines on NSLP participation.</td>
<td>NSLP participation rates were analyzed within districts that enforced stricter competitive food guidelines pre and post participation in the HFC program.</td>
<td>N=74. Participation in the HFC was associated with significantly higher NSLP participation rates for paid meals in middle school but did not increase overall NSLP participation beyond the upward trend.</td>
</tr>
</tbody>
</table>
### APPENDIX I (Continued)

#### SUMMARY OF ARTICLES ON FACTORS INFLUENCING NSLP PARTICIPATION

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<tr>
<td>Mirtcheva, D.M. &amp; Powell, L.M. (2009). Participation in the national school lunch program: Importance of school-level and neighborhood contextual factors. <em>J Sch Health</em></td>
<td>Examine the effect of stigma, neighborhood food environment, and demographic characteristics on participation in the NSLP.</td>
<td>1997 and 2003 data from the Child Development Supplement to the Study of Income Dynamics linked to school-level NSLP eligibility, fast food restaurant availability in school zip code, and neighborhood socioeconomic status. Probit model was used to evaluate the effect of these factors on NSLP participation.</td>
<td>Increased free lunch eligibility in a child’s school associated with increase in the probability of NSLP participation. Increased fast food restaurant availability significantly decreased school lunch participation among high school students.</td>
</tr>
<tr>
<td>Ohri-Vachespati, P. (2013). Parental perception of the nutritional quality of school meals and its association with students’ school lunch participation. <em>Appetite</em></td>
<td>To discover the association between parental perception of the nutritional quality of school meals and whether students eat lunch served at school.</td>
<td>Data from five low-income cities in New Jersey. Phone surveys with parents/guardians to gather data on parental perception of school meals and NSLP participation. Multivariate logistic regression analysis.</td>
<td>Students whose parents perceive the quality of school meals to be healthy have a greater odds of participating in school meal programs.</td>
</tr>
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### APPENDIX I (Continued)

**SUMMARY OF ARTICLES ON FACTORS INFLUENCING NSLP PARTICIPATION**

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<td>Snelling, A.M., Korba, C., &amp; Burkey, A. (2007). The national school lunch and competitive food offerings and purchasing behaviors of high school students. <em>J Sch Health</em></td>
<td>To determine the types of foods being offered for lunch in the cafeteria of 3 public high schools.</td>
<td>Daily food purchases were gathered and analyzed using a stoplight coding system based on nutrient density.</td>
<td>Students purchase foods of minimal nutritional value at higher rates when offered in the school cafeteria. Green and yellow foods accounted for 77% of the offerings and 73% of the offerings. Competitive foods classified as red foods accounted for 83% of competitive food sales.</td>
</tr>
<tr>
<td>Taber, D.R., Chriqui, J.F., Perna, F.M., Powell, L.M., &amp; Chaloupka, F.J. (2012). Weight status among adolescent in the states that govern competitive food nutrition content. <em>Pediatrics</em></td>
<td>To determine the effect of state laws regulating nutrition content of foods and beverages sold outside of federal meal programs on adolescent weight.</td>
<td>Longitudinal analysis. State competitive food laws were classified as strong, weak, or non-existent. Height and weight data obtained from students in fifth and eighth grade.</td>
<td>N=6300 students across 40 states. Strong competitive food laws are associated with lower BMI change among students across all grade levels.</td>
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# APPENDIX J

## SUMMARY OF ARTICLES ON THE NSLP AND STUDENT BMI & DIET

### QUALITY

<table>
<thead>
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<tr>
<td>Briefel, R.R., Wilson, A., &amp; Gleason, P. (2009b). Consumption of low-nutrient, energy-dense foods and beverages at school, home, and other locations among school lunch participants and nonparticipants. <em>Journal of the American Dietetic Association.</em></td>
<td>To discover patterns of consumption of low-nutrient, energy-dense foods by eating location among NSLP participants and non-participants.</td>
<td>Cross-sectional study using data from SNDA-III study collected during 2004-2005 school year. t-tests were run to compare the mean daily energy from low-nutrient energy dense foods by NSLP status.</td>
<td>N= 287 schools and 2,314 children in grades 1-12. Children consumed 527 empty calories during a 24 hour period. NSLP participants consumed less energy from sugar-sweetened beverages than non-participants.</td>
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</table>
## APPENDIX J (Continued)

