PARENTAL PERSPECTIVE AND FEEDING PRACTICES EFFECTS ON FOOD NEOPHOBIA IN ELEMENTARY-AGE SCHOOL CHILDREN

A Thesis

presented to

The Faculty of California Polytechnic State University,

San Luis Obispo

In Partial Fulfillment

of the Requirements for the Degree

Master of Science in Agriculture, with Specialization in Food Science

By

Farnoosh Ayoughi

December 2018
COMMITTEE MEMBERSHIP

TITLE: Parental Perspective and Feeding Practices Effects on Food Neophobia in Elementary-Age School Children

AUTHOR: Farnoosh Ayoughi

DATE SUBMITTED: December 2018

COMMITTEE CHAIR: Amy Lammert, Ph.D.
Associate Professor of Food Science

COMMITTEE MEMBER: Samir Amin, Ph.D.
Associate Professor of Food Science

COMMITTEE MEMBER: Ricky Volpe, Ph.D
Assistant Professor of Agribusiness
ABSTRACT

Parental Perspective and Feeding Practices Effects on Food Neophobia in Elementary School Children

Farnoosh Ayoughi

The Food neophobia (FN) behaviors in children are developed during childhood and can be influenced by parental FN and feeding behaviors. The objective of this study was to evaluate the relationship between FN and fruit and vegetable neophobia (FVN) among parents, the parents-reports on child's behavior and child self-reports. The effect of parental feeding practices and demographic variables on children’s FN and FVN were evaluated. Sixty-eight parents paired with their elementary school children (aged 7-12 years) in San Luis Coastal Unified School District participated in this study. Results indicated that parents reported their children more neophobic than children self-reported neophobia; however, there was a significant association between parents-reported child FN and child self-reported FN ($r=0.62$, $p<0.05$). FVN behaviors were positively and consistently correlated with FN in both parents and children. Parents with the highest income levels used less restriction for weight and child control strategies to feed their children ($p<0.05$). More pressure to eat was applied significantly for younger children, which increased their levels of food and FVN as reported by parents.

Keywords: Food neophobia, fruit and vegetable neophobia, parental feeding practices, elementary-age school children, parents
ACKNOWLEDGMENTS

I would like to express my special appreciation and thanks to my advisor Dr Amy Lammert for her support, advice and guidance that she has provided throughout my time as her student. I would like to thank to my thesis committee Dr Samir Amin and Dr Richard Volpe for their encouragement and support. I would like to thank my lab mate, Maria Handley, for all her help. I would like to thank all parents and children who participated in this study and completed our surveys as well as the principals and staff of the elementary schools in San Luis Coastal Unified School District. I would like to thank to the faculty, staff and students in the College of Agriculture, Food and Environmental Sciences at California Polytechnic State University for supporting our work. Last but not the least, I would like to thank my family and my husband, Moslem Ladoni, for their continued support and encouragement.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF TABLES</td>
<td>ix</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xi</td>
</tr>
<tr>
<td>LIST OF ABBREVIATION</td>
<td>xiii</td>
</tr>
<tr>
<td>CHAPTER</td>
<td></td>
</tr>
<tr>
<td>1. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>1.1 Objectives and hypothesis</td>
<td>3</td>
</tr>
<tr>
<td>2. LITERATURE REVIEW</td>
<td>5</td>
</tr>
<tr>
<td>2.1 Introduction</td>
<td>5</td>
</tr>
<tr>
<td>2.2 Food neophobia and its changes during childhood and adulthood</td>
<td>5</td>
</tr>
<tr>
<td>2.3 Food neophobia and children's consumption of fruit and vegetables (FV)</td>
<td>7</td>
</tr>
<tr>
<td>2.3.1 FV consumption among children</td>
<td>7</td>
</tr>
<tr>
<td>2.3.2 Factors that influence FV consumption</td>
<td>8</td>
</tr>
<tr>
<td>2.3.3 Association between food neophobia and children FV consumption</td>
<td>10</td>
</tr>
<tr>
<td>2.4 Factors that influence children food neophobia</td>
<td>11</td>
</tr>
<tr>
<td>2.4.1 Cognitive factors</td>
<td>11</td>
</tr>
<tr>
<td>2.4.2 Environmental factors</td>
<td>12</td>
</tr>
<tr>
<td>2.4.3 Parental feeding practices</td>
<td>14</td>
</tr>
<tr>
<td>2.4.4 Demographic factors</td>
<td>18</td>
</tr>
<tr>
<td>2.5 Food neophobia measurements methods</td>
<td>20</td>
</tr>
<tr>
<td>2.5.1 Measure of food neophobia in adults</td>
<td>21</td>
</tr>
</tbody>
</table>
2.5.2 Measure of food neophobia in children ................................................. 23
2.5.3 Measure of parental feeding practices ................................................... 24

3. MATERIAL AND METHODS ........................................................................... 26
  3.1 Participants ................................................................................................. 26
  3.2 Location ..................................................................................................... 27
  3.3 Parental questionnaire ............................................................................... 28
    3.3.1 Demographics ....................................................................................... 29
    3.3.2 Food Neophobia Scale ......................................................................... 29
    3.3.3. Fruit and Vegetables Neophobia Instrument (FVNI) ......................... 31
    3.3.4 Parental feeding practices questionnaire ............................................. 32
  3.5. Statistical analysis .................................................................................... 34

4. RESULTS ........................................................................................................ 36
  4.1 Food neophobia scores ............................................................................. 39
  4.2 Effect of demographics variables on food neophobia scores .................... 40
  4.3 The associations between socio-economic factors ................................. 44
  4.4 Fruit and vegetable neophobia ................................................................. 46
  4.5 Effect of demographic variables on parental feeding practices .............. 52
    4.5.1 Socio-economic status ......................................................................... 52
    4.5.2 Gender of children ............................................................................... 54
    4.5.3 Grade of children ............................................................................... 55
    4.5.4 Ethnicity ............................................................................................... 56
    4.5.5 Receiving free/reduced price school lunch ........................................... 57
    4.5.6 Number of sibling ages 7-12 years ...................................................... 58
4.6 Association between parental feeding practices and FN and FVN .......... 59

5. DISCUSSION ........................................................................................................... 61

5.1 Food neophobia scores ......................................................................................... 61

5.2 Effect of demographics variables on food neophobia scores ......................... 62

5.3 Fruit and vegetable neophobia ............................................................................ 63

5.4 Effect of demographic variables on parental feeding practices ..................... 64

5.5 Association between parental feeding practices and levels of FN and FVN 67

5.6 Conclusion ............................................................................................................. 69

REFERENCES ............................................................................................................. 71

APPENDICES

Appendix A: Parents’ survey ....................................................................................... 81

Appendix B: Comparison of demographics .............................................................. 107
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>The 10-item adult’s food neophobia scale.</td>
</tr>
<tr>
<td>3.1</td>
<td>Assigning family codes to the parents and students</td>
</tr>
<tr>
<td>3.2</td>
<td>Annual household income to qualify for free/reduced price meals.</td>
</tr>
<tr>
<td>3.3</td>
<td>The modified Child Food Neophobia Scale.</td>
</tr>
<tr>
<td>3.4</td>
<td>Children self-reported food neophobia questionnaire.</td>
</tr>
<tr>
<td>3.5</td>
<td>Fruit and Vegetables Neophobia Instrument.</td>
</tr>
<tr>
<td>3.6</td>
<td>Parental feeding practices questionnaire.</td>
</tr>
<tr>
<td>4.1</td>
<td>Characteristics of children and parents.</td>
</tr>
<tr>
<td>4.2</td>
<td>An accepted range for describing internal consistency (adapted from George &amp; Mallery, 2003).</td>
</tr>
<tr>
<td>4.3</td>
<td>The internal consistency results for food neophobia, fruit and vegetable neophobia and parental feeding practices.</td>
</tr>
<tr>
<td>4.4</td>
<td>Summary statistics of parent and children's food neophobia scores.</td>
</tr>
<tr>
<td>4.5</td>
<td>Results of Pearson correlation analysis of FN scores.</td>
</tr>
<tr>
<td>4.6</td>
<td>The effect of demographic factors on children food neophobia. Higher scores indicate greater neophobia behavior (Mean ± SE).</td>
</tr>
<tr>
<td>4.7</td>
<td>The effect of demographic factors on parents’ food neophobic. Higher scores indicate greater neophobia behavior (Mean ± SE).</td>
</tr>
<tr>
<td>4.8</td>
<td>Associations between parental income and education levels.</td>
</tr>
<tr>
<td>4.9</td>
<td>The relationship between measures of fruit and vegetable neophobia using Pearson correlation.</td>
</tr>
</tbody>
</table>
4.10 The relationship between measures of food neophobia with fruit and
table neophobia scores using Pearson correlation. ..........................52

4.11 Correlations between parental feeding practices and participants’
neophobia scores ..................................................................................60
LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Tested theoretical model of the variables effect on children food neophobia.</td>
</tr>
<tr>
<td>2.1</td>
<td>A potential lifespan model for levels of food neophobia in humans (adapted from Dovery et al., 2008).</td>
</tr>
<tr>
<td>4.1</td>
<td>Association between parental income on Child self-reported FN.</td>
</tr>
<tr>
<td>4.2</td>
<td>Eligibility of students for receiving the free/reduced lunch based on family income.</td>
</tr>
<tr>
<td>4.3</td>
<td>Eligibility of students for receiving the free/reduced lunch based on family educational level.</td>
</tr>
<tr>
<td>4.4</td>
<td>Parents’ attitude toward new FV intake.</td>
</tr>
<tr>
<td>4.5</td>
<td>Parents’ attitude toward new FV intake.</td>
</tr>
<tr>
<td>4.6</td>
<td>Parents-reported their child’s attitude toward new FV intake.</td>
</tr>
<tr>
<td>4.7</td>
<td>Parents-reported their child’s attitude toward new FV intake.</td>
</tr>
<tr>
<td>4.8</td>
<td>Children self-reported their attitude toward new FV intake.</td>
</tr>
<tr>
<td>4.9</td>
<td>Children self-reported their attitude toward new FV intake.</td>
</tr>
<tr>
<td>4.10</td>
<td>Fruit and vegetable neophobia scores among participants (mean ± SE).</td>
</tr>
<tr>
<td>4.11</td>
<td>Association between parental income levels with their feeding practices (mean ± SE).</td>
</tr>
<tr>
<td>4.12</td>
<td>Association between educational levels of parents with their feeding practices (mean ± SE).</td>
</tr>
<tr>
<td>4.13</td>
<td>Association between the gender of children with parental feeding practices (mean ± SE).</td>
</tr>
</tbody>
</table>
4. 14 Association between students’ grade with parental feeding practices (mean ± SE) .......................................................... 56

4. 15 Association between ethnicity with parental feeding practices (mean ± SE) ........ 57

4. 16 Association between eligibility of students for free/reduced price school lunch programs with their parental feeding practices (mean ± SE). ...................... 58

4. 17 Association between number of sibling (ages 7-12 years) with parental feeding practices (mean ± SE) .......................................................... 59
LIST OF ABBREVIATION

FN: Food Neophobia
FNS: Food Neophobia Scale
CFN: Child Food Neophobia
CFNS: Child Food Neophobia Scale
FrN: Fruit Neophobia
CFrN: Child Fruit Neophobia
VN: Vegetable Neophobia
CVN: Child Vegetable Neophobia
FV: Fruit and Vegetable
FVN: Fruit and Vegetable Neophobia
FVNI: Fruit and Vegetable Neophobia Instrument
CFPQ: Comprehensive Feeding Practices Questionnaire
FRL: Free-reduced price school lunch program
FFVP: Fresh Fruit and Vegetable Program
USDA: United States Department of Agriculture
WHO: World Health Organization
SE: Standard Error of the Mean
1. INTRODUCTION

Childhood is very important period for developing humans’ healthy food habits. The prevalence of so many health problems in adulthood have roots in poor diet quality and lower fruit and vegetable (FV) consumption in childhood (Forrest and Riley, 2004). FV intake among American children is typically below USDA recommended guidelines (Eaton et al., 2012). Evidence shows negative attitudes of children toward FV may interfere with their consumption of FV (Harrington, 2016). It is important to understand the influential factors in children’s food preferences to promote healthy eating behaviors in childhood and increase their FV consumption.

One of the main factors that effect on the diet quality of children and the development of food preferences is food neophobia (Russell & Worsley, 2008; Howard et al., 2013). Food neophobia (FN) is defined as an unwillingness to eat novel and/or unfamiliar foods (Addessi et al., 2005; Dovey et al., 2008). Evidence indicates a negative relationship between food neophobia and dietary variety particularly less FV intake (Falciglia et al., 2000; Cooke et al., 2003; Capiola & Raudenbush, 2012).

In the development of food neophobia in children, family as the first social interaction that children experience, plays a critical role. Parents/guardians can influence children’s food preferences and their willingness to eat new food and intake FV through their food preferences and eating habits and applying feeding techniques. Similarity in food neophobia behavior has been observed between parents and children (Galloway et al., 2003; Falciglia et al., 2004). Specific behaviors or rules that parents use to control what, how much, and/or when their child eats are described as parental feeding practices. Those feeding strategies are intuitively applied by parents for example to force children
to intake more amount of specific foods or to restrict children to access unhealthy foods. Parents use different feeding practices to feed their children with different levels of food and FV neophobia. It is critical to understand how parental feeding practices influence parents and children’s FN and FVN. Furthermore, it is important to study the role of socioeconomic statuses and cultural backgrounds on parental feeding practices and food neophobia in both parents and children.

Some evidence indicates that the neophobic behavior in parent might interfere with their prediction on their children’s neophobia. It has been observed that parents describe their child to have high food neophobia; whereas, children were rated relatively low in food neophobia behaviors (Moding & Stifter, 2016). Thus, to reduce the parental FN influences on their perception, it is important to gather data from children self-reported as well as parents-reported and compare both scores with parents FN. To date, in most of the published studies on child FN, either parents were asked to report their child’s neophobia behavior or children self-reported their food neophobic behavior.

In this study, first the relationship between FN and FV neophobia of parents/children (in the age range of 7-12 years) is examined through self-reported and parent-reported CFN to understand whether FN in children is reflective of neophobic behavior in parents.

Secondly, the associations between demographic variables with parental FN and parental feeding practices are studied. Lastly, the associations between parental feeding practices and parents and children’s food, fruit and vegetable neophobia are thoroughly studied.
1.1 Objectives and hypothesis

The goal of this research is to study the entire web of relationships between demographic variables, parental feeding practices and food neophobic behaviors in parents and children. A theoretical model of those relationships is presented in Fig 1.1.

Fig 1.1 Tested theoretical model of the variables effect on children food neophobia.

The specific objectives and the associated hypothesis are:

**Objective 1**: To compare parental food/fruit/vegetable neophobia and children’s self/parent reported food/fruit/vegetable neophobia.

**Hypothesis**:

There is a positive association between parents and children food and FV neophobia scores.

**Objective 2**: To assess the effect of demographic variables of parents (income, educational levels, family relationship and ethnicity) and children (grade, gender and eligibility for free/reduced school lunch program) on parents and children’s FN and FV neophobia behaviors.
**Hypothesis**

Families with lower income and educational levels have higher FN and FVN. The food neophobic behaviors in children varies by gender and age.

**Objective 3:** To examine the effect of parental FN on feeding practices and consequently the effect of those feeding practices on children’s FN and FVN scores.

**Hypothesis:**

Children’s neophobia scores are positively correlated with controlling feeding practices (such as pressure and restrictions) and negatively correlated with autonomy promoting feeding practices (such as encourage). Parents with high FN use less autonomy promoting feeding practices.

**Objective 4:** To evaluate the association between demographic variables and parental feeding practices.

**Hypothesis:**

Families with lower income and educational levels use more controlling and unstructured feeding practices and feeding practices differ by participant’s ethnicity and children’s gender and age.
2. LITERATURE REVIEW

2.1 Introduction

Food neophobia is considered as the main form of food rejection in children and may be associated with their diet quality. Reduction of fruits and vegetables intake, lack of essential micronutrients, restriction of dietary variety as well as expression of anxiety and negative reaction to foods are some consequences of FN in children (Dovey et al., 2008). In the development of children’s neophobia, primary guardians such as parents play a key role through making foods available in the home environment and using the practices to feed their children. FN can continue into adulthood and it is important to understand the key factors that contribute to food rejection among children.

