

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

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Farnoosh Ayoughi

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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

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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.

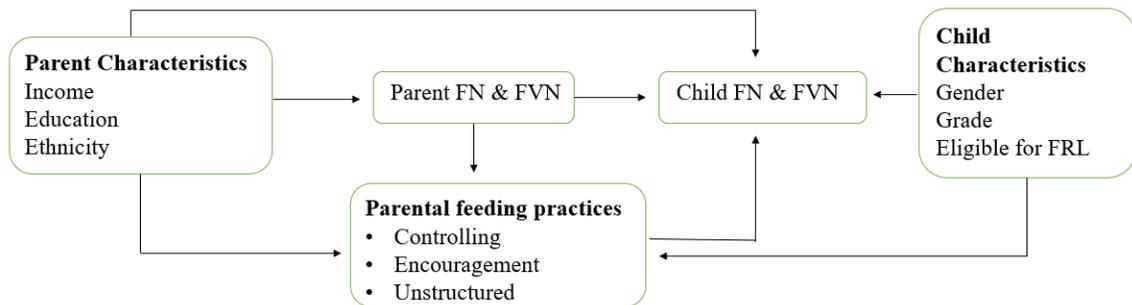


Fig 1. 1 Tested theoretical model of the variables effect on children food neophobia.

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' 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.

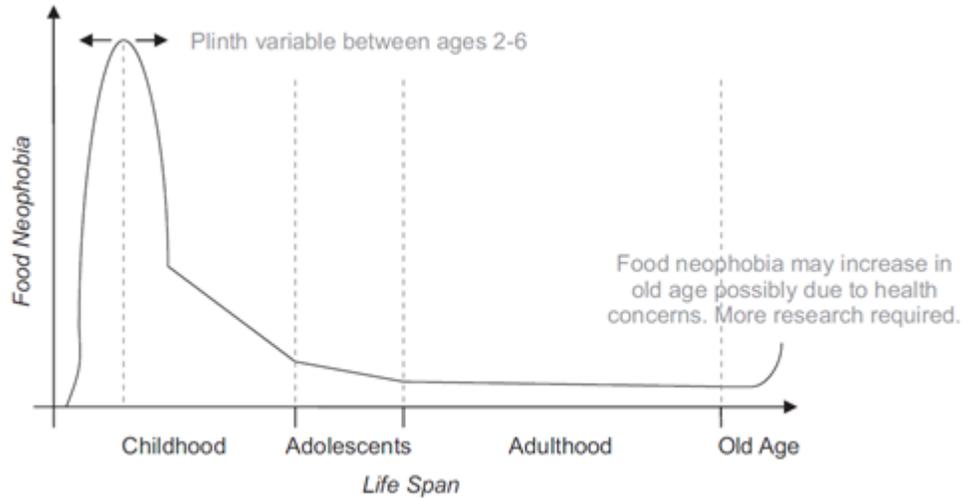


Fig 2. 1 A potential lifespan model for levels of food neophobia in humans (adapted from Dovere et al., 2008).

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 4th to 6th 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 socioeconomic 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 neophobia 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 et 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 of 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 & Sjöden, 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-Valentia 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's 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.

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

*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 Musher 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.

Subject	Parents family Code	Child family code
Family 1	¹ 2000	² 2001 ³ 2002
Family 2	2010	2011 2012
Family 3

¹Parents/guardians' code for family 1; ²Older child's code; ³Younger 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/mailed 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 3. 2 Annual household income to qualify for free/reduced price meals.

Household Size	Maximum Income Level (Per Year)
1	\$22,459
2	\$30,451
3	\$38,443
4	\$46,435
5	\$54,427
6	\$62,419
7	\$70,411
8	\$78,403

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. 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.

*I am constantly sampling new different foods. (R)

I don't trust new foods.

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.

I like foods from different countries / I like to try weird tastes and foods, which are unusual and come from different countries. (R)

Ethnic foods look too weird to eat.

At dinner parties or at a friend's party I will try a new food. (R)

I am afraid to eat things I have never had before.

I am very particular about the foods I will eat.

I will eat almost anything. (R)

I like to try new ethnic restaurants. (R)

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-control¹

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 variety²

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.

Pressure²

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 control²

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 Health²

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).

¹Responses options were 1=Never, 2=Rarely, 3=Sometimes, 4=Mostly and 5=Always

²Responses 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):

$$X_2=(B-A)*(X_1-a)/(b-a) + A$$

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

X₂ is new data in scale 1-7 and X₁ 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 1 Characteristics of children and parents.