### SUMMARY OF ARTICLES ON THE NSLP AND STUDENT BMI & DIET QUALITY

<table>
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<tr>
<td>Hanson, K.L., &amp; Olson, C.M. (2013). <em>School meals participation and weekday dietary quality were associated after controlling for weekend eating among us school children aged 6 to 17 years. Journal of Nutrition</em></td>
<td>To estimate the relationships between school meals participation, weekday energy intake and dietary quality. Family income was also examined as a possible moderator.</td>
<td>NHANES data (2003-2008) from dietary recalls. Multivariate regression was used to compare weekend dietary intake versus weekday intakes. Healthy Eating Index (HEI) scores were used to characterize diet quality.</td>
<td>N= 2,376 children aged 6-17. Low-income children who participate in the NSLP were shown to have significantly higher HEI scores.</td>
</tr>
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</table>
## APPENDIX J (Continued)

### SUMMARY OF ARTICLES ON THE NSLP AND STUDENT BMI & DIET QUALITY

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<tr>
<td>Kohn, M.J., Bell, J.F., Grow, H.M.G., &amp; Chan, G. (2013). Food insecurity, food assistance and weight status in US youth: new evidence from NHANES 2007–08. <em>Pediatric Obesity</em></td>
<td>To investigate food assistance participation as a risk factor for overweight and obesity in youth and food insecurity as a modifier.</td>
<td>NHANES data (2003-2008). Food insecurity measured through USDA survey module. Food assistance defined as participation in WIC, SNAP, and school meals. Regression models used to estimate association between food assistance program participation and BMI.</td>
<td>Food assistance program participation associated with increased BMI in food secure youth but not food insecure youth.</td>
</tr>
<tr>
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<tr>
<td>Taber, D., Chriqui, J., Powell, L., &amp; Chaloupka, F. (2013). Association between state laws governing school meal nutrition content and student weight status: Implications for new USDA school meal standards. <em>JAMA Pediatr</em></td>
<td>To determine if stronger school meal nutrition standards improve student weight status.</td>
<td>Quasi-experiment utilizing data obtained from the Early Childhood Longitudinal study (ECLS-K). Data for students in states that did not exceed the federal meal standards were compared with data for students in states that did not exceed USDA meal standards.</td>
<td>n= 7,050 students. In states that exceeded federal meal standards, difference in obesity prevalence between NSLP participants and non-participants was 12.3% smaller compared to states that did not exceed federal meal standards.</td>
</tr>
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</table>
An Evaluation Of The Factors Influencing Participation In The National School Lunch Program (NSLP) For Latino Students During Middle School And High School Years

Authors: Adriana Lopez, RD, Lisa Kessler DrPH, RD, Bonny Burns-Whitmore, DrPH, RD and David R. Edens, PhD

Abstract word count: 249
Manuscript word count: 3,531

Abstract

There is no published research available to explain the factors influencing participation in the National School Lunch Program (NSLP) for Latino students in Middle School and High School. Evidence exists that perceived social stigma, access to competitive foods, peer and parental influences all impact NSLP participation rates in the general student population. The purpose of this study was to evaluate the factors influencing participation in the NSLP for Latino students in middle school and high school years. Data was collected utilizing a 22-question survey tool. The independent variables investigated were: grade level, gender, ethnicity, perceived social stigma regarding NSLP participation, competitive foods served on and off campus, peer influences and parental influences. The dependent variable was participation in the NSLP. Study
participants were a convenience sample of students (N= 232) enrolled at two high schools and two middle schools within ABC Unified School District in Southern California. Results indicated that Latino students were significantly different from non-Latino students in their participation rates in the NSLP. The significant predictors of NSLP participation for Latino students were meal eligibility, parental level of education, frequency of family meals, and frequency of fast food consumption. Meal eligibility was the only significant predictor of participation in the NSLP for Latino students who are low-participators. Latino students are clearly different from non-Latino students in the factors that influence their participation in the NSLP. More research is needed to further clarify the exact factors impacting Latino NSLP participation and the degree of impact each of these factors has.

Keywords: NSLP, National School Lunch Program, Latino, School Meal Participation, School Meals, School Lunch, California.

Introduction

The National School Lunch Program (NSLP) was established under the National School Lunch Act of 1946 with the primary goal of ensuring that school children do not go hungry and have access to nutritious meals and snacks that support normal growth and development (USDA, 2012a). The Healthy Hunger-Free Kids act of 2010 required that the U.S. Department of Agriculture update
school meal nutrition standards in order to reflect the dietary recommendations outlined in the 2010 Dietary Guidelines for Americans (DGAs) (USDA, 2012b). The DGAs provide evidence-based food and beverage recommendations with the goal of promoting health, preventing chronic disease and helping people reach and maintain a healthy weight (Office of Disease Prevention and Health Promotion, 2016). Currently, meals served through the NSLP are designed to provide participating school children with a well-balanced, low-fat meal containing one-third of their daily nutrient requirements (USDA, 2012a). Evidence shows that meals served through the NSLP provide adequate nutrition and support student health (USDA, 2012a; Hanson & Olson, 2013; Taber, Chriqui, Powell and Chaloupka, 2013; Briefel, Crepinsek, Wilson & Gleason, 2009). Moreover, participation in the NSLP has the potential to help decrease childhood obesity rates (Taber et al., 2013).