The purpose of this literature review is to first provide background information on fruits and vegetables consumption among children. Secondly, the food neophobic behaviors and the association between food neophobia and nutritional outcomes in children will be discussed. Then, how parental food neophobia and feeding practice influence the expression of children’s food neophobia are reviewed. Finally, different techniques to examine food neophobia in children and parents as well as methods to measure parental food practices are reviewed.

2.2 Food neophobia and its changes during childhood and adulthood

Food neophobia (FN) is defined as an unwillingness to eat novel and/or unfamiliar foods (Pliner & Hobden, 1992). In several studies, it has been shown that many children express fear of new foods and reject foods that are unfamiliar to them (Addessi et al., 2005; Dovey et al., 2008; Tan & Holub., 2012). This behavior can be considered as a
normal stage in child development and also as a survival mechanism that prevents children from consuming poisonous foods and potentially toxic plants (Benton, 2004). Children naturally reject food with a bitter taste, which has been associated with chemical, toxic or harmful products. This behavior generally occurs in early childhood (between 18-24 months) and reaches at the highest point around 2-6 years old (Addessi et al., 2005; Cooke et al., 2003).

Evidence indicates that the age of 9 years is a critical period in a children’s life to develop their food behavior and neophobic reactions (Loewen & Pliner, 1999). Food preferences for children aged 10–12 years can be still changed thus it is impotent to introduce elementary school-aged children unfamiliar fruits and vegetables to reduce the level of their neophobic behaviors (Chu et al., 2013; Laureati et al., 2014).

The expression of food neophobia remains stable after adolescence (13 years old) and reaches a plateau in adulthood (Cooke & Wardle, 2005). It has also been observed that expression of food neophobia may increase among old people (Dovey et al., 2008; in Fig 2.1).

Neophobic behavior, as a key contributor to children’s food choices, is considered as a major concern for parents. Parents are worried that their food neophobic children might not meet their dietary need of healthy food for having healthy growth.
2.3 Food neophobia and children's consumption of fruit and vegetables (FV)

2.3.1 FV consumption among children

Fruits and vegetables (FV) are an integral part of a healthy diet for children. Consuming more FV is associated with reducing the risk of certain dietary related chronic diseases including cardiovascular diseases and certain types of cancer. Furthermore, providing more fresh fruits and vegetables for children in their daily diet are necessary to minimize their rise of overweight and obesity (WHO, 2005).

Based on the dietary goals, it was suggested that youth consume of two or more daily servings of fruit and three or more daily servings of vegetables (Healthy People, 2010). National Health and Nutrition Examination Survey indicated that daily intake of FV among children aged 9-13 years was estimated around 3.7 servings and only 18% to 20% of children in this age group consumed 5 or more daily servings of FV (Guenther et al., 2006). A similar study in elementary schools with 90% eligible for free/reduced
school meal programs in Minnesota showed that the average daily FV intake among 4\textsuperscript{th} to 6\textsuperscript{th} grade children was around 3.6 and around 80\% of children who eat at school do not consume the recommended number of FV servings (O’Brien et al., 2010). Fruits and vegetables are available to children through the school meal programs, which provide approximately 15\% to 30\% of the total daily intake of FV among school-aged children. Furthermore, some school health programs such as USDA Fresh Fruit and Vegetable Program (FFVP), provides a variety of free fresh FV snacks to elementary school students throughout the school lunch program. The FFVP introduces children to new and different fresh fruits such as kiwi, star fruit, pomegranate and vegetables such as crunchy sweet sugar snap peas, or asparagus. Processed or preserved FV for example in forms of canned, frozen, dried and juice, jellied fruit, nuts, cottage cheese, FV pizza and smoothies are not allowed to be served in the FFVP (USDA Fresh Fruit and Vegetable Program). In July 2008, California first participated in the FFVP with 24 pilot schools. The program continues to grow each year such that California received $12.7 million in school year 2016–2017 and funded 403 school sites (California Fresh Fruit and Vegetable Program, 2010). However, in California only 35.4\% of children aged 2-11 and 25.8\% age 12-17 ate five or more servings of FV daily (excluded juice and fried potatoes) in 2015-16 (California Health Interview Survey, 2015-2016), which means FV intake among children is still typically below USDA recommended guidelines.

2.3.2 Factors that influence FV consumption

Food preferences are generally formed in early childhood, which can affect an individual’s eating habits into adulthood. Furthermore, evidence shows that serious health problems such as diabetes, obesity and cardiovascular disease in older adults stems from
poor diet quality and lower FV consumption in childhood (Cooke et al., 2003). Thus, there is increased interest in identifying factors that influence children’s diet and their daily FV intake.

Environment is considered as one of important factors on FV intake particularly among young children. Family is the most influential aspect of environment such that children and parents in consumption of FV are similar (Fisher et al., 2002). Children’s food behaviors and acceptance of FV may be influenced by mothers from pregnancy through infancy, where breast-fed children can experience different range of flavors through their mothers’ diets (Mennella et al., 2001). Furthermore, in childhood and adolescence, parental influences are still observed on children’s eating habits and FV consumption. In addition of parental feeding strategies and their dietary variety, studies indicate that family socioeconomic status (SES) such as income and occupation as well as educational level were related to FV intake (Irala et al, 2000; Dave et al, 2009). Lower consumption of fruits has been observed among family with lower level of socio-economic status; however, SES differences were not found to influence the cheese or cake’s consumption (Pechey et al., 2015).

School free/reduced price lunch and breakfast programs also make an important contribution to the daily children’s consumption of FV specially among low-income students. Through school meals programs, healthy foods are made available to children and this may be the only reliable source of FV that children from low-income household have regularly (O'Brien et al., 2010). However, lower consumption of FV can be due to negative attitudes of children toward FV. It was observed that the lack of preferences and liking for the type of FV served in FRL in children due to their different eating behavior
lead in decreasing the consumption of FV (Harrington, 2016). Children’s eating behaviors and food choices can be influenced by individual children’s characteristics. Food neophobia is an important characteristic of children that has great impact on the diet quality and is associated with lower intake of FV (Lafraire et al., 2016).

2.3.3 Association between food neophilia and children FV consumption

Studies indicate that higher levels of food neophobia were associated with less dietary variety and lower consumption of FV (Falciglia et al., 2000; Cooke et al., 2003; Capiola & Raudenbush, 2012). Galloway et al. (2003) observed that a negative correlation between food neophobia and vegetables consumption existed in 7-year-old girls. They found that neophobic children consumed less vegetables than girls without neophobia. In another study, 564 parents of children completed an extensive questionnaire about the FN and eating behavior of their 2–6-year-old children (Cooke et al., 2003). Results indicated that lower consumption of vegetables, fruit and meat were associated with higher levels of neophobia; however, no association were found for the consumption of sweet and starchy staples or eggs. Lower vegetable intake was reported among neophobic children aged 10–12 years (Guzek et al., 2017).

Similarly, Australian mothers reported fewer FV intake for their neophobic children (Howard et al., 2012). The finding of these studies suggested that neophobic children were more unwilling to eat some types of unfamiliar foods than rejecting all types of new foods. However, low intake of protein, unsaturated fats, magnesium and vitamin E have been reported in neophobic children (Capiola & Raudenbush, 2012; Falciglia et al., 2000). Moreover, Falciglia at al. (2000) declared that Healthy Eating Index scores, were lower for 9–10 years neophobic children than the average group due
to the impact of neophobia on decreasing food variety and increasing consumption of saturated fat; however, it was not seen any differences in total energy intake in children.

Evidence suggests that eating behavior is developed during childhood (Kelder et al., 1994) and not consuming enough FV by children leads to unhealthy habits in adults. Thus, encouraging children to acquire healthy eating habits and consume more FV is incredibly important. However, to overcome FN problems in children, factors that contribute to development and expression of FN must be studied and understood.

2.4 Factors that influence children food neophobia

Literature shows a range of cognitive factors such as food perception, emotions and cognitive representations that have potential to influence food neophobia in children. Furthermore, children's food rejections can be significantly influenced by social and environmental factors. In this literature review the major focus is on the environmental factors.

2.4.1 Cognitive factors

The visual presentation of the novel foods as well as the texture, color, odors and taste are considered as important factors in accepting or rejecting foods by children (Jansen et al., 2010; Lafraire et al., 2016). The forms of exposure to foods can also influence children’s food preferences and acceptance. For example, the visual exposure to foods during infancy lead to increased attraction to those foods among children and because of that, food neophobia is reduced (Lafraire et al., 2016). Furthermore, repeated exposure of children to the novel foods may increase their acceptance of those novel foods. Evidence shows that exposure of children to familiar vegetables decreased their willingness to taste the familiar foods; however, repeated exposure children to taste
unfamiliar fruits increased children’s desire to consume the unfamiliar fruits (Houston-Price et al., 2009).

Emotions and feelings toward food also can be associated with food rejections. For example, in individuals aged four and older, a negative emotion associated with food neophobia is the feeling of disgust, which can be corresponded to the bitter and/or potentially harmful food items (Lafraire et al., 2016). Furthermore, some studies have associated anxiety over food with food neophobia and rejection (Galloway et al., 2003; Pliner & Hobden, 1992). For example, pressuring children to eat a food, which they have feeling of disgust towards, may increase both aversion and the anxiety responses to that food.

2.4.2 Environmental factors

Children experience family as the first social interaction. Parents/primary guardians can shape the home food environment as well as their children’s food eating behaviors and neophobia (Birch & Fisher, 1998). Thus, parents can influence their children’s willingness to eat new food through using the practices to feed their children, their food preferences and eating habits and making new foods available in the environment.

In the very early stage of life, parental feeding strategies may impact the children’s reactions to novel foods. For instance, flavors of foods, eaten by the mother, is reflected in the flavor of mother’s breast milk and children who are breastfed are familiarized with those food flavors (Sullivan & Birch, 1994); however, the appearance of those foods stays novel to the child. It has been observed that breast-fed children, who experienced high variety of vegetable at the start of weaning, were more willing to eat new vegetables at the age of 6 years (Maier-Noth et al., 2016).
Familial similarity in food neophobia behavior has been observed through many studies. Evidence within the literature suggests that parental food neophobia influences food neophobia expression in children. Birch et al. (1987) showed that increasing the availability of new foods at home and tasting these items by parents reduced children’s unwillingness to try these new foods. A significant mother-child correlation in FN (r = 0.23, p < 0.01) was seen in a study among 81 siblings’ pairs of ages 5-11 years old, which showed food neophobia is familial (Pliner & Loewen, 1997). Similarly, a significant positive association between food neophobia scores of parents (mainly mothers) and their 7-year old daughters indicated that mothers with higher food neophobia scores rated their children as more neophobic (Galloway et al., 2003). Similarly, a significant correlation between parent-child food neophobia in 9-11-year-old youth was reported by Falciglia et al. (2004). The finding of this research resembled those of Tan and Holub (2012), who revealed a positive but not significant correlation between child and maternal food neophobia. In a study among a population of 722 Swedish families, researchers reported that food neophobia scores were correlated among mothers and children at ages 11, 13, 15, and 17 years (Hursti & Sjödén, 1997).

Moreover, a direct relationship exists for vegetables intake between mothers and their 9-11-year-old daughters suggesting that parents who consumed more variety of foods had children with less food neophobia (Falciglia et al., 2004; Fisher et al., 2002). Additionally, researchers reported that the probability of offering healthy foods to children by mothers with higher food neophobia were lower (Cooke & Wardle, 2005).
2.4.3 Parental feeding practices

Family plays an important role to affect childhood FN and can motivate children to eat FV through parental feeding strategies. Specific behaviors or rules that parents use to control what, how much, and/or when their child eats are described as parental feeding practices. Particularly, through providing new foods in the home environment and applying feeding techniques, parents can influence children’s willingness to eat the novel foods. Thus, parental feeding practices are specific techniques that influence children’s eating behavior and food preferences through increasing or decreasing consumption of certain foods. Parental feeding practices were identified in three higher-order, 1) coercive control, 2) autonomy support, and 3) structured parental control (Vaughn et al., 2016).

2.4.3.1 Coercive control

Researchers selected the term of “coercive control” to have emphasize on a specific type of parental control. Those feeding parental control included the restriction of child’s eating or the imposition of external pressure on the child to eat what parents want (Grolnick & Pomerantz, 2009).

Pressure to eat assesses how much parents physically struggle with and/or force children to intake enough and/or more amount of specific foods at meal. An example of such an item is “my child should always eat all of the food on his/her plate” or “if my child says, ‘I’m not hungry, I try to get him/her to eat anyway” (Musher-Eizenman & Holub, 2007).

Restriction is the limitations and regulations that parents apply for not letting children access unhealthy foods. Restriction for health is typically used for restricting
high-fat and sugar foods rather than total caloric intake. The other type of restriction is applied to control the weight of children. An example of restriction for health is “I have to be sure that my child does not eat too many sweets (candy, ice cream, cake, or pastries)” and a sample of restriction for weight control is “If my child eats more than usual at one meal, I try to restrict her/his eating at the next meal” (Musher-Eizenman & Holub, 2007).

Association between two parental feeding practices, pressuring and urging to eat new food, with children’s food neophobia was observed in a study among 210 parents of children ages 3–5 years (Kaar et al., 2016). Offering children new foods was negatively correlated with children’s food neophobia, while a pressuring to eat and food neophobia were positively correlated. A longitudinal study was conducted to examine how mothers’ FV consumption and use of pressure in feeding of their 7-year daughters influenced their children’s food intake. Results indicated that parents who consumed more FV applied less pressure on their children to eat and have children who had adequate FV consumption (Galloway et al., 2005).

Literature suggests that pressuring children to eat specific foods has been related to lower consumption of those foods. In a study among 2–6-year old children in the UK, researchers indicated that more control over feeding and pressure children to eat was associated to higher children’s food neophobia and led to inadequate FV consumption (Wardle et al., 2005). Furthermore, it has been found that parents who use greater pressure to eat, consume fewer FV themselves and have children who eat fewer FV (Fisher et al., 2002) and higher levels of food neophobia (Brown et al., 2008).
About parental restriction, several studies have found that restriction that parents use to feed children is positively associated with children’s unwillingness for those restricted foods. Evidence shows that less consumption of energy-dense food and drinks and more fruit intake were related with higher restrictive feeding practices (Van Strien et al., 2009; Sud et al., 2010). The correlation between restrictive feeding practices and children’s FV consumption demonstrated that parents used more restrictive feeding technique to improve dietary quality and variety (Coulthard & Blissett, 2009; Campbell et al., 2010).

Similarly, lower intake of sweets, chocolate, cookies and higher intake of FV were reported by 2578 families, who applied restriction in their feeding practices even though there was a weak correlation between this practice and FV intake ($r = 0.05–0.09$) (Gubbels et al., 2009). Results of a study on the feeding practices of 152 mothers with children ages of 1.6 - 8 years, suggested that parents, who were more concerned about their children’s eating habits reported more monitoring, more pressure and, more restriction for weight control and health strategies. The study also observed a positive correlation between restriction for weight control and restriction for health reasons (Musher-Eizenman, 2007).

Although parents may use restriction for limiting their child’s intake of unhealthy foods, a negative impact on children’s eating habits has been observed. A longitudinal study on 117 Scottish children showed a positive association ($r=0.35$) between parental restriction with intaking high energy in boys (Montgomery et al., 2006). Tan and Holub (2012) studied associations between children and mothers’ food neophobia and parental feeding practice for 85 mothers of 3-12 years children. Results indicated that mothers
with high food neophobia used more restriction for weight in feeding their children. Furthermore, mothers who had food neophobic children applied more restriction for health and less monitoring and did not readily make available healthy foods for their children at home.

It seems some moderately restrictive regulation is important to improve the dietary quality of children. However, it should be noted that applying high restriction and pressure to eat by parents can lead to negative emotional expressions and reactions to food in children (Galloway et al., 2006; Webber et al., 2010).

2.4.3.2 Autonomy promoting feeding practices

Through autonomy support, parents provide enough structures to allow children to make food choices appropriately (Grolnick & Pomerantz, 2009). Encourage balance and variety is the way that parents positively try and support to persuade children to consume healthy foods and have healthy eating habits. Through this practice, a child is encouraged to have well-balanced food intake and to consume varied and healthy foods (Musher-Eizenman & Holub, 2007).