Literature suggests that Latino students are the most at risk for food insecurity and obesity (Ogden, Carroll, Kit and Flegal, 2014; USDA, 2016a; CDC, 2012). According to recent figures, approximately 30.5 million school children participated in the NSLP nationwide in 2015, 72.6% of which received free or reduced price meals (USDA, 2016b). In California alone, approximately 3.2 million students participated in the NSLP in 2015 (USDA, 2016c). Latino students account for approximately 25% of all students enrolled in U.S. public schools and about one-third of the total students eligible for free or reduced
meals through the NSLP (National Center for Education Statistics, 2016). Additionally, Latino students make up 53.97% of all public school students in California (California Department of Education, 2016a). Currently, Latinos represent the largest ethnic group in California at 38.6% of the total population, a number that is expected to continue to grow (United States Census Bureau, 2015). Latino students will continue to grow as a target population for the NSLP, especially in California. Thus, it is crucial to elucidate the factors influencing their participation in the NSLP in order to help increase their participation rates.

Participation rates in the NSLP have been dropping in recent years decreasing from 31.8 million in 2011 to 30.5 million in 2015 (USDA, 2016b). Additionally, NSLP participation rates are drastically lower for students at higher grade levels: 66% for elementary students compared to 54.5% for middle school students and 40.5% for high school students (Gleason, 1995). Decreased NSLP participation during middle school and high school years is concerning since these are years of marked growth and increased dietary needs (California Department of Public Health, 2013).

Previous research has demonstrated the significant effect of school lunch price, access to competitive foods, perceived social stigma, peer influences and parental/home influence on NSLP participation in the general population of school children (Akin, Guilkey, Popkin & Wyckoff, 1993; Bhatia, Jones & Reicker, 2011; Gleason, 1995; Long, Henderson & Schwarts, 2010; Maurer, 1984; Miller,
There are no published studies that examine the factors influencing participation in the NSLP specifically for Latino students during middle and high school years. Latino students comprise the largest student population in California yet no studies have been published to investigate the factors that may be influencing their participation in the NSLP.

Our search of the existing literature revealed only a few published studies where students provided direct input regarding their experience in the NSLP (Meyer & Conklin, 1998; Meyer 2000; Asperin, Nettles & Carr, 2009; Castillo, Lofton & Wilson, 2012). Although these studies provided valuable insight into the factors that may influence student participation in the NSLP, the survey tools utilized in these studies failed to include questions related to other factors that may be influencing school lunch participation such as parental influences, peer pressure and competitive foods. Hence, there is a need for a study utilizing a more comprehensive survey tool in order to fully elucidate the range of factors influencing NSLP participation among middle and high school students.

The purpose of this study was to examine the barriers to participation in the NSLP for Latino school children at middle school and high school grade levels in order to discover what factors influence their decision to consume school meals. The overall goal for this study is to provide guidance and suggestions to school food service professionals to help increase NSLP participation among Latino students.
Participants

Study participants were a convenience sample recruited from four school sites within ABC Unified School District: two high schools (Artesia and Gahr High School) and two middle schools (Ross and Fedde Middle School). The California State Polytechnic University, Pomona Institutional Review Board approved the study protocol #14-0021.

Survey Instrument

Study participants completed a survey consisting of 22 questions: five background questions, fifteen questions relating to the proposed factors influencing NSLP participation and two open-ended questions to gather additional student opinions regarding the NSLP. The background questions inquired about gender, ethnicity, grade level, NSLP eligibility and frequency of consumption of school lunch. Fifteen questions related to the following factors that may affect student participation in the NSLP: personal food preferences/perceived quality of school lunches, perceived healthfulness of school lunches, competitive foods, social stigma/peer pressure and home environment/parental influences. The modified survey instrument was adapted from the validated Participation & Non-Participation Surveys published by the National Food Service Management Institute (NFSMI) (Asperin & Carr, 2009; Rushing, 2013).
Statistical Analysis

Survey data was coded to enable statistical analysis of all type questions. Students who reported multiethnic Latino ethnicities were all categorized as Latino. Ethnicity was defined as a dichotomous variable: Latino or non-Latino. All data collected was analyzed using IBM SPSS (Statistical Package for Social Sciences) version 22 software. Missing cases were deleted in a list wise fashion. A student t-test was used to determine if Latino students differ significantly from non-Latinos in their rates of school lunch participation. Multiple regression analysis was performed to determine the effectiveness of a model to predict school lunch participation for Latino and non-Latino students. For this analysis, blocks were formed by grouping survey questions related to similar variables. The blocks used for the regression analysis were as follows:

- **Block 1:** School
- **Block 2:** Gender, meal eligibility, Grade (Questions 1, 2 & 4)
- **Block 3:** Preferences/Perceived quality of school lunches (Questions 6-8)
- **Block 4:** Competitive foods (Questions 10-12)
- **Block 5:** Social stigma/peer pressures (Questions 13 & 14)
- **Block 6:** Home environment/parental influences (Questions 15-17, 19 & 20)
- **Block 7:** Perceived healthfulness of school lunches (Questions 18 & 9)

The same regression model was used to determine the significant predictors of NSLP participation for Latino students who participate in the NSLP at high
rates (3 or more times per week) and for Latino students who participate at low rates (2 or less times per week).

Lastly, a one-way ANOVA was run to determine if there was a significant difference between the four school populations in the mean response values for each of the survey questions/independent variables.

Participant Characteristics

This study included 232 participants enrolled at ABC Unified School District in 7th through 12th grade. As shown in Table 1, the largest amount of participants was recruited from Gahr high school (n=94) as compared to the other three schools. The majority of the study participants were female (n=135). Participants were well distributed across all six grade levels with the slightly more students enrolled in 10th grade (n=53) compared to other grades. More than half of the survey respondents were of Latino ethnicity (52%). Additional participant characteristics are listed in table 2, including Meal eligibility, Frequency of meals eaten daily as a family, school lunch participation and Highest Level of Parent Education.

Results

There was no significant difference in level of NSLP participation between Latino and non-Latino students \( t(229) = 3.176, p < .10 \).

Table 2 summarizes the results of the regression analysis for Latino and non-Latino study participants. For Latino students, the significant predictors of NSLP participation were meal eligibility (\( \beta = -.410 \)) parental level of education (question 20; \( \beta = .182 \)), Frequency of family meals (question 19, \( \beta = .173 \)) and
Frequency of fast food consumption (question 17, $\beta = -0.163$). Meal eligibility was the most significant predictor of all with $\beta = -0.410$ and $P < 0.001$. Not surprisingly, meal eligibility strongly predicts a lower rate of NSLP participation among students who do not qualify for free or reduced school meals. Parental level of education, frequency of family meals and frequency of fast food consumption were also significant predictors. Higher level of parental education and higher frequency of family meals both significantly predict higher levels of NSLP participation. Conversely, higher frequency of fast food consumption significantly predicts lower levels of NSLP participation. The factors of perceived social stigma (question 13, $\beta = -0.166$) and bringing food from home (question 10, $\beta = -0.155$) were approaching significance ($p < 0.1$). These results suggest that higher perceived social stigma and higher frequency of bringing lunch from home predict lower rates of NSLP participation, but these results were not significant. The final model predicting NSLP participation for Latino students accounted for 35.3% ($R^2_{adj} = 0.353$) of the variation in level of NSLP participation $F(19, 109) = 4.68$, $p < 0.001$.

For non-Latino students, there was only one significant predictor of NSLP participation: bringing lunch from home (question 10, $\beta = -0.338$), $p < 0.05$. This result suggests that a higher frequency of bringing lunch from home decreases rates of NSLP participation among non-Latino students. Two factors were approaching significance ($p < 0.10$): dislike in taste of school lunch (question 7, $\beta = -
.221) and parent concern that school meals are unhealthy (question 18, \(\beta = .188\)). These results suggest that a stronger dislike for the taste of school meals and higher parental concerns that school meals are unhealthy decreases rates of NSLP participation, but these results were not significant. Surprisingly, meal eligibility is not a significant predictor in NSLP participation among non-Latino students. Thus, unlike with Latino students, lower participation in the NSLP would not be predicted among non-Latino students who do not qualify for free or reduced school meals. The final model predicting NSLP participation for non-Latino students accounted for 19.3\% (\(R^2_{adj} = .193\)) of the variation in level of NSLP participation \(F(19, 75) = 2.184, p < .05\).

A separate regression analysis was run on Latino students with high NSLP participation and those with low NSLP participation utilizing the same model used to compare non-Latino students to Latino students. Low participators were defined as consuming school lunch two times per week or less. High participators were defined as consuming school lunch three or more times per week. Results of this regression analysis revealed only one significant predictor of NSLP participation among Latino high-participators: Meal eligibility (\(\beta = -.410\)). Not surprisingly, meal eligibility predicts lower participation among students who do not qualify for free and/or reduced lunches. The final model predicting NSLP participation for Latino students who are low-participators accounted for 33.2\% (\(R^2_{adj} = .332\)) of the variation in level of NSLP participation \(F(19, 45) = 2.68, p < .05\).
.05. No significant predictors of NSLP participation for Latino students who are high-participators. The final model predicting NSLP participation for Latino students who are high-participators accounted for 3.7% ($R^2_{adj} = .037$) of the variation in level of NSLP participation $F(19, 47) = 2.68, p > .05$. The factors predicting NSLP participation for Latino high participators are different from the factors predicting NSLP participation for Latino low participators.