The literature has fairly consistently shown a positive association between parental encouragement with children’s FV consumption. Wardle et al. (2003) suggested that encouraging children to taste new foods and exposing them to healthy foods resulted in an increased consumption of healthy foods. Similarly, based on the report of three hundred and sixteen mothers of children aged 2.5–7 years in Belgium, higher FV intake has been observed when parents used parental encouragement feeding practice (Vereecken et al., 2004).
2.4.3.3 Child self-control

Some parents allow and encourage children to have self-control on their eating behaviors. In fact, in the child self-control practice, children are allowed and free to consume what and how much foods they like, without parental interference. In other words, parents do not provide oversight, guidance and/or direction and allow their children to make inappropriate eating decisions. This behavior is considered as “unstructured practices”, which points to a lack of parental control or structure around child eating (Vaughn et al., 2016).

Some research suggests that child self-control feeding strategy is associated with a lower diet quality in children. Melbye et al. (2012) studied the impact of parental feeding practices on children’s intention to consume FV among 963 parents and their children in the grade of 5th and 6th. Results revealed a negative and significant association ($r = -0.14$, $p<0.001$) between the variable child self-control and the self-reported willingness of children to eat fruit. Similarly, in another study among 84 parents of preschool age children, the Comprehensive Feeding Practices Questionnaire and Food Neophobia Scale instruments were conducted to explore the relationship between food parenting practices with child’ FN (Gramm et al., 2017). Results indicated that child food neophobia was positively related to child control of his or her eating ($r= 3.94$, $p=0.005$).

2.4.4 Demographic factors

The literature suggests an association between demographic factors such as gender, age, the levels of parental education, income levels and ethnicity with food neophobia behavior and parental feeding practices.
The relationship between gender and food neophobia has not completely uncovered. In some studies women showed more neophobic behavior (Frank & van der Klaauw, 1994); however, Tuorila et al. (2001) in a large survey among a population aged 16-80 years reported higher neophobia in men. The gender effect on FN in children has not consistently been shown. In the study of 3-12 years old children in the US, Tan & Holub, (2012) did not observe an association between children’s FN and their age and gender. Similarly, Cooke et al. (2003) did not observe any associations between children’s age or gender and their FN scores. However, some studies show that parents might use different feeding practices for feeding their sons and daughters. For example, mothers used more pressure and monitoring towards sons but used more praise practice to feed their daughters (Spruijt-Metz et al., 2006).

Socio-economic status (SES) of family can also influence the level of children’s FN. Tuorila et al. (2001) indicated that higher level of education was negatively associated with food neophobia. People from higher socio-economic status may have more exposure to cultural diversity and knowledge of a variety of foods. In a study among American and Lebanese students, Olabi et al. (2009) observed associations between SES on children’s FN levels. Family socio-economic status was categorized in three levels based on the parents’ educational level. Higher FN scores were observed among students from families with lower level of SES. Moreover, both American and Lebanese students from families with low level of incomes showed high score in FN.

Evidence suggests that children’s consumption of FV is also influenced by parental social economic status (Flight et al., 2003). Lower FV variety and intakes are reported among children, who came from lower socioeconomic status families (Darmon &
Drewnowski, 2008) and higher-SES children were reported to be less neophobic than children from lower-SES backgrounds (Cooke et al., 2004; Dovey et al., 2008). It is likely that wider variety of foods are available to children from higher-SES parents with higher educational and income levels (Daniel, 2016). The association between parental feeding strategies with their socio-economic status indicate that high-SES parents used more reasoning, praise, and food rewards (Orrell-Valentea et al., 2007) and they restricted unhealthy foods more than lower-SES parents (Hupkens et al., 1998). Furthermore, more monitoring has been reported by higher level of maternal education (Dave et al., 2009; Kröller & Warschburger, 2008).

Feeding practices can also be influenced by ethnicity. In a study among mothers of 146 children ages 7-14 in Alabama, African-American mothers have reported more restriction, pressure to eat and monitoring than White-Caucasian mothers (Spruijt-Metz et al, 2002), while Caucasian British parents applied more monitoring and less pressure to eat than other ethnicities (Carnell & Wardle, 2007).

2.5 **Food neophobia measurements methods**

A variety of methods are used to measure particular aspects of adults and children’ willingness to try unfamiliar food. The techniques that can be used include using behavioral measurement, self-reports of FN as well as reports from parents and/or peers. Self-report is the most common method to measure FN in adults; whereas, children FN can be assessed using children self-reports and parental reports.

The choice of measurement method depends on the target group, outcomes of measurement as well as the time and cost requirements of the method. Quality and reliability of instruments is assessed using a Cronbach's coefficient. The internal
consistency varies between 0-1, and generally a value of 0.70 or above are considered acceptable (Damsbo-Svendsen et al., 2017).

One of the methods is using a direct behavioral test, which measures people’s food choices and their willingness to consume unfamiliar foods by offering good variety of novel foods (El Dine & Olabi, 2009). However, there are numerous difficulties with conducting this method for adults. Some external variables such as hunger and impression management can influence participants’ willingness to try foods. The other difficulty with this method is time constraints, because a limited number of foods can be assessed in one session. Furthermore, in testing with adults, who have experienced wide variety of foods, too few unfamiliar foods may be presented.

Self-report, as an indirect approach, is another method to measure food neophobia through asking questions from participants about what they would do in the given scenarios. Self-report measures are faster and data collection is easier. Furthermore, questionnaires can be distributed online and allow to have larger and more diverse sample sizes.

The other method is getting data on food neophobia from peers, primary caretaker or parents. Memory accuracy is very important because data collection in this method is based on the other people’s predictions and observations about eating behavior of another person.

2.5.1 Measure of food neophobia in adults

The Food Neophobia Scale (FNS) is one of the most reliable, common methods used world-wide to collect data on food neophobia among adults and predict their
attitudes toward new foods (Nicklaus et al., 2005; Fernandez-Ruiz et al., 2013; Laureati et al., 2014).

This 10-item questionnaire was originally designed to score adults' food neophobia by Pliner and Hobden (1992). Each item of the FNS is rated on a 7-point hedonic that ranges from are 1=disagree strongly, 2=disagree, 3=disagree slightly, 4= neither disagree nor agree, 5=agree slightly, 6=agree, and 7=agree strongly. Thus, the potential range of scores is 1 to 7 and six items are reverse scored (Table 2.1). The reason of reversing some items in FNS is because these statements are positive and measure neophilic behavior. For example, in the item of “I trust new foods”, higher scores indicate that participants have lower level of neophobic. Thus, to have consistency between the responses of all statements and make sure that higher scores show higher level of neophobic, the scores of some items must be reversed.

The FSN has been translated into other languages, such as French (Nicklaus et al., 2005), Spanish (Fernandez-Ruiz et al., 2013), and Italian (Laureati et al., 2014).

Table 2.1 The 10-item adult’s food neophobia scale.

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>If I do not know what is in a food, I will not try it.</td>
<td></td>
</tr>
<tr>
<td>I trust new foods *(R)</td>
<td></td>
</tr>
<tr>
<td>I will eat almost anything. *(R)</td>
<td></td>
</tr>
<tr>
<td>I am afraid to eat things that I have never tried before.</td>
<td></td>
</tr>
<tr>
<td>I am very particular about the foods that I will eat.</td>
<td></td>
</tr>
<tr>
<td>I am constantly sampling new and different foods. *(R)</td>
<td></td>
</tr>
<tr>
<td>At dinner parties, I will try new foods. *(R)</td>
<td></td>
</tr>
<tr>
<td>I like foods from different cultures. *(R)</td>
<td></td>
</tr>
<tr>
<td>Ethnic food looks weird to eat.</td>
<td></td>
</tr>
<tr>
<td>I like to try ethnic restaurants. *(R)</td>
<td></td>
</tr>
</tbody>
</table>

*R means six items of FN scale are reversed scored because these items are corresponding to food neophobia.
2.5.2 Measure of food neophobia in children

2.5.2.1 Parental report

One of the best methods of obtaining data, specifically for young children, is reporting by parents/primary caretakers. A decrease in reliability of responses related to the age of children indicated that young children's responses might not be reliable. Thus, it may be more appropriate if parents complete the questionnaire instead of their children to increase the accuracy of the responses (Borgers & Hox, 2000).

In the Child Food Neophobia Scale (CFNS), 10 FNS items were changed in terms to assess children’s behavior from the parental perspective; for example, “I do not trust new foods” was restated to “My child does not trust new foods.” The modified version of the is the most widely applied. A modified and shorter questionnaire, 6-item version of the CFNS, was used by Howard (2012) in a study of parental reporting of child’s neophobia. Wardle (2005) excluded four items from CFNS to measure the effect of parental control on fruit and vegetable consumption in girls. A six-item CFNS was also tested among 5-8 years French children to evaluate their willingness to taste novel foods (Rubio et al., 2008).

The appropriate number of responses options in the FNS depends on the target group. It is recommended that 3-5-point scales applied for children, 5-7-point scales used for parents responding on behalf of their child and 7-10 response category applied for adults. (Damsbo-Svendsen et al. 2017).
2.5.2.2 Self-reports of children

Two of the validated instruments to measure neophobia in children, based on their own reports, are the Child Food Neophobia Scale and Fruit and Vegetable Neophobia Instrument. The CFNS was developed by Pliner (1994) based on the adult FNS. The CFNS is in both forms of unaltered (10 questions) and modified (shorter version) FNS. CFNS is one of the best-known tools used to assess food neophobia in children and several studies indicate the use of self-report CFNS to assess food neophobia. For example, Falciglia et al. (2000) conducted an unaltered FNS to 4th and 5th grade students.

Studies indicate that food neophobia has a remarkable effect on fruits and vegetables intake among children. Thus, the Fruit and Vegetable Neophobia Instrument (FVNI) was developed based on the FNS and it was designed to target 8-10 years old children with reliability ranged from 0.83-0.92. In fact, FNS has been converted into a measure of participants’ attitudes toward fruits and vegetables (Hollar et al., 2013). This 18-item self-report instrument include two subscales and each subscale specifically measures children’s willingness to try new fruits and vegetables under different circumstances.

2.5.3 Measure of parental feeding practices

The Comprehensive Feeding Practices Questionnaire (CFPQ), which was developed by Mushor in 2006 to evaluate parental behaviors, is a reliable, valid and extensively used to measure parenting feeding style (Tan & Holub, 2009). CFPQ consisted of 49 items measuring and twelve factors. These factors include monitoring, emotion regulation, food as a reward, child self-control, modelling, restriction for weight
control, restriction for health, teaching about nutrition, encourage balance and variety, pressure, environment, involvement. A high score on each factor indicated high levels of that practice.
3. MATERIAL AND METHODS

A survey of families with a child of 7-12 years of age was conducted on both parents/guardians and the children. A total of 73 families were recruited to participate in this survey. This project has received human subjects’ approval through the Institutional Review Board (IRB) at California Polytechnic State University. The following describes the details of data collection and analysis.

3.1 Participants

Parents/guardians paired with their elementary school students of ages 7-12 were recruited to participate in this study. Family codes were administered to both groups of participants, children and guardians to link and share the family data (Table 3.1). Parents/guardians and children were asked to enter their family codes upon completing the survey and participating in the fruit and vegetable acceptance test respectively. If parents had more than one child in this age range (7-12 years), they were asked to answer the questions for the older child. The data of parents paired with older child were used. For example, for family 1, the parent received code 2000 upon participating in the survey and her/his older child received code 2001.

Table 3.1 Assigning family codes to the parents and students.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Parents family code</th>
<th>Child family code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family 1</td>
<td>1 2000</td>
<td>2 2001 ^3 2002</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family 2</td>
<td>2010</td>
<td>2011 ^2 2012</td>
</tr>
<tr>
<td>Family 3</td>
<td>…</td>
<td>…</td>
</tr>
</tbody>
</table>

\(^1\text{Parents/guardians’ code for family 1}; \^2\text{Older child’s code}; \^3\text{Younger child’s code}
Parents were sent the project announcement describing the study objectives by the schools’ principals. Then, hard copy/online consent forms were sent/emailed to the parents and asked them to sign up their children to participate in the FV tasting (Handley et al., 2018) during a time slot on the testing days. The parents who provided their contact information received a parental questionnaire link.

Both English and Spanish survey links via email and/or text were sent and parents were asked to complete it online at the appointment. Furthermore, some parents took the survey on-site using the school computers in the computer lab while their child was taking the FV tasting. To increase the rate of participation, reminder texts and emails after two weeks were sent. An incentive of $25 gift card to Amazon.com was offered to all participants who completed the survey. To protect the participants’ privacy, a second survey link was provided at the end of the first survey and asked parents/guardians to indicate their preferred method of contact (phone number or email) to receive the gift cards.

3.2 Location

Two public elementary schools in San Luis Coastal Unified School District, Hawthorne and Bishop's Peak Elementary Schools participated. Schools were selected based on the percentage of eligible students for free or reduced-price lunch with high and low free/reduced school meal rates. Fifty eight percent of students at Hawthorne Elementary school were eligible for the schools’ free lunch program in 2016-2017. Bishop's Peak Elementary has a reduced lunch program were 22.5% are eligible for the program in 2016-2017 (California Department of Education).
Nutritious meals are provided to children at reasonable prices or free through five programs, namely, “The National School Lunch Program, School Breakfast Program, Seamless Summer Feeding Option, Special Milk Program, and State Meal Program”. Parents/primary guardians must be a resident of the state of California and have a particular annual household income (before taxes) to qualify to apply for these programs (Table 3.2).

<table>
<thead>
<tr>
<th>Household Size</th>
<th>Maximum Income Level (Per Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$22,459</td>
</tr>
<tr>
<td>2</td>
<td>$30,451</td>
</tr>
<tr>
<td>3</td>
<td>$38,443</td>
</tr>
<tr>
<td>4</td>
<td>$46,435</td>
</tr>
<tr>
<td>5</td>
<td>$54,427</td>
</tr>
<tr>
<td>6</td>
<td>$62,419</td>
</tr>
<tr>
<td>7</td>
<td>$70,411</td>
</tr>
<tr>
<td>8</td>
<td>$78,403</td>
</tr>
</tbody>
</table>

3.3 Parental questionnaire

SurveyMonkey was conducted for the parental questionnaire. This questionnaire included six parts 1) demographic information, 2) parents-reported CFN, 3) parents-reported children fruit and vegetable neophobia (FVN), 4) parents FN, 5) parents FVN and 6) parental feeding practices.
3.3.1 Demographics

Parents were asked to report their ethnicity, and relationship to the student (parent (mother or father), grandparents and/or legal guardian). Parents reported their yearly family income on an 8-point scale ranging from “less than $10,000” to “greater than $140,000,” and reported their own educational level on a 6-point scale ranging from “Middle School” to “College Graduate Degree such as MS, PHD, MBA, etc.” The child’s age, grade and gender were reported by parents. Parents were asked to determine the eligibility of their child for the school free/reduced price meals.

3.3.2 Food Neophobia Scale

3.3.2.1 Parents and parental reporting

The Child Food Neophobia Scale (Pliner, 1994) is a validated tool, which is used to assess the parental perspectives on their child’s reaction to the novel foods.

An adult version of the food neophobia scale is also used for assessing parents’ food neophobia (Pliner & Hobden, 1992). The internal consistency of the food neophobia scales has been verified in multiple studies, which was ranged from $r = 0.82–0.91$ (Tan & Holub, 2012; Frank et al., 1997; Ritchey et al., 2003).

Four items of CFNS (which has originally 10 items) were excluded because they were not being considered age-appropriate for the target children ages (Howard, 2012). The six remaining items are presented in Table 3.3.
Table 3. The modified Child Food Neophobia Scale.

If my child doesn’t know what’s in a food, s/he won’t try it.
My child trusts new foods. (R)
My child eats almost anything. (R)
My child is very particular about the foods that will eat.
My child is constantly sampling new and different foods. (R)
My child is afraid to eat things that have/has never tried before.

R means responses to these items were reversed.
Responses ranged from ‘strongly disagree’ to ‘strongly agree’ on a seven-point scale. We attributed scores of 1 to strongly disagree, 2 to disagree, 3 to somewhat disagree, 4 to neither agree nor disagree, 5 to somewhat agree, 6 to agree and 7 to strongly agree.

The scores of some items from both adult/children questionnaires were reversed, because these items correspond to food neophilia. For example, the higher score for this item “my child constantly sampling new and different foods” indicate that this child is less neophobic and is willing to try new foods; whereas, higher scores in CFNS indicate greater neophobia behavior.

Thus, the scores for items 2, 3 and 5 (3 out of 6 items) in the CFNS and items 2, 3, 6, 7, 8 and 10 (6 out of 10 items) in the FNS had to be reversed (Table 2.1 and 3.3). In the reversed scoring the numerical scoring scale runs in the opposite direction. Thus, strongly disagree have a score of 7 and strongly agree will equal to 1. Mean FN score was computed, with higher scores indicate a stronger behavior of neophobia.

3.3.2.2 Children self-assessment

To measure children’s reaction to the new foods, children completed the self-report Food Neophobia Scale with the 10-items (Pliner, 1994) and rated items on a scale from 1 (Disagree) to 5 (Agree) using RedJade Software. Higher scores represent greater food neophobia. Question 4 was modified to be more understandable for children (Table 3.4). The scores for items 1, 4, 6, 9 and 10 were reversed (Handley et al., 2018).
Table 3. 4 Children self-reported food neophobia questionnaire.

<table>
<thead>
<tr>
<th>Item</th>
<th>Response Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am constantly sampling new different foods. (R)</td>
<td></td>
</tr>
<tr>
<td>I don’t trust new foods.</td>
<td></td>
</tr>
<tr>
<td>If I don’t know what is in a food, I won’t try it. If a food is new, I won’t try it.</td>
<td></td>
</tr>
<tr>
<td>I like foods from different countries / I like to try weird tastes and foods, which are unusual and come from different countries. (R)</td>
<td></td>
</tr>
<tr>
<td>Ethnic foods look too weird to eat.</td>
<td></td>
</tr>
<tr>
<td>At dinner parties or at a friend’s party I will try a new food. (R)</td>
<td></td>
</tr>
<tr>
<td>I am afraid to eat things I have never had before.</td>
<td></td>
</tr>
<tr>
<td>I am very particular about the foods I will eat.</td>
<td></td>
</tr>
<tr>
<td>I will eat almost anything. (R)</td>
<td></td>
</tr>
<tr>
<td>I like to try new ethnic restaurants. (R)</td>
<td></td>
</tr>
</tbody>
</table>

R means responses to these items were reversed.
Responses ranged from ‘disagree’ to ‘agree’ on a seven-point scale. We attributed scores of 1 to disagree, 2 to somewhat disagree, 3 to Neither Agree nor Disagree, 4 Somewhat Agree, 5 to agree.

3.3.3. Fruit and Vegetables Neophobia Instrument (FVNI)

The FVNI was used to specifically evaluate participants FVN. This instrument was originally developed to assess FVN among 8-12 years children (Hollar et al., 2013). In this study, this instrument was modified to 8-item questionnaire in two subscales. Each subscale included 4 items to measure children’s willingness to try new fruits and vegetables. Parents were asked to complete this questionnaire and explain their own behavior as well as predict their children’s willingness to try new FV (Table 3.5).

Response options for questions 1 and 2 for both fruit and vegetable subscales included “1=A lot, 2=A little, 3=Not very much, and 4=Not at all.” Response options for the rest of questions included “1=Definitely, 2=Probably, 3=Probably not, and 4=Definitely not.” Higher scores represent greater FVN.

Similar to the Food Neophobia Scale, children also completed the self-reported FVN instrument and talked about their eating behavior and willingness to eat new FV.
(Handley et al., 2018). Parent/child resemblance in FVN was compared using eight questions from children self-reported FVN.

Table 3. 5 Fruit and Vegetables Neophobia Instrument.

**Fruit Neophobia**
1. How much does (do) your child (you) like/like tasting fruits that s/he (you) has (have) never tried?
2. How much does (do) your child (you) like fruit?
3. When my child (you) is (are) at school (at social gathering/home/friend’s house), will s/he (you) try a new fruit?
4. Will your child (you) taste a fruit if it looks strange/do not know what it is?

**Vegetables Neophobia**
1. How much does (do) your child (you) like/like tasting vegetables that s/he (you) has (have) never tried?
2. How much does (do) your child (you) like vegetables/?
3. When my child (you) is (are) at school (at social gathering/home/friend’s house), will s/he (you) try a new vegetable?
4. Will your child (you) taste a vegetable if it looks strange/do not know what it is?

3.3.4 Parental feeding practices questionnaire

Parents/guardians’ feeding practices were measured through evaluating three controlling subscales (included pressure, restriction for health, and restriction for weight control) and one autonomy-promoting subscales (encourage balance and variety) and one structured parental control (child self-control) from the Comprehensive Feeding Practices Questionnaire, which was validated with Cronbach’s alpha values ranging from 0.58 to 0.84 (Musher-Eizenman & Holub, 2007) (Table 3.6).

Guardians rated items on a scale from 1-5 where 1=Never, 2=Rarely, 3=Sometimes, 4=Mostly and 5=Always for “child self-control” subscale. The remaining subscales were rated on a scale from 1-5 where 1=Disagree, 2=disagree, slightly, 3=
Neither Agree/Nor Disagree, 4=slightly agree, and 5=agree. Higher scores represent those feeding practices are more used by parents. Internal consistencies of the subscales are calculated. For each participant, the average of all questions of each feeding practice were calculated, if more than 50% of the scale items were answered.
Table 3. 6 Parental feeding practices questionnaire.

**Child self-control**
- Do you allow your child to eat whatever s/he wants?
- If your child does not like what is being served, do you make something else?
- Do you allow your child to eat snacks whenever s/he wants?
- Do you allow your child to leave the table when s/he is full, even if your family is not done eating?

**Encourage balance and variety**
- Do you encourage your child to eat healthy foods before unhealthy ones?
- I encourage my child to try new foods.
- I tell my child that healthy food tastes good.
- I encourage my child to eat a variety of foods.

**Pressure**
- My child should always eat all of the food on his/her plate.
- If my child says, “I’m not hungry,” I try to get him/her to eat anyway.
- When she/he says that finished eating, I try to get my child to eat one more (two more, etc.) bites of food.

**Restriction for weight control**
- I have to be sure that my child does not eat too many high-fat foods.
- If my child eats more than usual at one meal, I try to restrict her/his eating at the next meal.
- There are certain foods my child shouldn’t eat because they will make her/his fat.
- I don’t allow my child to eat between meals because I don’t want her/his to get fat.

**Restriction for Health**
- If I do not guide or regulate my child’s eating, he/she would eat too many junk foods.
- If I do not guide or regulate my child’s eating, he/she would eat too much of his/her favorite foods.
- I have to be sure that my child does not eat too much of his/her favorite foods.
- I have to be sure that my child does not eat too many sweets (candy, ice cream, cake, or pastries).

1 Responses options were 1=Never, 2=Rarely, 3=Sometimes, 4=Mostly and 5=Always
2 Responses options were 1=Disagree, 2=Disagree slightly, 3=Neither Agree/Nor Disagree, 4=Agree slightly, and 5=Agree.

3.5. Statistical analysis

All analyses were conducted in JMP Pro 12. To conduct statistical analysis the likert-scale scores of parents and children’s food neophobia, fruit and vegetable neophobia and parental feeding practice were converted to the numeric scales. The
relationship between different tests were compared using linear transformations were to convert one Likert scale from one test to another. For example, to compare the results of food neophobia of child self-reported with parents and parents-reported on children, a linear transformation was conducted to convert 5-point Likert scale to 7-point Likert scale using below formula (IBM Support, 2016):

\[ X_2 = (B - A) \frac{(X_1 - a)}{(b - a)} + A \]

Where, \( A = 1 \) and \( B = 7 \) minimum and maximum 7-point scale respectively
\( a = 1 \) and \( b = 5 \) minimum and maximum 5-point scale respectively

\( X_2 \) is new data in scale 1-7 and \( X_1 \) is old data in scale 1-5.

Normality of the numeric scales of survey responses was checked by visual inspection of histograms and using Shapiro-Wilk test.

Pearson correlation analysis was conducted to assess the correlations among continuous variables including food neophobia, FV neophobia scores and parental feeding practice scores. To compare different levels of parents and children neophobia across the categorical variables, one-way ANOVA was used.

ANOVA was also used to examine whether demographic variables (parental income, education levels, and child gender and grade etc) are associated with food neophobia scores. For categorical variables, chi-square tests were conducted with significance level at \( p<0.05 \). The paired t-test was performed to compare the mean of two related food neophobic scores between parents and children and to examine whether children are more food neophobic than their parents.
4. RESULTS

A total number of 68 parents/guardians completed the survey which accounted for a 73% response rate. For the parents, who participated in this study, corresponding children data from the other survey was used (Handley et al., 2018). Survey codes was used to match the parents and children's responses. Six parents were excluded from the study because the children response associated with those of the parents were not found. Participants were mostly parents (97%) and had college education (60%). More than 50% of guardians had 2 or more than 2 children in the 7-12 age range. The mean age of children was 9.8 ± 0.16 years old and around 50% of children studied in the 5th and 6th grade. Most guardians reported that their children ate lunch from the school lunch programs (60%, n=44); whereas, more than half of these students were eligible for free/reduced price school lunch programs (n=24). More than half of the guardians were from White or Caucasian race (53.4%) and the remaining were from Hispanic, Asian, or Mixed racial groups. Around 58% of participants reported that their income level before taxes was more than $80,000 in 2017. Table 4.1 shows the demographic characteristics of children and parents.
Table 4.1  Characteristics of children and parents.

<table>
<thead>
<tr>
<th>Variables</th>
<th>n</th>
<th>Frequency %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Children</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Sibling between 7-12 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- One child</td>
<td>29</td>
<td>39.7</td>
</tr>
<tr>
<td>- Two children</td>
<td>31</td>
<td>42.5</td>
</tr>
<tr>
<td>- Three children or more</td>
<td>13</td>
<td>17.8</td>
</tr>
<tr>
<td>Grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 6th grade</td>
<td>18</td>
<td>24.7</td>
</tr>
<tr>
<td>- 5th grade</td>
<td>19</td>
<td>26</td>
</tr>
<tr>
<td>- 4th grade</td>
<td>11</td>
<td>15.1</td>
</tr>
<tr>
<td>- 3rd grade</td>
<td>17</td>
<td>23.3</td>
</tr>
<tr>
<td>- 2nd grade</td>
<td>8</td>
<td>10.96</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Female</td>
<td>41</td>
<td>56.2</td>
</tr>
<tr>
<td>- Male</td>
<td>32</td>
<td>43.8</td>
</tr>
<tr>
<td>Eligible for FRL $^1$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Yes</td>
<td>24</td>
<td>52.3</td>
</tr>
<tr>
<td>- No</td>
<td>19</td>
<td>45.5</td>
</tr>
<tr>
<td>- I don’t know</td>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td><strong>Parents</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highest level of education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Middle School</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>- Some College</td>
<td>18</td>
<td>24.7</td>
</tr>
<tr>
<td>- College Graduate - Associates Degree</td>
<td>4</td>
<td>5.5</td>
</tr>
<tr>
<td>- College Graduate - Bachelor’s Degree</td>
<td>14</td>
<td>19.2</td>
</tr>
<tr>
<td>- Some Post Graduate Education</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>- College Graduate Degree-MS, PHD, etc.</td>
<td>22</td>
<td>30.1</td>
</tr>
<tr>
<td>- Other</td>
<td>5</td>
<td>6.9</td>
</tr>
<tr>
<td>Relationship</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Parent - Mother or Father</td>
<td>71</td>
<td>97.3</td>
</tr>
<tr>
<td>- Grandparents</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td>- Legal guardian</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td>Family income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Less than $10,000</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>- $10,000-39,999</td>
<td>14</td>
<td>19.2</td>
</tr>
<tr>
<td>- $40,000-59,999</td>
<td>10</td>
<td>13.7</td>
</tr>
<tr>
<td>- $60,000-79,999</td>
<td>5</td>
<td>6.9</td>
</tr>
<tr>
<td>- $80,000-99,999</td>
<td>7</td>
<td>9.6</td>
</tr>
<tr>
<td>- $100,000-119,999</td>
<td>6</td>
<td>8.2</td>
</tr>
<tr>
<td>- $120,000-139,999</td>
<td>11</td>
<td>15.1</td>
</tr>
<tr>
<td>- More than $140,000</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td>- Prefer not to answer</td>
<td>3</td>
<td>4.1</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- White or Caucasian</td>
<td>39</td>
<td>53.4</td>
</tr>
<tr>
<td>- Hispanic or Latino</td>
<td>21</td>
<td>28.8</td>
</tr>
<tr>
<td>- Asian</td>
<td>7</td>
<td>9.6</td>
</tr>
<tr>
<td>- Black or African American</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>- Native American</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>- Pacific Islander</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>- Other (Mexican, Indian, Portuguese, Mixed)</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>- Prefer not to answer</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

$^1$FRL: free/reduced price school lunch program
Reliability analysis

The internal consistency of FN scores, fruit neophobia (FrN), vegetable neophobia (VN) and parental feeding practice were assessed using Cronbach’s α (Table 4.2).

Table 4.2 An accepted range for describing internal consistency (adapted from George & Mallery, 2003).

<table>
<thead>
<tr>
<th>Cronbach’s alpha</th>
<th>Internal consistency</th>
</tr>
</thead>
<tbody>
<tr>
<td>α ≥ 0.9</td>
<td>Excellent</td>
</tr>
<tr>
<td>0.9 &gt; α ≥ 0.8</td>
<td>Good</td>
</tr>
<tr>
<td>0.8 &gt; α ≥ 0.7</td>
<td>Acceptable</td>
</tr>
<tr>
<td>0.7 &gt; α ≥ 0.6</td>
<td>Questionable</td>
</tr>
<tr>
<td>0.6 &gt; α ≥ 0.5</td>
<td>Poor</td>
</tr>
<tr>
<td>0.5 &gt; α</td>
<td>unacceptable</td>
</tr>
</tbody>
</table>

The results of Cronbach’s α test indicated an excellent internal consistency for Parent-reported CFN (α=0.9) and a good internal consistency for Child self-reported FN (α=0.75) and Parents FN (α =0.85). The internal consistency reliability of each sub-construct in PFP ranged from 0.59 to 0.87 and for fruit and vegetable ranged from 0.59 to 0.70 and 0.80 to 0.81 respectively (for all three groups) which showed good internal consistency (Table 4.3).
Table 4.3 The internal consistency results for food neophobia, fruit and vegetable neophobia and parental feeding practices.

<table>
<thead>
<tr>
<th>Instruments</th>
<th>No. of items</th>
<th>Cronbach coefficient α</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parents</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FN</td>
<td>10</td>
<td>0.85</td>
</tr>
<tr>
<td>FrN</td>
<td>4</td>
<td>0.70</td>
</tr>
<tr>
<td>VN</td>
<td>4</td>
<td>0.81</td>
</tr>
<tr>
<td><strong>Parents-reported children</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FN</td>
<td>6</td>
<td>0.90</td>
</tr>
<tr>
<td>FrN</td>
<td>4</td>
<td>0.66</td>
</tr>
<tr>
<td>VN</td>
<td>4</td>
<td>0.82</td>
</tr>
<tr>
<td><strong>Children self-reported</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FN</td>
<td>10</td>
<td>0.77</td>
</tr>
<tr>
<td>FrN</td>
<td>4</td>
<td>0.60</td>
</tr>
<tr>
<td>VN</td>
<td>4</td>
<td>0.81</td>
</tr>
<tr>
<td><strong>Parental feeding practices</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restriction for health</td>
<td>4</td>
<td>0.87</td>
</tr>
<tr>
<td>Restriction for weight control</td>
<td>4</td>
<td>0.76</td>
</tr>
<tr>
<td>Encourage balance and variety</td>
<td>4</td>
<td>0.60</td>
</tr>
<tr>
<td>Child self-control</td>
<td>4</td>
<td>0.65</td>
</tr>
<tr>
<td>Pressure to eat</td>
<td>3</td>
<td>0.70</td>
</tr>
</tbody>
</table>

FN: Food Neophobia; FrN: Fruit Neophobia; VN: Vegetable Neophobia;

4.1 Food neophobia scores

The studied parents and children generally self-reported themselves as not food neophobic (Table 4.4). However, parents rated their children more neophobic as they rated themselves. Parents also reported a wider range of FN for the children than children themselves. In a seven-point scale (from 1 to 7), none of the children in the study reported a FN of 4.5 for themselves, however, nine out of 73 parents reported FN of higher than five for their children.
Table 4.4 Summary statistics of parent and children's food neophobia scores.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean ± SE</th>
<th>Range</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parents FN</td>
<td>2.5 ± 0.1b</td>
<td>1-4.9</td>
<td>73</td>
</tr>
<tr>
<td>Parent-reported CFN</td>
<td>3.5 ± 0.2a</td>
<td>1-7</td>
<td>73</td>
</tr>
<tr>
<td>Child self-reported FN</td>
<td>2.5 ± 0.1b</td>
<td>1-4.5</td>
<td>67</td>
</tr>
</tbody>
</table>

All the scores were converted to 1-7 scale using Likert linear transformation. The letters indicate statistical differences of FN scores among participants. Higher scores indicate greater neophobia behavior (Mean ± SE). SE: Standard error of the mean.