The analysis of variance revealed a significant difference between group means for Gender ($F(3,227) = 3.87, p = 0.01$), Grade ($F(3,227) = 230.24, p = 0.00$), Meal Eligibility ($F(3,228) = 4.42, p = 0.005$), Rate of NSLP Participation ($F(3,228) = 3.13, p = 0.027$), Question 10/frequency of bringing food from home ($F(3,228) = 4.35, p = .005$), Question 12/buying lunch at off-campus location ($F(3,228) = 4.05, p = .008$), Question 17/frequency of fast food consumption ($F(3,227) = 2.65, p = 0.05$), and Question 20/level of parental education ($F(3,227) = 5.16, p = 0.002$). Post hoc analysis indicated that the number of female respondents was significantly higher for Gahr High School compared to the other three schools. Additionally, participants from Gahr High School had significantly lower rates of NSLP participation, significantly higher frequency of bringing lunch from home, significantly higher frequency of purchasing lunch at an off-campus location and significantly higher frequency of fast food consumption compared to the other schools. Post hoc analysis also showed that parental level of education was significantly lower for Fedde Middle School than for the other three schools.
Lastly, it was found that number of respondents who qualify for free or reduced school meals was significantly higher for Fedde Middle School compared to the three other schools.

Questions 21 and 22 of the survey tool were meant to gather information regarding any other factors that may be affecting NSLP participation. Question 21 asked students to list the reasons they do not eat school lunches. Question 22 asked for students to write down any other comments/concerns they wanted to share regarding school lunches. A visual inspection of the qualitative data collected through these questions revealed the following reoccurring topics: time constraints/busy student schedules, limited availability of desired menu items and not wanting to wait in line.

Discussion

Prior to this study, no study had examined the factors influencing participation in the NSLP for Latino students during middle school and high school years. Additionally, no study had utilized a comprehensive survey tool including a wide range of factors that may be influencing participation in the NSLP. This study provided a deeper understanding of the factors that may be influencing the participation in the NSLP for Latino and non-Latino students.

The primary findings of this study were that: (1) Latino students do not
differ significantly from non-Latino students in their participation in the NSLP (2)
The significant predictors of NSLP participation for Latino students are meal
eligibility, parental level of education, Frequency of family meals and Frequency
of fast food consumption (3) The factors predicting participation in the NSLP are
different for Latino and non-Latino students and (4) The factors predicting
participation in the NSLP are different for Latino high-participators and Latino
Low-participators.

For non-Latino students, bringing lunch from home was the only significant
predictor of NSLP participation. For Latino students, the significant predictors of
NSLP participation were meal eligibility, parental level of education, Frequency of
family meals, and Frequency of fast food consumption. These results illustrate
the need for studies focused on the factors influencing NSLP participation
specifically for Latino students.

The regression analysis performed on high versus low NSLP participants
revealed that there were no significant predictors of participation for Latino high
participants and only one significant predictor of participation for Latino low
participants: Meal Eligibility. These findings indicate that more research is
necessary to create a model that includes more significant predictors of NSLP
participation for Latino students who are low and high participators. Furthermore,
these results suggest that the model predicting NSLP participation for Latinos
who are low participators may include completely different factors than the model
predicting NSLP participation for Latino students who are high participators.

The analysis of variance revealed a significant difference between group means for Gender, Grade, Meal Eligibility, Rate of NSLP Participation, Question 10/frequency of bringing food from home, Question 12/buying lunch at off-campus location, Question 17/frequency of fast food consumption, and Question 20/level of parental education. All of these results combined indicate that significant differences exist between the school site populations. Due to the observed differences between the participant groups, our results may have been skewed. It may be necessary to further explore these differences to assess their impact on our study results.

Other studies have found a significant relationship between NSLP participation and school lunch price, access to competitive foods, perceived social stigma, peer influences and parental/home in the general population of school children (Akin, et al., 1993; Bhatia et al., 2011; Gleason, 1995; Long et al., 2010; Maurer, 1984; Miller, 2011; Snelling, 2007; Mirtcheva & Powell, 2009). In this study, we were able to demonstrate the significant effect of meal eligibility, parental level of education, frequency of family meals, and frequency of fast food consumption on NSLP participation for Latino students. Compared to previous studies, the current study utilized a more comprehensive survey tool but had a much smaller sample size. Although included in the survey tool, competitive foods, peer pressure/perceived social stigma were not found to be significant
predictors of NSLP participation in either non-Latino or Latino students. These results contradict results from previous studies in the factors affecting NSLP participation. This discrepancy may be due to a difference in the validity of the survey tool used in our study compared to the survey tools used in previous research.