A statistically significant correlation between Parent FN and Parent-reported CFN was not observed; however, the Parent-reported CFN and Child self-reported FN were positively correlated (Table 4.5).

Table 4.5 Results of Pearson correlation analysis of FN scores.

<table>
<thead>
<tr>
<th></th>
<th>Parents FN</th>
<th>Parent-reported CFN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parents FN</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Parent-reported CFN</td>
<td>-0.02</td>
<td>1</td>
</tr>
<tr>
<td>Child self-reported FN</td>
<td>0.15</td>
<td><strong>0.62</strong>*</td>
</tr>
</tbody>
</table>

*Significant at p < 0.001

4.2 Effect of demographics variables on food neophobia scores

No significant child gender differences were found on FN scores, self-reported by children or their parents; however, slightly higher neophobia was reported by boys (Table 4.6).
To analyze the effect of grade on the food neophobia scores, children’s grade was categorized in three groups where:

1) 4\textsuperscript{th} grade or less (includes 2\textsuperscript{nd} and 3\textsuperscript{rd} grade)

2) 5\textsuperscript{th} grade

3) 6\textsuperscript{th} grade or more (included 7\textsuperscript{th} grade)

The children FN scores were not statistically significant between different grade of students. However, younger students (4\textsuperscript{th} grade or less) indicated higher neophobic behavior than older children (Table 4.6).

Parents reported that 55% of students (24 out of 44), who eat lunch from the school lunch programs, were eligible for receiving the free/reduced lunch, while rest of children (n=19) did not have eligibility condition based on their parents’ socio-economic status. Although, significant differences were not observed in neophobia behavior of students, self-reported eligible students for free or reduced-price school meals, showed rather more neophobic behavior (Table 4.6). Results indicated that on average students of Hawthorn were more neophobic than Bishop’s Peak; however, a significant difference was not found. The neophobic behavior of children was not related to the number of sibling that they had in their family (Table 4.6).
Table 4.6 The effect of demographic factors on children food neophobia. Higher scores indicate greater neophobia behavior (Mean ± SE).

<table>
<thead>
<tr>
<th>Factor</th>
<th>Levels</th>
<th>Parent-reported CFN$^1$</th>
<th>Child self-reported FN$^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>3.48 ± 0.2</td>
<td>2.67 ± 0.2</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3.54 ± 0.3</td>
<td>2.36 ± 0.2</td>
</tr>
<tr>
<td>Grade</td>
<td>&lt; 4$^{th}$</td>
<td>3.73 ± 0.2</td>
<td>2.63 ± 0.2</td>
</tr>
<tr>
<td></td>
<td>5$^{th}$</td>
<td>3.54 ± 0.3</td>
<td>2.6 ± 0.2</td>
</tr>
<tr>
<td></td>
<td>6$^{th}$&lt;</td>
<td>3.12 ± 0.3</td>
<td>2.12 ± 0.2</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>White/Caucasian</td>
<td>3.49 ± 0.2</td>
<td>2.46 ± 0.2</td>
</tr>
<tr>
<td></td>
<td>Hispanic/Latino</td>
<td>3.42 ± 0.3</td>
<td>2.58 ± 0.2</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>3.7 ± 0.3</td>
<td>2.4 ± 0.3</td>
</tr>
<tr>
<td>Education level</td>
<td>Have a college degree</td>
<td>3.55 ± 0.2</td>
<td>2.48 ± 0.2</td>
</tr>
<tr>
<td></td>
<td>Not have a college degree</td>
<td>3.5 ± 0.3</td>
<td>2.48 ± 0.2</td>
</tr>
<tr>
<td>Income level</td>
<td>&lt;$39,999</td>
<td>4 ± 0.3</td>
<td>2.73 ± 0.3</td>
</tr>
<tr>
<td></td>
<td>$40,000 – 79,999</td>
<td>3.53 ± 0.3</td>
<td>2.60 ± 0.3</td>
</tr>
<tr>
<td></td>
<td>$80,000 &lt;</td>
<td>3.35 ± 0.2</td>
<td>2.33 ± 0.2</td>
</tr>
<tr>
<td>Eligible for FRL</td>
<td>Yes</td>
<td>3.69 ± 0.2</td>
<td>2.76 ± 0.2</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>3.71 ± 0.4</td>
<td>2.38 ± 0.2</td>
</tr>
<tr>
<td>No. of sibling</td>
<td>1 child</td>
<td>3.67 ± 0.3</td>
<td>2.39 ± 0.2</td>
</tr>
<tr>
<td></td>
<td>2 children</td>
<td>3.32 ± 0.3</td>
<td>2.64 ± 0.2</td>
</tr>
<tr>
<td></td>
<td>3 children &lt;</td>
<td>3.56 ± 0.4</td>
<td>2.34 ± 0.3</td>
</tr>
<tr>
<td>School</td>
<td>Bishop’s Peak</td>
<td>3.38 ± 0.2</td>
<td>2.38 ± 0.2</td>
</tr>
<tr>
<td></td>
<td>Hawthorn</td>
<td>3.79 ± 0.3</td>
<td>2.65 ± 0.2</td>
</tr>
</tbody>
</table>

$^1$CFN: Child Food Neophobia.
$^2$FN: Food Neophobia

The number of participants in Asian, Black or African America, Native American, Pacific Islander ethnicity groups were not enough to evaluate each as a single ethnicity group. Therefore, all these groups were combined into one category and analyzed as “other” group. The results of ethnic categories on FN scores did not show a statistically significant effect on Parent FN and Parent/Child self-reported FN (Table 4.6 and 4.7).
Table 4. The effect of demographic factors on parents’ food neophobia. Higher scores indicate greater neophobia behavior (Mean ± SE).

<table>
<thead>
<tr>
<th>Factor</th>
<th>Level</th>
<th>Parent FN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity</td>
<td>White/Caucasian</td>
<td>2.55 ± 0.2</td>
</tr>
<tr>
<td></td>
<td>Hispanic/Latino</td>
<td>2.56 ± 0.2</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>2.2 ± 0.3</td>
</tr>
<tr>
<td>Education level</td>
<td>Have a college degree</td>
<td>2.38 ± 0.1</td>
</tr>
<tr>
<td></td>
<td>Not have a college degree</td>
<td>2.64 ± 0.2</td>
</tr>
<tr>
<td>Income level</td>
<td>&lt;$39,999</td>
<td>2.74 ± 0.2</td>
</tr>
<tr>
<td></td>
<td>$40,000 – 79,999</td>
<td>2.26 ± 0.2</td>
</tr>
<tr>
<td></td>
<td>$80,000 &lt;</td>
<td>2.36 ± 0.1</td>
</tr>
</tbody>
</table>

The influence of two markers of socio-economic status (education and income levels) on parents and children food neophobia scores were evaluated. To analyze data of the educational level of parents, five participants, who selected “other”, were excluded and participants’ education was merged into two categories:

Group 1: Have a college degree

Group 2: Not have a college degree

The group with a college degree included post graduate, college graduate degree such as MS, PHD, MBA, JD, MD, DDS, etc. and bachelor’s degree and group without a college degree included middle school, some college and college graduate (associate degree).

Participants, who preferred not to answer to this question, were excluded from analysis. Parents’ yearly income was scored in three groups to better study the effects of family income level on FN and feeding practices.

Group 1: Income less than $39,999

Group 2: Income between $40,000 - 79,999

Group 3: Income more than $80,000
The grouping also allowed having minimum of 15 participants in each group for a large enough sample size.

Results indicated that socio-economic status did not have statistically significant effect on parents FN. Similar to the parent’s results, any significant effects of family income level background on children self-reports of FN was not found (Table 4.6). Although not statistically significant, students from families with lower income level background indicated higher neophobia scores (Fig 4.1).

Fig 4.1 Association between parental income on Child self-reported FN. Letters indicate the differences between FN scores within parental income levels (mean ± SE).

4.3 The associations between socio-economic factors

The study showed socio-economic factors are not necessarily independent of one another. A significant and positive association was observed between parental income and educational levels \( p < 0.001 \). Results indicated that majority of families (74%) with more than $80,000 income level reported higher level of education. Then, it was followed
by family with income less than $10,000 to 39,999/year without degree (43.5%) (Table 4.8).

Table 4. 8 Associations between parental income and education levels.

<table>
<thead>
<tr>
<th>Income levels</th>
<th>Have a college degree% (n)</th>
<th>Not have a college degree% (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;$10,000 - 39,999</td>
<td>9.5 (4)</td>
<td>43.5 (10)</td>
</tr>
<tr>
<td>$40,000 - 79,999</td>
<td>17 (7)</td>
<td>30.4 (7)</td>
</tr>
<tr>
<td>$80,000 &lt;</td>
<td>74 (31)</td>
<td>26.1 (6)</td>
</tr>
</tbody>
</table>

Percentage of income levels were compared within each educational level.

Contingency analysis was used to assess the associations between socio-economic factors with eligibility of students for FRL (Fig 4.2 and Fig 4.3). As expected, the number of students eligible for receiving the free/reduced lunch at school was proportionally larger among the low-income families (100%) and the families without a college degree (89%). Only one student, who was from high-income family, was reported as being eligible for FRL, which it is probably due to misunderstanding this question.

Fig 4. 2 Eligibility of students for receiving the free/reduced lunch based on family income.
Fig 4.3 Eligibility of students for receiving the free/reduced lunch based on family educational level.

4.4 Fruit and vegetable neophobia

Children self-reported that they were more willing to eat fruits than vegetables. Similarly, parents-reported that their children were more likely to try a new fruit than a new vegetable. However, parents reported themselves less fruit and vegetable neophobic than the children.

Parents’ attitude toward new FV intake is presented in the Fig 4.4. Although parents were more willing to eat fruits than vegetables, the percentage differences between their willingness for FV were very close. For example, 86.3% of parents declared that they like “a lot” fruits in general in compared to 80.8% for vegetable.
Similarly, more parents liked “a lot” novel fruits (Fig 4.4) and will more likely taste a fruit if it looks strange than trying vegetables (Fig 4.5). Furthermore, if parents are at social gathering, they will “definitely” more try new fruits than vegetables (76.7% and 71.2% respectively) (Fig 4.5).

**Fig 4. 4 Parents’ attitude toward new FV intake (a).**
Values in the chart are the percentage of responses to each question. Scales were on a four-point scale from 1=A lot, 2=A little, 3=Not very much, and 4=Not at all.

<table>
<thead>
<tr>
<th></th>
<th>Definitely (%)</th>
<th>Probably (%)</th>
<th>Probably not (%)</th>
<th>Definitely not (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taste a strange vegetable</td>
<td>57.5</td>
<td>38.4</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Tast a strange fruit</td>
<td>61.6</td>
<td>33</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Will try a new vegetable at social gathering</td>
<td>71.2</td>
<td>27.4</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Will try a new fruit at social gathering</td>
<td>76.7</td>
<td>21.9</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Fig 4. 5 Parents’ attitude toward new FV intake (b).**
Values in the chart are the percentage of responses to each question. Scales were on a four-point scale from 1=Definitely, 2=Probably, 3=Probably not, and 4=Definitely not.
Parents reported that their children were more willing to eat fruits than vegetables. For example, around 92% of parents reported that their child like fruits whereas only 33% of parents predicted that children like vegetable in general (Fig 4.6).

Similarly, 67% of parents predicted that their children will “probably” try a new fruit at school; whereas, only 33.3% will “probably” try a new vegetable at school (Fig 4.7). Furthermore, based on parental reports, more children “definitely” taste a strange food compared to vegetable (16.4% versus 11% respectively) (Fig 4.7).
Fig 4. 7 Parents-reported their child’s attitude toward new FV intake (b). Values in the chart are the percentage of responses to each question. Scales were on a four-point scale from 1=A lot, 2=A little, 3=Not very much, and 4=Not at all.

Similarly, the children self-reported more likely to try a new fruit than a new vegetable. For example, majority of children (98.5%) self-reported that they like fruits in general whereas less than half of children (40.6%) declared that they like vegetables (Fig 4.8).

Fig 4. 8 Children self-reported their attitude toward new FV intake (a). Values in the chart are the percentage of responses to each question. Scales were on a four-point scale from 1=Definitely, 2=Probably, 3=Probably not, and 4=Definitely not.
This pattern was consistent for liking more novel fruits and trying strange fruits (Fig 4.8 and 4.9). Furthermore, children self-reported that at school, they are “definitely” more willing to try new fruits than vegetables (46.2% and 32.3% respectively) (Fig. 4.9).

![Bar chart showing children’s attitude toward new FV intake](chart)

**Fig 4.9** Children self-reported their attitude toward new FV intake (b). Values in the chart are the percentage of responses to each question. Scales were on a four-point scale from 1=Definitely, 2=Probably, 3=Probably not, and 4=Definitely not.

T-test analysis was conducted to statistically compare fruit and vegetable neophobia in participants (Fig 4.10). The results indicated that parents predicted their child to have statistically higher vegetable neophobia than fruit neophobia (*p*<0.05). This also suggests that parents reported that their child liked fruit more than vegetables. The parents’ perception of children's fruit and vegetable neophobia was similar to children’s self-reported fruit and vegetable neophobia. No significant difference between fruit neophobia and vegetable neophobia in parents was found.
A positive and significant correlation between fruit and vegetable neophobia score was found in participants, suggesting that participants who had fruit neophobia also showed higher reluctance to consume novel vegetables (Table 4.9). The correlation between fruit neophobia and vegetable neophobia were stronger for parents ($r=0.8$) compared to children ($r=0.4$ and $r=0.6$ for Parents-reported and Child self-reported respectively).

Table 4.9 The relationship between measures of fruit and vegetable neophobia using Pearson correlation.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable</th>
<th>Pearson Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent FrN</td>
<td>Parent VN</td>
<td>0.8**</td>
</tr>
<tr>
<td>Parent-reported CFrN</td>
<td>Parent-reported CVN</td>
<td>0.4*</td>
</tr>
<tr>
<td>Child self-reported CFrN</td>
<td>Child self-reported VN</td>
<td>0.6**</td>
</tr>
</tbody>
</table>

* $p<0.05$, **$p<0.01$
A significant and positive correlation was observed between FVN with FN scores among parents and children (Tables 4-10). Thus, in all three measurement, food neophobia scores was correlated significantly with FVN, suggesting that neophobia can be associated with lower willingness to eat fruit and vegetables.

Table 4. The relationship between measures of food neophobia with fruit and vegetable neophobia scores using Pearson correlation.

<table>
<thead>
<tr>
<th>FVN</th>
<th>FN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent FrN</td>
<td>0.52**</td>
</tr>
<tr>
<td>Parent VN</td>
<td>0.56**</td>
</tr>
<tr>
<td>Parent-reported CFrN</td>
<td>0.61**</td>
</tr>
<tr>
<td>Parent-reported CVN</td>
<td>0.60**</td>
</tr>
<tr>
<td>Child self-reported FrN</td>
<td>0.48**</td>
</tr>
<tr>
<td>Child self-reported VN</td>
<td>0.32*</td>
</tr>
</tbody>
</table>

* p<0.05, **p<0.01
FrN: Fruit Neophobia; VN: Vegetable Neophobia; CFrN: Child Fruit Neophobia; CVN: Child Vegetable Neophobia.

4.5 Effect of demographic variables on parental feeding practices

Association between parents and children demographic variables with their feeding practices was analyzed. The results for each of the demographic variable are presented individually.

4.5.1 Socio-economic status

Results indicated that parents with highest income levels (more than $80,000) used significantly less restriction for weight control to feed their child in comparison to low-income families (p = 0.037; Fig 4.11). The high-income parents allowed significantly less
child self-control compared to low-income families ($p = 0.039$). In another word, the low-income families applied more restriction to the child when it came to the weight of the child, but otherwise allowed the child to control themselves more than the high-income families did.

The analysis of parents’ education level showed that parents without college degree used significantly more restriction for health and weight control compared to the educated parents ($p = 0.0245$ and $p = 0.034$ respectively; Fig 4.12). These findings suggest that low educated parents used more regulation for not letting their child to eat too much of his/her favorite foods or junk foods and/or restrict child not to eat the foods, which might make him/her fat.
Fig 4. 12 Association between educational levels of parents with their feeding practices (mean ± SE).
Letters indicate the differences between parental educational levels within each parental feeding practice using Student’s t test. Sample size ranged from 66 to 68. Scales were from 1=Never to 5=Always and/or 1=Disagree to 5=Agree. Higher scores indicate a higher usage of the feeding practice by parents.