**Study Limitations**

This study was not without limitations. The study population was limited to students within ABC Unified School District and may not be representative of the student population within all school districts across the United States. Additionally, data collected is based on student self-report and may not be as accurate as data collected by other means. For instance, it may have been more reliable to collect information regarding NSLP eligibility and participation rates for each student by utilizing the schools point of sale (POS) computer database. It is possible that our study population is inherently biased due to the fact that only the students who were allowed to participate in this study were those whose parents took the time to sign and return a consent form. This may have resulted in an inadvertent selection bias towards students whose parents are more actively involved in their child’s education.

Another limitation to this study was that the survey tool utilized was not pilot tested and validated. Because of this, it is possible that the terms used in the study survey tool may have been interpreted differently by each student and lead
to skewed results. A pilot test could have benefited our analysis in that it would have identified any terms that needed further clarification. Additionally, validation of the current survey tool would confirm that the each of the survey questions actually measured the factors they were intended to measure.

A very significant limitation to our study is that our findings are based on regression analysis. In regression analysis, the beta weights analyzed only hold true for the particular combination of variables included in the predictive equation. Thus, it is impossible to discern the predictive power a single variable would have on its own. Additionally, regression analysis does not prove causality. Future research could focus on fine-tuning the predictive equation by removing the variables that were shown not to be significant predictors in our study.

Lastly, our survey failed to include questions on lunch price, customer service and time constraints -- factors that have been shown to impact student NSLP participation (Meyer et al., 1998; Meyer, 2000; Asperin et al., 2009; Castillo et al., 2012). Future studies could improve the survey tool used in our study by adding questions related to these missing factors.

A confounding variable in our study may have been income. The survey tool did not inquire about family income, primarily because it was predicted that student-reported family income would be very inaccurate. One improvement to the current study could be to incorporate a phone survey with parents to determine family income.
Future Research

Based on the findings in this study, it is evident that Latino students are different from non-Latino students in the factors that influence their participation in the NSLP. Future research is needed in order to discover all of the factors that influence NSLP participation for Latino students. A follow-up study to this investigation could lead to the development of a more comprehensive validated survey tool for NSLP participation. A larger sample size could also improve the statistical power of study findings. It may also prove useful to compare the data collected from NSLP participant & non-participant groups within each ethnicity. Our regression equation could also be tested against a new sample of students to see how well it predicts NSLP participation.

Future research could include more of a mixed-methods approach involving the analysis of qualitative and quantitative data. Qualitative data could help elucidate what factors account for variance in NSLP participation unaccounted for through our investigation.

Conclusion

Participation in the NSLP offers many potential benefits to students. The current study evaluated the factors influencing NSLP participation for Latino students during Middle and High School years. The results of this study show that meal eligibility, parental level of education, frequency of family meals, and
frequency of fast food consumption are all significant predictors of NSLP participation for Latino students. Future research focusing on the Latino student population is needed in order to reveal all other undiscovered factors that influence Latino student participation in the NSLP. Despite it’s limitations, the current study provided valuable insight into the factors that influence participation in the NSLP for Latino students in particular and may serve to guide future research focused on Latino students in the NSLP.

**Conflict of Interest:** None

**Funding Disclosure:** None
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through 2009-2010.
http://www.cdc.gov/nchs/data/hestat/obesity_child_09_10/obesity_child_0

Gleason, P.M. (1995). Participation in the National School Lunch Program and

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a Connecticut program to reduce availability of unhealthy competitive food
in schools. *J Sch Health.*, 80(10), 478-486.


Study-IV: Summary of Findings.