4.5.2 Gender of children

A significant relationship between the gender of children with parental feeding strategies was not observed (Fig 4.13). It seems parents used the same feeding practices for feeding their boys or girls.
Fig 4. Association between the gender of children with parental feeding practices (mean ± SE). Letters indicate the differences between gender of children within each parental feeding practice using Student’s t-test. Sample size ranged from 71 to 73. Scales were from 1=Never to 5=Always and/or 1=Disagree to 5=Agree. Higher scores indicate a higher usage of the feeding practice by parents.

4.5.3 Grade of children

Among the feeding practices only pressure factor was impacted by the grade of the children (Fig 4.14). Parents applied significantly less pressure on the children in 6th grade compared to those on 4th grade ($p = 0.014$). The level of pressure decreased almost 30% from 4th graders to 6th graders.
Fig 4. 14 Association between students’ grade with parental feeding practices (mean ± SE).

Letters indicate the differences between the grade of children within each parental feeding practice using Student’s t test. Sample size ranged from 71 to 73. Scales were from 1=Never to 5=Always and/or 1=Disagree to 5=Agree. Higher scores indicate a higher usage of the feeding practice by parents.

4.5.4 Ethnicity

Among the demographic factors, ethnicity had the most significant effects on feeding practices. In general, White or Caucasian parents showed less controlling behavior towards their children consumption of food. Hispanic parents and other ethnicities applied significantly more restriction for controlling the weight of children and encouraged the children to have a more balanced food ($p = 0.0002$ and $p = 0.002$ respectively; Fig 4.15).
Fig 4. 15 Association between ethnicity with parental feeding practices (mean ± SE). Letters indicate the differences between ethnicity within each parental feeding practice using Student’s t test. Sample size ranged from 71 to 73. Scales were from 1=Never to 5=Always and/or 1=Disagree to 5=Agree. Higher scores indicate a higher usage of the feeding practice by parents.

4.5.5 Receiving free/reduced price school lunch

Children, who were eligible for school lunch program, experienced significantly more restriction for weight control and pressure to intake enough food from their parents ($p = 0.016$ and $p = 0.004$ respectively; Fig 4.16).
Fig 4. 16 Association between eligibility of students for free/reduced price school lunch programs with their parental feeding practices (mean ± SE). Letters indicate the differences between ethnicity within each parental feeding practice using Student’s t test. Sample size ranged from 40 to 44. Scales were from 1=Never to 5=Always and/or 1=Disagree to 5=Agree. Higher scores indicate a higher usage of the feeding practice by parents.

<table>
<thead>
<tr>
<th></th>
<th>Average of scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restriction for health</td>
<td>YES: 3.3, NO: 2.8</td>
</tr>
<tr>
<td>Restriction for weight control</td>
<td>YES: 3.2, NO: 2.6</td>
</tr>
<tr>
<td>Pressure</td>
<td>YES: 3.5, NO: 3.0</td>
</tr>
<tr>
<td>Encourage balance and variety</td>
<td>YES: 4.0, NO: 3.5</td>
</tr>
<tr>
<td>Child self-control</td>
<td>YES: 3.2, NO: 2.8</td>
</tr>
</tbody>
</table>

4.5.6 Number of sibling ages 7-12 years

Association between the number of children that each parent had in the age range of 7-12 years with parental feeding practices were examined. Results did not show a significant relationship between the number of siblings and parental feeding practices (Fig 4.17).
Fig 4. Association between number of sibling (ages 7-12 years) with parental feeding practices (mean ± SE). Letters indicate the differences between ethnicity within each parental feeding practice using Student’s t test. Sample size ranged from 71 to 73. Scales were from 1=Never to 5=Always and/or 1=Disagree to 5=Agree. Higher scores indicate a higher usage of the feeding practice by parents.

4.6 Association between parental feeding practices and FN and FVN

Correlation analysis was conducted to evaluate how parental feeding practices are associated with both parents and children’s food and FV neophobia (Table 4.11). Based on what parents reported about their children, pressuring to eat showed positive and significant correlations with food neophobia ($r=0.28$, $p<0.05$), fruit ($r=0.48$, $p<0.0001$) and vegetable ($r=0.33$, $p<0.05$) neophobia scores in children. Similarly, a significant correlation was observed between pressure feeding strategy with children’s self-ratings of food neophobia ($r=0.28$, $p<0.05$); however, this controlling practice was not associated to the self-reports of children’s FVN scores.
Child self-control strategy was positively but not significantly correlated to the neophobia scores in all three groups; except for children’s fruit neophobia, where significant correlation was observed ($r=0.27$, $p<0.05$) based on the parental reports.

Although not reaching statistical significance, results showed that restriction for health and restriction for weight control feeding practices were positively correlated with parental food and FV neophobia scores. However, a significant correlation was found between parental vegetable neophobia and restriction for health feeding practice ($r=0.29$, $p<0.05$), suggesting that more neophobic parents used more controlling feeding practices for not letting children access unhealthy foods such as high-fat and sugar foods.

Table 4. Correlations between parental feeding practices and participants’ neophobia scores.

<table>
<thead>
<tr>
<th></th>
<th>Controlling</th>
<th>Autonomy promoting</th>
<th>Unstructured practices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Restriction for health</td>
<td>Restriction for weight control</td>
<td>Pressure</td>
</tr>
<tr>
<td>Parent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FN</td>
<td>0.02</td>
<td>0.09</td>
<td>-0.16</td>
</tr>
<tr>
<td>FrN</td>
<td>0.08</td>
<td>0.2</td>
<td>0.04</td>
</tr>
<tr>
<td>VN</td>
<td>0.19</td>
<td>0.29**</td>
<td>0.03</td>
</tr>
<tr>
<td>Child (parent-reported)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FN</td>
<td>0.25*</td>
<td>0.11</td>
<td>0.28*</td>
</tr>
<tr>
<td>FrN</td>
<td>0.15</td>
<td>0.15</td>
<td>0.48**</td>
</tr>
<tr>
<td>VN</td>
<td>0.27*</td>
<td>0.17</td>
<td>0.33**</td>
</tr>
<tr>
<td>Child (self-reported)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FN</td>
<td>0.20</td>
<td>0.13</td>
<td>0.28*</td>
</tr>
<tr>
<td>FrN</td>
<td>0.02</td>
<td>0.06</td>
<td>0.03</td>
</tr>
<tr>
<td>VN</td>
<td>0.01</td>
<td>0.11</td>
<td>0.1</td>
</tr>
</tbody>
</table>

The relationship between parental feeding practices and neophobia scores using Pearson correlation. Significant results were shown in bold (* $p<0.05$, ** $p < 0.01$).
5. DISCUSSION

5.1 Food neophobia scores

Both parents and children perceived themselves as not food neophobic in this study. However, parents rated their children more neophobic than they rated themselves (Table 4.4). The positive correlation similarly showed an agreement between parent-reported CFN and Child self-reported FN ($r=0.62$, $p<0.05$); however, children were rated more neophobic by their parents ($3.5 \pm 0.2$) (Table 4.5). The statistically significant difference between parent-reported CFN and Child self-reported FN could be due to unequal definitions of FN between parents and children. In another word, a food neophobic behavior from parents’ perspective might be considered non-neophobic by children. This could be related to changes in FN by age as indicated by previous research (Cooke & Wardle, 2005). An evidence for the effect of age on FN is the results of students’ grade on CFN. We observed that both parent-reported and Child self-reported FN numerically decreased as the grade of students increased (Table 4.6). Another reason could be that children perceive their behavior less extreme than it might be seen from outside. A significant correlation between parents FN and parent-reported CFN was not observed meaning that parents did not think their children’s food neophobic behavior was related their own FN. Finding a positive association between parent/child FN have been reported in the previous studies (Galloway et al., 2003; Falciglia et al., 2004). However, similar to findings of Tan and Holub, (2012), a significant association was not observed ($r= 0.15$, $p >0.05$).
5.2 Effect of demographics variables on food neophobia scores

As expected, parents’ education and income level were positively correlated, which is in agreement with the findings of Attorp et al. (2014) who observed associations between income and education levels of parents. The surveyed parents were from a wide range of income and education levels. However, a statistically significant effect from any of the socio-economic factors on parents' FN was not observed. Although not statistically significant, the results indicate that parents' FN decreases by increasing their income. This pattern is consistent for both Parent-reported CFN and Child self-reported FN (Table 4.6). Consistently, the results show that both parents-reported CFN and child self-reported FN are smaller in the Bishop’s Peak school that has parents with higher levels of income. These numerical patterns suggest that parental income can have an effect on feeding behavior of children and are consistent with findings of previous research who observed a negative relationship between income levels and FN (Tuorila et al., 2001; Olabi et al., 2009; Meiselman et al., 2010). One possible explanation is that parents with higher income levels have greater opportunities to eat outside home and expose children to a diverse cuisine. We did not observe any significant differences in parent or child self-reported FN across the levels of education.

Another interesting pattern observed in this study was between the grades of the students and their FN. Interestingly, based on parents-reported CFN and Child self-reported, FN decreased for students in higher school grades. This study showed that younger children are numerically more neophobic than older ones, suggesting that children in higher grades most likely have experience with foods, thus there are more willing to taste new foods. Evidence showed that older children, due to have lower
optimal arousal levels, are more willing to taste the novel foods than younger children and might have lower level of FN (Pliner & Loewen, 2002).

Similar to the other studies (Cooke et al., 2003; Tan & Holub., 2012) any associations between children’s gender with their FN scores was not observed; however, in a study among children aged 6-9 years, boys showed more neophobic behavior than girls (Guzek et al., 2017).

5.3 Fruit and vegetable neophobia

Fruit and vegetable neophobic behaviors were positively and consistently correlated with FN in both parents and children (Table 4.10). Higher levels of food neophobia were associated with less dietary variety in children. The relationship between FN and consumption of FV are studied extensively (Cooke et al., 2003; Falciglia et al., 2000; Galloway et al., 2003; Capiola & Raudenbush, 2012; Howard et al., 2012; Laureati et al., 2015; Guzek et al., 2017). As food neophobia concerns mostly FV intake, FVN instrument was used to measure children’s attitudes toward new FV.

The strong correlations between FN and FVN observed in these results suggests that FN can impact the consumption of fruit and vegetables in both parents and children.

Parents reported themselves to have similar neophobic behavior toward fruit and vegetable (Fig 4.10). However, parents rated their children to be more neophobic toward vegetable than fruit. Children self-reported themselves less neophobic toward vegetable and fruit compared their parents rating; however, consistent with their parent’s rating, children self-reported more vegetable neophobic than fruit neophobic.

Previous study indicated that vegetables were more refused to eat by children than fruits (Cashdan, 1998). The difference in neophobic behavior toward vegetable could be
due to perceived taste difference between fruit and vegetables. Fruits, in general, are sweeter and contain more enjoyable flavors than vegetables, which contain more bitter compounds. Hence, trying a new fruit might be more rewarding than a new vegetable. The accuracy of parental prediction on their child liking of fruit and vegetable in this study is similar to the findings of Mata et al. (2008), who observed how accurate parents predicted their children’s meal preferences from the school lunch choices. It appeared that parents to make predictions using both their knowledge about their children’s food preferences and the reflecting of their own preferences.

5.4 Effect of demographic variables on parental feeding practices

Ethnic compositions in 46,716 population of San Luis Obispo (SLO) is distributed among 72.9% White, 16.7% Hispanic, 5.23% Asian, and 2.12% Black residents (San Luis Obispo, 2017). The ratio of participants in this study was similar to the county of SLO (53.4% White, 28.8% Hispanic, 9.6% Asian and 2.7% Black) and it was predictable that the number of participants in some ethnic groups such as Asian, Black or African America, Native American, Pacific Islander was not enough to study them individually (Appendix B). Therefore, all these groups were combined into one category.

The median of annual household income in San Luis Obispo is $47,777 in 2016, which is less than the median annual income in the United States. In this study, 62% of parents reported their family income greater than the median income in SLO.

The lower income families apply two distinct feeding practices toward their children compared to higher income families (Fig 4.11). The first practice is to allow their child to consume what and how much foods s/he likes, without parental interference. The previous research suggests that unstructured parental feeding practice
among families, who lived in low-income rural areas, can result in lower diet quality (Hennessy et al., 2012). These permissive parents might not be aware of the negative consequences of allowing children to make inappropriately eating decisions on their eating habit. Secondly, families with income less than $40,000 used significantly more restriction for weight compared to families with more than $80,000, suggesting low-income parents, who limit their child not to take high-fat foods, are more likely to be overweight. In other words, overweight parents more likely to restrict their child’s eating habits and control more her/his weight because they do not like their child become obese. Previous study indicated the positive and significant correlation between restriction for weight feeding practice with higher body mass index in both parents and children aged 6-8 years (Warkentin et al., 2018). Furthermore, lower household income was highly associated with overweight and obesity in children (Rogers et al., 2015). Future research should examine the body mass index of low- and high-income families to understand better the reasons of using more restriction for controlling the weight of children by parents.

Similar to the lower income families, parents without a college degree used significantly more restriction for health and weight control compared to the educated parents (p<0.05). These restrictive behaviors as an easier way of controlling child behavior are more common among lower education parents. However, the restrictive behaviors have a negative effect on child FN. Findings of this study are consistent with the previous research, who found that higher restriction feeding practice was associated with low parental educational levels (Cardel et al., 2012).
The previous studies indicate that restrictive feeding practices differ by ethnicity. Cardel et al. (2012) reported higher levels of restrictive feeding in Hispanic American parents compared to European American or African American parents. We observed that Hispanic parents applied statistically higher restriction for weight control (Fig 4.15). The other controlling behaviors, restriction for health and pressure, were applied more by Hispanic parents than other races (not statistically significant, \( p<0.5 \)). However, while Hispanic or Latino parents were limiting their children to access high energy foods and controlling their weight, they encouraged children to consume healthy foods. Thus, the consequence of these different feeding might be having a healthy eating practice among Hispanic or Latino groups. Future research should examine the FV intake and children’s body mass index among different ethnicity.

The results of this study revealed that parents used the same feeding practices for feeding their boys or girls. However, evidence shows that parents used more food restriction and monitoring for their girls than boys in ages 9-12 years (Yamborisut et al., 2018).

Less pressure was significantly applied on the children in 6\(^{th}\) grade compared to those on 4\(^{th}\) grade. These results are consisted with the previous research where it was investigated how mothers and fathers use differential feeding practices for feeding their children (aged 6-12 years) (Pulley et., 2014). Both mothers and fathers used more pressure to feed younger children compared with older ones, suggesting that child’s eating behaviors can be changed over the time and parents may be less concern about older children to intake enough food varieties.
5.5 Association between parental feeding practices and levels of FN and FVN

The parent-reported CFN scores were more reflective of effects of feeding practices compared to Child self-reported FN (Table 4.11). The results showed that pressuring children to eat increased their levels food, fruit and vegetable neophobia as reported by parents. Forcing children to eat results in creation of negative emotion in them, which may potentially have negative effects such as the development of eating disorders and with negative outcomes for children's reactions to food (Ellis et al., 2016).

Applying pressure on children to eat fruit might increase consumption of fruit in temporarily, however, it can result in longer-term food neophobia (Galloway et al., 2006). Pressuring children to eat is considered less efficient than asking the child to taste without pressure. Theses finding is consistent with findings of previous studies, for example, Galloway et al. (2005) reported that mothers who used higher pressure on their daughters had children with lower levels of FV consumption.

On the other hand, unstructured parenting to allow the child to self-control increased CFrN. This result is consistent with the other studies who observed a positive and significant association between the unstructured feeding practice with children food neophobia (Gramm et al., 2017). Child control feeding strategy can influence children’s diet quality by lowering the willingness of children to intake fruit and vegetable (Melbye et al., 2012). These findings suggest that if children are allowed to eat what they want without receiving any oversight and guidance from their parents, they might have a higher food neophobia and as a consequence of this behavior, children may have a lower diet quality.
Previous study revealed that parental encouragement was positively and significantly associated with children’s daily consumption of FV (Wardle et al., 2003). While not reaching statistical significance, encourage to have balance feeding practice negatively was associated to children’s food and FV neophobia behaviors.