# Table 1

*Study Participant Characteristics*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N = 232</th>
<th>n</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>School</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Artesia High School</td>
<td>60</td>
<td></td>
<td>26%</td>
</tr>
<tr>
<td>Gahr High School</td>
<td>94</td>
<td></td>
<td>41%</td>
</tr>
<tr>
<td>Fedde Middle School</td>
<td>23</td>
<td></td>
<td>10%</td>
</tr>
<tr>
<td>Ross Middle School</td>
<td>55</td>
<td></td>
<td>24%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>94</td>
<td></td>
<td>41%</td>
</tr>
<tr>
<td>Female</td>
<td>135</td>
<td></td>
<td>58%</td>
</tr>
<tr>
<td><strong>Grade Level</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7th</td>
<td>44</td>
<td></td>
<td>19%</td>
</tr>
<tr>
<td>8th</td>
<td>34</td>
<td></td>
<td>15%</td>
</tr>
<tr>
<td>9th</td>
<td>22</td>
<td></td>
<td>9%</td>
</tr>
<tr>
<td>10th</td>
<td>53</td>
<td></td>
<td>23%</td>
</tr>
<tr>
<td>11th</td>
<td>42</td>
<td></td>
<td>18%</td>
</tr>
<tr>
<td>12th</td>
<td>36</td>
<td></td>
<td>16%</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White/ Caucasian</td>
<td>14</td>
<td></td>
<td>6%</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>121</td>
<td></td>
<td>52%</td>
</tr>
<tr>
<td>Black/African American</td>
<td>18</td>
<td></td>
<td>8%</td>
</tr>
<tr>
<td>Asian/Asian Indian</td>
<td>40</td>
<td></td>
<td>17%</td>
</tr>
<tr>
<td>Native American/American Indian</td>
<td>1</td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>16</td>
<td></td>
<td>7%</td>
</tr>
<tr>
<td>Multi ethnic Latino</td>
<td>11</td>
<td></td>
<td>5%</td>
</tr>
<tr>
<td>Multiethnic Non Hispanic</td>
<td>5</td>
<td></td>
<td>2%</td>
</tr>
</tbody>
</table>
Table 1 (Continued)

*Study Participant Characteristics*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N = 232</th>
<th>n</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meal Eligibility</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free</td>
<td></td>
<td>125</td>
<td>54%</td>
</tr>
<tr>
<td>Reduced</td>
<td></td>
<td>32</td>
<td>14%</td>
</tr>
<tr>
<td>Paid</td>
<td></td>
<td>36</td>
<td>16%</td>
</tr>
<tr>
<td>Don’t know</td>
<td></td>
<td>39</td>
<td>17%</td>
</tr>
<tr>
<td><strong>School Lunch Participation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td></td>
<td>53</td>
<td>23%</td>
</tr>
<tr>
<td>1-2 Days per week</td>
<td></td>
<td>63</td>
<td>27%</td>
</tr>
<tr>
<td>3 Days per week</td>
<td></td>
<td>25</td>
<td>11%</td>
</tr>
<tr>
<td>4 Days per week</td>
<td></td>
<td>28</td>
<td>12%</td>
</tr>
<tr>
<td>5 Days per week</td>
<td></td>
<td>62</td>
<td>27%</td>
</tr>
<tr>
<td><strong>Frequency of Meals eaten as a family per week</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td>8</td>
<td>3%</td>
</tr>
<tr>
<td>1-2</td>
<td></td>
<td>55</td>
<td>24%</td>
</tr>
<tr>
<td>3-5</td>
<td></td>
<td>57</td>
<td>25%</td>
</tr>
<tr>
<td>Everyday</td>
<td></td>
<td>110</td>
<td>47%</td>
</tr>
<tr>
<td><strong>Highest Level of Parent Education</strong></td>
<td></td>
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</tr>
<tr>
<td>No high school diploma</td>
<td></td>
<td>29</td>
<td>13%</td>
</tr>
<tr>
<td>High School Diploma</td>
<td></td>
<td>33</td>
<td>14%</td>
</tr>
<tr>
<td>Some College</td>
<td></td>
<td>48</td>
<td>21%</td>
</tr>
<tr>
<td>Bachelors degree</td>
<td></td>
<td>40</td>
<td>17%</td>
</tr>
<tr>
<td>Masters Degree</td>
<td></td>
<td>18</td>
<td>8%</td>
</tr>
<tr>
<td>Doctoral Degree (PhD)</td>
<td></td>
<td>4</td>
<td>2%</td>
</tr>
<tr>
<td>Don’t know</td>
<td></td>
<td>59</td>
<td>25%</td>
</tr>
</tbody>
</table>
### Table 2

*Results of Regression Analysis of Variables on NSLP Participation for Latino & non-Latino Students*