The food neophobic parents did not apply a greater health restriction, however, based on what parents reported, child’s unwillingness to consume vegetable was positively and significantly associated with parental restriction for health \( (r=0.27) \) (Table 4.11). Evidence indicated that restriction for health feeding practice was negatively associated to children's vegetable intake (Shim et al., 2016; Faith et al., 2004) and led to development of food neophobia in children (Tan & Holub., 2012). Neophobic children might consume lower variety of FV and had higher choices of high energy and low nutrient density foods (Perry, 2015). Thus, parents might compensate the lack of adequate nutrition and dietary variety in their neophobic children’ eating habit, through regulating children not to eat too much of their favorite foods.

Parental vegetable neophobia was the only food neophobic behavior among parents and children that was correlated with restriction for weight practice \( (r=0.29) \) (Table 4.11). The lack of significant relationship between restriction for weigh and CVN, CFrN and CFN is consistent with previous research that did not observe an association between this controlling approach with children’s FN behavior (Tan & Holub., 2012). Cook et al. (2006) did not observe an association between food neophobia with consuming more starch and/or snacks. These findings suggest that parental restrictive behavior to control child's weight might not increase children's food neophobia. However, more research is needed to assess this relationship.
This research has a few limitations. The median of annual household income in San Luis Obispo is $47,777 in 2016, which is less than the median annual income in the United States. In this study, around 60% of parents reported their family income greater than the median income in SLO and had college education. Findings of this sample might be limited within the community with the relatively higher socio-economic status.

This study was conducted in San Luis Obispo Coastal Unified School District with the majority of White and Hispanic population. These participants may not be demographically representative of parents and their elementary schools’ children across California or the USA.

The effects of five parental feeding practices were investigated in this study; however, future studies should explore the effect of other parental feeding strategies that may have an effect on FN and FVN in both children and parents.

In this study, data about the children were reported from one parent. Collecting data from a single parent could be subject to bias. Both parents may observe different behaviors of their child and provide more information about their child in the different situations, which may increase the accuracy of the parental predictions.

5.6 Conclusion

It was observed that neophobia behavior of parents did not impact on their feeding practices; however, some controlling and uninstructed feeding practices led to increasing the level of neophobic levels in children. This study helps parents and/or guardians to have an insight on how their feeding strategies can influence the food consumption balance of their children. Parents can promote their children's eating habits towards
consuming more FV by avoiding pressure while encouraging their children to have a more dietary variety.
REFERENCES


76. O'Brien, R., Burgess-Champoux, T., Haines, J., Hannan, P. J., & Neumark-Sztainer, D. (2010). Associations between school meals offered through the national school lunch program and the school breakfast program and fruit and


APPENDICES

Appendix A: Parents’ survey

A1: English Parents’ survey #1

Informed Parental/Guardian Consent Form

INFORMED CONSENT TO PARTICIPATE IN A RESEARCH PROJECT

A research project is being conducted by graduate student Farnoosh Ayoughi, under the supervision of Dr. Amy Lammert in the Department of Food Science and Nutrition at Cal Poly, San Luis Obispo. The purpose of the study is to better understand the perception of parents about how their children like to try new foods.

You are being asked to take part in this study by inputting your family code. The code is used to link this study to the study of fruit and vegetable consumption by your children.

The identity of you and your children will be protected by not affiliating with any of your responses in all data reporting. Please be aware that you are not required to participate in this research and may discontinue your participation at any time without penalty. You also do not have to answer any questions you choose not to answer.

Your participation will take approximately 10-20 minutes and upon completion of the questionnaire, you will be given a $25 Amazon.com gift card.

If you have questions regarding this study or would like to be informed of the results when the study is completed, please feel free to contact Amy Lammert at alammert@calpoly.edu. If you have concerns regarding the manner in which the study is conducted, you may contact Dr. Michael Black, Chair of the Cal Poly Institutional
Review Board, at (805) 756-2754, mblack@calpoly.edu, or Ms. Debbie Hart, Compliance Officer, at (805) 756-1508, dahart@calpoly.edu.

To receive the gift card and protect your privacy, please follow the link at the end of this survey and indicate your preferred method of contact. We will contact you for the gift card. If you take the survey after school during research testing days, you can receive the gift card on the same day after taking the survey.

Thank you,

1. I Agree to participate
   • Yes
   • No

2. Please enter your family code

3. How many children do you have ages 7 to 12?
   • 1
   • 2
   • 3 or more
   • Not applicable

If you have more than one child, please answer the survey questions about your OLDEST CHILD between age of 7-12.

4. What grade is your child in?
   • 4th grade
   • 5th grade
   • 6th grade
   • Other (please specify)

5. What is the gender of your child?
   • Female
   • Male
   • Prefer not to answer

6. What school does your child go to?
7. While at school, does your child eat lunch from the school lunch programs?
   • Yes
   • No
   • I don't know

8. Is your child eligible for free or reduced-price school lunch program?
   • Yes
   • No
   • I don't know

9. What is your highest level of education?
   • Middle School
   • Some College
   • College Graduate - Associates degree
   • College Graduate - Bachelor’s degree
   • Some Post Graduate Education
   • College Graduate Degree- MS, PHD, MBA, JD, MD, DDS, etc.
   • Other

10. What is your relationship to the student?
    • Parent - Mother or Father
    • Grandparents
    • Legal guardian

11. In 2017, what was your total family income from all sources, before taxes?
    • Less than $10,000
    • $10,000-39,999
    • $40,000-59,999
    • $60,000-79,999
    • $80,000-99,999
    • $100,000-119,999
    • $120,000-139,999
    • Above than $140,000
    • Prefer not to answer
    • Other (please specify)

12. How would you describe yourself?
    • Native American
    • Asian
    • Black or African American
• Hispanic or Latino
• Pacific Islander
• White or Caucasian
• Prefer not to answer
• Other (please specify)

Please select the response that best describes your OLDEST CHILD.

13. If my CHILD doesn’t know what is in a food, s/he won’t try it.
   • Strongly Agree
   • Agree
   • Somewhat Agree
   • Neither Agree Nor Disagree
   • Somewhat Disagree
   • Disagree
   • Strongly Disagree

   • Strongly Agree
   • Agree
   • Somewhat Agree
   • Neither Agree Nor Disagree
   • Somewhat Disagree
   • Disagree
   • Strongly Disagree

15. My CHILD is afraid to eat things that s/he has never tried before.
   • Strongly Agree
   • Agree
   • Somewhat Agree
   • Neither Agree Nor Disagree
   • Somewhat Disagree
   • Disagree
   • Strongly Disagree

16. My CHILD will eat almost anything.
   • Strongly Agree
   • Agree
   • Somewhat Agree
   • Neither Agree Nor Disagree
   • Somewhat Disagree
   • Disagree
   • Strongly Disagree
17. My CHILD is very particular about the foods that will eat.
   • Strongly Agree
   • Agree
   • Somewhat Agree
   • Neither Agree Nor Disagree
   • Somewhat Disagree
   • Disagree
   • Strongly Disagree

18. My CHILD is constantly sampling new and different foods.
   • Strongly Agree
   • Agree
   • Somewhat Agree
   • Neither Agree Nor Disagree
   • Somewhat Disagree
   • Disagree
   • Strongly Disagree

19. When my CHILD is at school, s/he will try a new FRUIT.
   • Definitely
   • Probably
   • Probably not
   • Definitely not

20. How much does your CHILD like FRUITS that s/he has never tried?
   • A lot
   • A little
   • Not very much
   • Not at all

21. Will your CHILD taste a FRUIT if it looks strange?
   • Definitely
   • Probably
   • Probably not
   • Definitely not

22. How much does your CHILD like FRUITS?
   • A lot
   • A little
   • Not very much
   • Not at all

23. When my CHILD is at school, s/he will try a new VEGETABLE.
• Definitely
• Probably
• Probably not
• Definitely not

24. How much does your CHILD like VEGETABLES that s/he has never tried?
• A lot
• A little
• Not very much
• Not at all

25. Will your CHILD taste a VEGETABLE if it looks strange?
• Definitely
• Probably
• Probably not
• Definitely not

26. How much does your CHILD like VEGETABLES?
• A lot
• A little
• Not very much
• Not at all

Please select the response that best describes YOUR eating behavior.

27. If I don’t know what is in a food, I won’t try it.
• Strongly Agree
• Agree
• Somewhat Agree
• Neither Agree Nor Disagree
• Somewhat Disagree
• Disagree
• Strongly Disagree

28. I trust new foods.
• Strongly Agree
• Agree
• Somewhat Agree
• Neither Agree Nor Disagree
• Somewhat Disagree
• Disagree
• Strongly Disagree
29. I am afraid to eat things that have never tried before.
   • Strongly Agree
   • Agree
   • Somewhat Agree
   • Neither Agree Nor Disagree
   • Somewhat Disagree
   • Disagree
   • Strongly Disagree

30. I will eat almost anything.
   • Strongly Agree
   • Agree
   • Somewhat Agree
   • Neither Agree Nor Disagree
   • Somewhat Disagree
   • Disagree
   • Strongly Disagree

31. I am very particular about the foods that I will eat.
   • Strongly Agree
   • Agree
   • Somewhat Agree
   • Neither Agree Nor Disagree
   • Somewhat Disagree
   • Disagree
   • Strongly Disagree

32. I am constantly sampling new and different foods.
   • Strongly Agree
   • Agree
   • Somewhat Agree
   • Neither Agree Nor Disagree
   • Somewhat Disagree
   • Disagree
   • Strongly Disagree

33. At dinner parties, I will try new foods.
   • Strongly Agree
   • Agree
   • Somewhat Agree
   • Neither Agree Nor Disagree
   • Somewhat Disagree
   • Disagree
   • Strongly Disagree
34. I like foods from different cultures.
   - Strongly Agree
   - Agree
   - Somewhat Agree
   - Neither Agree Nor Disagree
   - Somewhat Disagree
   - Disagree
   - Strongly Disagree

35. Ethnic food looks weird to eat.
   - Strongly Agree
   - Agree
   - Somewhat Agree
   - Neither Agree Nor Disagree
   - Somewhat Disagree
   - Disagree
   - Strongly Disagree

36. Ethnic food looks weird to eat.
   - Strongly Agree
   - Agree
   - Somewhat Agree
   - Neither Agree Nor Disagree
   - Somewhat Disagree
   - Disagree
   - Strongly Disagree

37. At a SOCIAL GATHERING, I will try a new FRUIT.
   - Definitely
   - Probably
   - Probably not
   - Definitely not

38. How much do you like FRUITS that you have never tried?
   - A lot
   - A little
   - Not very much
   - Not at all

39. Will you taste a FRUIT if it looks strange?
   - Definitely
   - Probably
   - Probably not
   - Definitely not
40. How much do you like FRUITS?
   - A lot
   - A little
   - Not very much
   - Not at all

41. At a SOCIAL GATHERING, I will try a new VEGETABLE.
   - Definitely
   - Probably
   - Probably not
   - Definitely not

42. How much do you like VEGETABLES that you have never tried?
   - A lot
   - A little
   - Not very much
   - Not at all

43. Will you taste a VEGETABLE if it looks strange?
   - Definitely
   - Probably
   - Probably not
   - Definitely not

44. How much do you like VEGETABLES?
   - A lot
   - A little
   - Not very much
   - Not at all

Please select the appropriate box to show how YOU deal with feeding your child.

45. Do you allow your child eat whatever s/he wants?
   - Always
   - Mostly
   - Sometimes
   - Rarely
   - Never

46. If your child does not like what is being served, do you make something else?
   - Always
   - Mostly
   - Sometimes
   - Rarely
   - Never
47. Do you allow your child to eat snacks whenever s/he wants?
   - Always
   - Mostly
   - Sometimes
   - Rarely
   - Never

48. Do you allow your child to leave the table when s/he is full, even if your family is not done eating?
   - Always
   - Mostly
   - Sometimes
   - Rarely
   - Never

49. My child should always eat all of the food on his/her plate.
   - Agree
   - Agree slightly
   - Neither Agree Nor Disagree
   - Disagree slightly
   - Disagree

50. If my child says, ‘‘I’m not hungry,’’ I try to get him/her to eat anyway.
   - Agree
   - Agree slightly
   - Neither Agree Nor Disagree
   - Disagree slightly
   - Disagree

51. When he/she says “I am finished eating,” I try to get him/her to eat one more (two more, etc.) bites of food.
   - Agree
   - Agree slightly
   - Neither Agree Nor Disagree
   - Disagree slightly
   - Disagree

52. If I did not guide or regulate my child’s eating, he/she would eat too many junk foods.
   - Agree
   - Agree slightly
   - Neither Agree Nor Disagree
   - Disagree slightly
   - Disagree
53. I have to be sure that my child does not eat too much of his/her favorite foods.
   - Agree
   - Agree slightly
   - Neither Agree Nor Disagree
   - Disagree slightly
   - Disagree

54. I have to be sure that my child does not eat too many sweets (candy, ice cream, cake, or pastries).
   - Agree
   - Agree slightly
   - Neither Agree Nor Disagree
   - Disagree slightly
   - Disagree

55. I have to be sure that my child does not eat too many high-fat foods.
   - Agree
   - Agree slightly
   - Neither Agree Nor Disagree
   - Disagree slightly
   - Disagree

56. If my child eats more than usual at one meal, I try to restrict her/his eating at the next meal.
   - Agree
   - Agree slightly
   - Neither Agree Nor Disagree
   - Disagree slightly
   - Disagree

57. There are certain foods my child shouldn’t eat because they will make her/his fat.
   - Agree
   - Agree slightly
   - Neither Agree Nor Disagree
   - Disagree slightly
   - Disagree

58. I don’t allow my child to eat between meals because I don’t want her/his to get fat.
   - Agree
   - Agree slightly
   - Neither Agree Nor Disagree
   - Disagree slightly
   - Disagree
59. Do you encourage your child to eat healthy foods before unhealthy ones?
   - Agree
   - Agree slightly
   - Neither Agree Nor Disagree
   - Disagree slightly
   - Disagree

60. I encourage my child to try new foods.
   - Agree
   - Agree slightly
   - Neither Agree Nor Disagree
   - Disagree slightly
   - Disagree

61. I tell my child that healthy food tastes good.
   - Agree
   - Agree slightly
   - Neither Agree Nor Disagree
   - Disagree slightly
   - Disagree

62. I encourage my child to eat a variety of foods.
   - Agree
   - Agree slightly
   - Neither Agree Nor Disagree
   - Disagree slightly
   - Disagree

Thank you for completing the survey. If you would like to receive a $25 gift card to Amazon.com and protect your privacy, please click below links and indicate your preferred method of contact. We will contact you for the gift card. If you take the survey after school during research testing days, you can receive the gift card on the same day after taking the survey.

Your preferred method of contact

and/or copy and paste the link below into your internet browser:

https://www.surveymonkey.com/r/WTBTQH3
A2: English Parents’ survey #2

1. Please indicate your preferred method of contact:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>Phone number</td>
<td></td>
</tr>
<tr>
<td>Email</td>
<td></td>
</tr>
<tr>
<td>Family code</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>
FORMA DE AUTORIZACION PARA PARTICIPAR EN UN ESTUDIO DE INVESTIGACION

Un proyecto de investigación esta siendo llevado a cabo por la estudiante de postgrado Farnoosh Ayoughi, bajo la supervisión de la Dra. Amy Lammert en el Departamento de Ciencias de los Alimentos y Nutrición en Cal Poly, San Luis Obispo. El propósito de este estudio es entender mejor a los padres por medio de su disposicion para que sus hijos prueben comidas nuevas o poco familiares.

Usted esta siendo invitado a participar en este estudio al proporcionar el código de familia asignado. Necesitamos el código de familia para conectar y compartir información proporcionada entre los proyectos de padres e hijos. Su identidad y la de su hijo será protejida al no conectar ninguna de sus encuestas con la información personal que adquirimos de usted.

Por favor, tenga en cuenta que usted no esta obligado a participar en este estudio y puede suspender su participación en cualquier momento sin consecuencia alguna.

Su participación tomará aproximadamente de 10-15 minutos y una vez completado el cuestionario, usted recibirá una tarjeta de regalo de $25.00 dolares.

Si usted tiene alguna pregunta o duda con respecto al estudio o le gustaría recibir información sobre los resultados una vez que el proyecto termine, no dude en contactar a Amy Lammert en el correo electrónico alammert@calpoly.edu. Si usted tiene alguna duda sobre la manera en que el estudio de investigación esta siendo llevado a cabo, usted puede ponerse en contacto con el Dr. Michael Black, jefe de la Junta de Revision Institucional (IRB) de Cal Poly al número (805) 756-2754 o al correo
mblack@calpoly.edu, o con la Sra. Debbie Hart, encargada del cumplimiento de las normas de investigación a el número (805) 756-1508, o a el correo electrónico dhart@calpoly.edu.

Para proteger su privacidad, le proveemos un segundo enlace de encuesta al final del cuestionario. Favor de seleccionar el enlace al final de la segunda encuesta y favor de poner su nombre y dirección de correo electronico para comunicarnos con usted y darle la tarjeta

Gracias,

1. Estoy de acuerdo en participar
   - Si
   - No

2. Por favor ponga el código de familia:

Información demografica

3. ¿Cuantos niños tiene entre las edades de 7 y 12 años?
   - 1
   - 2
   - 3 or more
   - No aplica

4. Si tiene más de un niño, favor de contestar el cuestionario acerca de su HIJO MAJOR entre las edades de 7-12 años. ¿En que grado esta su hijo?
   - 4˚ grado
   - 5˚ grado
   - 6˚ grado
   - Otro

5. ¿Cúal es el género de su hijo/a?
   - Mujer
   - Hombre
   - Prefiero no contestar

6. ¿A que escuela va su hijo?
• Hawthorne Elementary School
• Bishop's Peak Elementary School
• Otro (por favor especifique)

7. ¿En la escuela, su hijo come por medio del programa de almuerzo escolar?
   • Sí
   • No
   • No se

8. ¿Es su hijo/a legible para recibir almuerzo gratis o de bajo costo por medio del programa escolar?
   • Sí
   • No
   • No se

9. ¿Cuál es el nivel de educación de usted?
   • Secundaria
   • Universidad
   • Egresado de la Universidad- Carrera técnica
   • Egresado de la Universidad con licenciatura
   • Also de estudios de Post-grado o Maestría
   • Egresado de estudios de post-grado con título en MS, PHD, MBA, JD, MD, DDs, etc.
   • Otro (por favor especifique)

10. ¿Cuál es su parentezco con el estudiante?
    • Padre- Madre o Padre
    • Abuelo o Abuela
    • Tutor legal

11. ¿En el 2017, cuál fue su fuente de ingresos totales antes de impuestos?
    • Menos de $10,000
    • $10,000-39,999
    • $40,000-59,999
    • $60,000-79,999
    • $80,000-99,999
    • $100,000-119,999
    • $120,000-139,999
    • $Mas de 140,000
    • $Prefiero no contestar
    • Otro (por favor especifique)

12. ¿Cómo se identifica? (puede escojer uno o más si es necesario)
    • Nativo Americano
    • Asiático
• Afro- Americano
• Hispano o Latino
• Isleño Pacífico
• Blanco o Caucásico
• Prefiero no contestar
• Otro (por favor especifique)

Favor de escojer la respuesta que mejor describe a SU HIJO MAYOR

13. Si mi HIJO no sabe que hay en la comida, él o ella no la prueba
• Totalmente de acuerdo
• De acuerdo
• Algo de acuerdo
• No estoy en acuerdo ni en desacuerdo
• Algo en desacuerdo
• en desacuerdo
• Totalmente en desacuerdo

14. Mi HIJO tiene miedo de comer cosas que nunca ha probado
• Totalmente de acuerdo
• De acuerdo
• Algo de acuerdo
• No estoy en acuerdo ni en desacuerdo
• Algo en desacuerdo
• en desacuerdo
• Totalmente en desacuerdo

15. Mi HIJO confía en comidas nuevas
• Totalmente de acuerdo
• De acuerdo
• Algo de acuerdo
• No estoy en acuerdo ni en desacuerdo
• Algo en desacuerdo
• en desacuerdo
• Totalmente en desacuerdo

16. Mi HIJO se come casi todo.
• Totalmente de acuerdo
• De acuerdo
• Algo de acuerdo
• No estoy en acuerdo ni en desacuerdo
• Algo en desacuerdo
• en desacuerdo
• Totalmente en desacuerdo
17. Mi HIJO es muy delicado o delicada con los alimentos que se come.
   • Totalmente de acuerdo
   • De acuerdo
   • Algo de acuerdo
   • No estoy en acuerdo ni en desacuerdo
   • Algo en desacuerdo
   • en desacuerdo
   • Totalmente en desacuerdo

18. Mi HIJO prueba con frecuencia diferentes comidas.
   • Totalmente de acuerdo
   • De acuerdo
   • Algo de acuerdo
   • No estoy en acuerdo ni en desacuerdo
   • Algo en desacuerdo
   • en desacuerdo
   • Totalmente en desacuerdo

19. Cuando mi HIJO está en la ESCUELA, el/ella prueba una FRUTA nueva.
   • Definitivamente
   • Probablemente
   • Probablemente no
   • Definitivamente no

20. ¿Que tanto le gustan a su HIJO FRUTAS que el o ella nunca ha probado?
   • Mucho
   • Un poco
   • No mucho
   • Para nada

21. ¿Su HIJO probaría una FRUTA de apariencia rara o extraña?
   • Definitivamente
   • Probablemente
   • Probablemente no
   • Definitivamente no

22. ¿Que tanto le gustan las FRUTAS a su HIJO?
   • Mucho
   • Un poco
   • No mucho
   • Para nada

23. ¿Cuando su HIJO está en la ESCUELA, el/ella prueba un VEGETAL nuevo?
   • Definitivamente
24. ¿Qué tanto le gustan a SU HIJO vegetales que el/ella nunca ha probado?
   - Mucho
   - Un poco
   - No mucho
   - Para nada

25. ¿Su HIJO probaría un VEGERAL de apariencia rara o extraña?
   - Definitivamente
   - Probablemente
   - Probablemente no
   - Definitivamente no

26. ¿Qué tanto le gustan los vegetales a su hijo?
   - Mucho
   - Un poco
   - No mucho
   - Para nada

Favor de seleccionar la respuesta que mejor describa SU ACTITUD O COMPORTAMIENTO acerca de probar nuevas comidas.

27. Si usted no sabe que hay en la comida, no la prueba.
   - Totalmente de acuerdo
   - De acuerdo
   - Algo de acuerdo
   - No estoy en acuerdo ni en desacuerdo
   - Algo en desacuerdo
   - en desacuerdo
   - Totalmente en desacuerdo

28. Yo confío en comidas nuevas.
   - Totalmente de acuerdo
   - De acuerdo
   - Algo de acuerdo
   - No estoy en acuerdo ni en desacuerdo
   - Algo en desacuerdo
   - en desacuerdo
   - Totalmente en desacuerdo
29. Yo me como casi todo.
   • Totalmente de acuerdo
   • De acuerdo
   • Algo de acuerdo
   • No estoy en acuerdo ni en desacuerdo
   • Algo en desacuerdo
   • en desacuerdo
   • Totalmente en desacuerdo

30. Me da miedo comer cosas que nunca he probado.
   • Totalmente de acuerdo
   • De acuerdo
   • Algo de acuerdo
   • No estoy en acuerdo ni en desacuerdo
   • Algo en desacuerdo
   • en desacuerdo
   • Totalmente en desacuerdo

31. Soy muy delicado con los alimentos que como.
   • Totalmente de acuerdo
   • De acuerdo
   • Algo de acuerdo
   • No estoy en acuerdo ni en desacuerdo
   • Algo en desacuerdo
   • en desacuerdo
   • Totalmente en desacuerdo

32. Yo pruebo comidas nuevas constantemente.
   • Totalmente de acuerdo
   • De acuerdo
   • Algo de acuerdo
   • No estoy en acuerdo ni en desacuerdo
   • Algo en desacuerdo
   • en desacuerdo
   • Totalmente en desacuerdo

33. En fiestas con comida, pruebo nuevos alimentos.
   • Totalmente de acuerdo
   • De acuerdo
   • Algo de acuerdo
   • No estoy en acuerdo ni en desacuerdo
   • Algo en desacuerdo
   • en desacuerdo
   • Totalmente en desacuerdo
34. Me gustan las comidas de países diferentes.
   - Totalmente de acuerdo
   - De acuerdo
   - Algo de acuerdo
   - No estoy en acuerdo ni en desacuerdo
   - Algo en desacuerdo
   - en desacuerdo
   - Totalmente en desacuerdo

35. La comida étnica me parece demasiado rara para comer.
   - Totalmente de acuerdo
   - De acuerdo
   - Algo de acuerdo
   - No estoy en acuerdo ni en desacuerdo
   - Algo en desacuerdo
   - en desacuerdo
   - Totalmente en desacuerdo

36. Me gusta probar nuevos restaurantes étnicos.
   - Totalmente de acuerdo
   - De acuerdo
   - Algo de acuerdo
   - No estoy en acuerdo ni en desacuerdo
   - Algo en desacuerdo
   - en desacuerdo
   - Totalmente en desacuerdo

37. Si estoy EN UNA REUNION SOCIAL, yo pruebo una FRUTA nueva.
   - Definitivamente
   - Probablemente
   - Probablemente no
   - Definitivamente no

38. ¿Qué tanto le gustan las FRUTAS que no ha probado antes?
   - Mucho
   - Un poco
   - No mucho
   - Para nada

39. ¿Usted se comería una FRUTA de apariencia extrana o rara?
   - Mucho
   - Un poco
   - No mucho
   - Para nada
40. ¿Qué tanto le gustan las FRUTAS?
   • Definitivamente
   • Probablemente
   • Probablemente no
   • Definitivamente no

41. En UNA REUNIÓN, YO pruebo un VEGETAL nuevo.
   • Definitivamente
   • Probablemente
   • Probablemente no
   • Definitivamente no

42. ¿Qué tanto le gustan LOS VEGETALES que jamás ha probado?
   • Mucho
   • Un poco
   • No mucho
   • Para nada

43. ¿Usted probaría VEGERALES de apariencia rara o extraña?
   • Mucho
   • Un poco
   • No mucho
   • Para nada

44. ¿Qué tanto le gustan LOS VEGETALES?
   • Definitivamente
   • Probablemente
   • Probablemente no
   • Definitivamente no

**Favor de seleccionar la respuesta que demuestra como USTED maneja la alimentación de su hijo.**

45. ¿Usted permite que su hijo/a coma lo que quiera?
   • Siempre
   • La mayor parte del tiempo
   • A veces
   • Raramente
   • Nunca

46. ¿Si a su hijo no le gusta lo que le sirvieron, usted le hace otra cosa?
   • Siempre
   • La mayor parte del tiempo
• A veces
• Raramente
• Nunca

47. ¿Usted permite que su hijo coma botana o aperitivos cuando el/ella quiere?
• Siempre
• La mayor parte del tiempo
• A veces
• Raramente
• Nunca

48. ¿Usted permite que su hijo se levante de la mesa si ya esta lleno aunque su familia todavia no haya terminado?
• Siempre
• La mayor parte del tiempo
• A veces
• Raramente
• Nunca

49. Mi hijo siempre debe de comer toda la comida que hay en su plato.
• Totalmente de acuerdo
• De acuerdo
• No estoy en acuerdo ni en desacuerdo
• En desacuerdo
• Totalmente en desacuerdo

50. ¿Cuendo el/ella dice que ya termino de comer, intento que mi hijo/a coma una cucharada (o dos o mas) de comida?
• Totalmente de acuerdo
• De acuerdo
• No estoy en acuerdo ni en desacuerdo
• En desacuerdo
• Totalmente en desacuerdo

51. Si mi hijo/a dice “no tengo hambre,” de todas maneras intento que coma.
• Totalmente de acuerdo
• De acuerdo
• No estoy en acuerdo ni en desacuerdo
• En desacuerdo
• Totalmente en desacuerdo

52. Si yo no controlara lo que come, mi hijo/a comería mucha comida chatarra.
• Totalmente de acuerdo
• De acuerdo
• No estoy en acuerdo ni en desacuerdo
53. Tengo que asegurarme de que mi hijo/a no coma mucha cantidad de sus comidas favoritas.
   - Totalmente de acuerdo
   - De acuerdo
   - No estoy en acuerdo ni en desacuerdo
   - En desacuerdo
   - Totalmente en desacuerdo

54. Tengo que asegurarme de que mi hijo/a no coma muchas cosas dulces (caramelos, helado, pastel, tartas, etc).
   - Totalmente de acuerdo
   - De acuerdo
   - No estoy en acuerdo ni en desacuerdo
   - En desacuerdo
   - Totalmente en desacuerdo

55. Tengo que asegurarme de que mi hijo no coma muchas comidas altas en grasa.
   - Totalmente de acuerdo
   - De acuerdo
   - No estoy en acuerdo ni en desacuerdo
   - En desacuerdo
   - Totalmente en desacuerdo

56. Si mi hijo come más de lo normal en una de sus comidas, intento limitar lo que se come en la siguiente comida.
   - Totalmente de acuerdo
   - De acuerdo
   - No estoy en acuerdo ni en desacuerdo
   - En desacuerdo
   - Totalmente en desacuerdo

57. Hay ciertas comidas que mi hijo/a no debería comer porque tienen mucha grasa.
   - Totalmente de acuerdo
   - De acuerdo
   - No estoy en acuerdo ni en desacuerdo
   - En desacuerdo
   - Totalmente en desacuerdo

58. No permito que mi hijo/a coma entre comidas porque no quiero que engorde.
   - Totalmente de acuerdo
   - De acuerdo
   - No estoy en acuerdo ni en desacuerdo
59. Usted anima a su hijo a comer comidas saludables antes de comer comidas que no son saludables?
   • Totalmente de acuerdo
   • De acuerdo
   • No estoy en acuerdo ni en desacuerdo
   • En desacuerdo
   • Totalmente en desacuerdo

60. You animo a mi hijo a que pruebe comidas nuevas.
   • Totalmente de acuerdo
   • De acuerdo
   • No estoy en acuerdo ni en desacuerdo
   • En desacuerdo
   • Totalmente en desacuerdo

61. Yo le digo a mi hijo que las comidas saludables son ricas.
   • Totalmente de acuerdo
   • De acuerdo
   • No estoy en acuerdo ni en desacuerdo
   • En desacuerdo
   • Totalmente en desacuerdo

62. Yo animo a mi hijo a que coma una variedad de comidas.
   • Totalmente de acuerdo
   • De acuerdo
   • No estoy en acuerdo ni en desacuerdo
   • En desacuerdo
   • Totalmente en desacuerdo

Gracias por su participación en la encuesta. Si le gustaría recibir la tarjeta de regalo de $25 dólares para Amazzon.com y proteger su identidad, favor de hacer click en el enlace de abajo para abrir otra encuesta en donde usted puede dar su nombre y correo electrónico para que nosotros nos comuniquemos con usted y darle la tarjeta.

Sy método preferido de contacto

y/o copiar y pegar el siguiente enlace:

https://www.surveymonkey.com/r/WZCMK65
A4: Spanish Parents’ survey #2

1. Favor de indicar de que forma prefiere que nos comuniquemos con usted:

<table>
<thead>
<tr>
<th>Nombre:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Numero de teléfono:</td>
<td></td>
</tr>
<tr>
<td>Correo electronico:</td>
<td></td>
</tr>
<tr>
<td>El código de familia</td>
<td></td>
</tr>
<tr>
<td>Otro:</td>
<td></td>
</tr>
</tbody>
</table>
## Appendix B: Comparison of demographics

Table 6: Comparison of demographics of San Luis Obispo (SLO) county, California, and the elementary schools of this study.

<table>
<thead>
<tr>
<th>Diversity of populations</th>
<th>SLO County</th>
<th>California</th>
<th>Bishop’s Peak Elementary</th>
<th>Hawthorne Elementary</th>
</tr>
</thead>
<tbody>
<tr>
<td>White or Caucasian</td>
<td>71.4</td>
<td>40.1</td>
<td>46.9</td>
<td>39.2</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>20.8</td>
<td>37.6</td>
<td>23.4</td>
<td>22.7</td>
</tr>
<tr>
<td>Asian</td>
<td>3.3</td>
<td>13.0</td>
<td>10.9</td>
<td>1.0</td>
</tr>
<tr>
<td>Black or African American</td>
<td>2.0</td>
<td>5.8</td>
<td>4.7</td>
<td>1.0</td>
</tr>
<tr>
<td>American Indian and Alaska Native</td>
<td>0.5</td>
<td>0.4</td>
<td>7.8</td>
<td>17.5</td>
</tr>
<tr>
<td>Some other race</td>
<td>0.2</td>
<td>0.2</td>
<td>10.9</td>
<td>17.5</td>
</tr>
<tr>
<td>Native Hawaiian</td>
<td>0.1</td>
<td>0.4</td>
<td>0.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

All values indicate the percentage of population.