<table>
<thead>
<tr>
<th></th>
<th>Latino&lt;sup&gt;a&lt;/sup&gt; (N=129)</th>
<th></th>
<th></th>
<th>non-Latino&lt;sup&gt;b&lt;/sup&gt; (N=95)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SEB</td>
<td>β</td>
<td>B</td>
<td>SEB</td>
<td>β</td>
</tr>
<tr>
<td><strong>Block 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School</td>
<td>-0.01</td>
<td>0.05</td>
<td>-0.04</td>
<td>.03</td>
<td>0.07</td>
<td>.08</td>
</tr>
<tr>
<td><strong>Block 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demographics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-0.003</td>
<td>0.07</td>
<td>-0.004</td>
<td>-0.06</td>
<td>0.09</td>
<td>-0.08</td>
</tr>
<tr>
<td>Meal Eligibility</td>
<td>-0.17</td>
<td>0.03</td>
<td>-0.41***</td>
<td>-0.04</td>
<td>0.04</td>
<td>-0.11</td>
</tr>
<tr>
<td>Grade</td>
<td>-0.04</td>
<td>0.03</td>
<td>-0.17</td>
<td>-0.01</td>
<td>0.05</td>
<td>-0.06</td>
</tr>
<tr>
<td><strong>Block 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual preferences &amp; perceived school lunch quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q6: I am satisfied with the quality of school lunches.</td>
<td>0.2</td>
<td>0.19</td>
<td>0.09</td>
<td>0.05</td>
<td>0.03</td>
<td>0.19</td>
</tr>
<tr>
<td>Q7: I do not eat school lunches because the food does not taste good.</td>
<td>-0.02</td>
<td>0.02</td>
<td>-0.11</td>
<td>-0.04</td>
<td>0.02</td>
<td>-0.22*</td>
</tr>
<tr>
<td>Q8: I do not eat school lunches because I do not recognize what the food is or I am not familiar with the foods being served.</td>
<td>0.003</td>
<td>0.02</td>
<td>0.01</td>
<td>0.03</td>
<td>0.03</td>
<td>0.13</td>
</tr>
<tr>
<td><strong>Block 4</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competitive foods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q10: I do not eat school lunches because I bring my own food from home.</td>
<td>-0.03</td>
<td>0.02</td>
<td>-0.16*</td>
<td>-0.05</td>
<td>0.02</td>
<td>-0.34**</td>
</tr>
<tr>
<td>Q11: I do not eat school lunches because I prefer to eat foods that are sold in the snack/a la carte lines.</td>
<td>-0.01</td>
<td>0.02</td>
<td>-0.07</td>
<td>0.03</td>
<td>0.03</td>
<td>0.14</td>
</tr>
</tbody>
</table>
Table 2 (Continued)

Results of Regression Analysis of Variables on NSLP Participation for Latino & non-Latino Students

<table>
<thead>
<tr>
<th></th>
<th>Latino&lt;sup&gt;a&lt;/sup&gt; (N=129)</th>
<th></th>
<th>non-Latino&lt;sup&gt;b&lt;/sup&gt; (N=95)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SEB</td>
<td>β</td>
<td>B</td>
</tr>
<tr>
<td>Q12: I do not eat school lunches because I buy lunch at an off-campus location.</td>
<td>0.02</td>
<td>0.02</td>
<td>0.07</td>
<td>-0.01</td>
</tr>
<tr>
<td><strong>Block 5</strong> Social stigma/Peer influences</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q13: I do not eat school lunches because I am worried about being judged negatively by my classmates.</td>
<td>-0.06</td>
<td>0.03</td>
<td>-.17*</td>
<td>0.02</td>
</tr>
<tr>
<td>Q14: I would eat lunch more often if all of my friends also ate a school lunch.</td>
<td>0.001</td>
<td>0.02</td>
<td>0.004</td>
<td>0.001</td>
</tr>
<tr>
<td><strong>Block 6</strong> Home &amp; parental influences</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q15: My family eats fruits and vegetables everyday.</td>
<td>-0.01</td>
<td>0.02</td>
<td>-0.06</td>
<td>.003</td>
</tr>
<tr>
<td>Q16: I eat healthy food most of the time when I am at home.</td>
<td>-0.01</td>
<td>0.02</td>
<td>-0.03</td>
<td>0.02</td>
</tr>
<tr>
<td>Q17: My family and I eat at fast food restaurants 3 to 5 times a week.</td>
<td>-0.04</td>
<td>0.02</td>
<td>-0.16**</td>
<td>0.01</td>
</tr>
</tbody>
</table>
Table 2 (Continued)

Results of Regression Analysis of Variables on NSLP Participation for Latino & non-Latino Students

<table>
<thead>
<tr>
<th>Block 7</th>
<th>Perceived healthfulness of school lunches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Latino(^a) (N=129)</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Q19: How many times per week do you eat meals together with at least one of your parents?</td>
<td>0.08</td>
</tr>
<tr>
<td>Q20: What is the highest level of education either of your parents has completed?</td>
<td>0.05</td>
</tr>
</tbody>
</table>

* p<0.1, **p<0.05, ***p<0.001
\(^a\) F(19, 109) = 4.68, \(p < .001\); \(R^2_{adj} = .353\)
\(^b\) F(19, 75) = 2.184, \(p < .01\); \(R^2_{adj} = .193\)