Children	Variables	n	Frequency %
Number of Sibling between 7-12 years	- One child	29	39.7
	- Two children	31	42.5
	- Three children or more	13	17.8
Grade	- 6 th grade	18	24.7
	- 5 th grade	19	26
	- 4 th grade	11	15.1
	- 3 rd grade	17	23.3
	- 2 nd grade	8	10.96
Gender	- Female	41	56.2
	- Male	32	43.8
Eligible for FRL¹	- Yes	24	52.3
	- No	19	45.5
	- I don't know	1	2.3
Parents			
Highest level of education	- Middle School	2	2.7
	- Some College	18	24.7
	- College Graduate - Associates Degree	4	5.5
	- College Graduate - Bachelor's Degree	14	19.2
	- Some Post Graduate Education	7	11
	- College Graduate Degree-MS, PHD, etc.	22	30.1
	- Other	5	6.9
Relationship	- Parent - Mother or Father	71	97.3
	- Grandparents	1	1.4
	- Legal guardian	1	1.4
Family income	- Less than \$10,000	2	2.7
	- \$10,000-39,999	14	19.2
	- \$40,000-59,999	10	13.7
	- \$60,000-79,999	5	6.9
	- \$80,000-99,999	7	9.6
	- \$100,000-119,999	6	8.2
	- \$120,000-139,999	11	15.1
	- More than \$140,000	15	21
	- Prefer not to answer	3	4.1
Race	- White or Caucasian	39	53.4
	- Hispanic or Latino	21	28.8
	- Asian	7	9.6
	- Black or African American	2	2.7
	- Native American	-	-
	- Pacific Islander	-	-
	- Other (Mexican, Indian, Portuguese, Mixed)	2	2.7
	- Prefer not to answer	-	-

¹FRL: 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).

Cronbach's alpha	Internal consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	unacceptable

The results of Cronbach's α test indicated an excellent internal consistency for Parent-reported CFN ($\alpha=0.9$) and a good internal consistency for Child self-reported FN ($\alpha=0.75$) and Parents FN ($\alpha =0.85$). 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.

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

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.

Variables	Mean \pm SE	Range	n
Parents FN	2.5 \pm 0.1 ^b	1-4.9	73
Parent-reported CFN	3.5 \pm 0.2 ^a	1-7	73
Child self-reported FN	2.5 \pm 0.1 ^b	1-4.5	67

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 \pm 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.

	Parents FN	Parent-reported CFN
Parents FN	1	–
Parent-reported CFN	- 0.02	1
Child self-reported FN	0.15	0.62*

*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) 4th grade or less (includes 2nd and 3rd grade)
- 2) 5th grade
- 3) 6th grade or more (included 7th grade)

The children FN scores were not statistically significant between different grade of students. However, younger students (4th 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 \pm SE).

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

¹CFN: Child Food Neophobia.

²FN: 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. 7 The effect of demographic factors on parents' food neophobic. Higher scores indicate greater neophobia behavior (Mean \pm SE).

Factor	Level	Parent FN
Ethnicity	White/Caucasian	2.55 \pm 0.2
	Hispanic/Latino	2.56 \pm 0.2
	Other	2.2 \pm 0.3
Education level	Have a college degree	2.38 \pm 0.1
	Not have a college degree	2.64 \pm 0.2
Income level	<\$39,999	2.74 \pm 0.2
	\$40,000 – 79,999	2.26 \pm 0.2
	\$80,000 <	2.36 \pm 0.1

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).

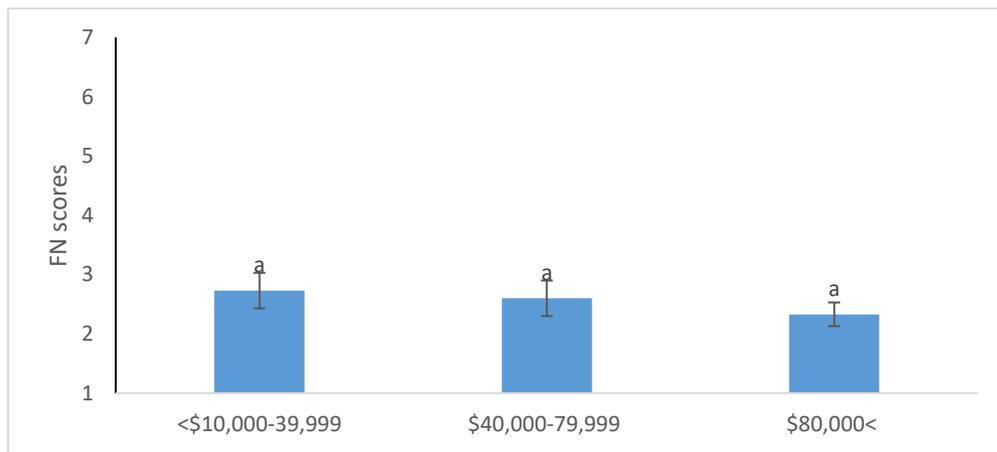


Fig 4. 1 Association between parental income on Child self-reported FN. Letters indicate the differences between FN scores within parental income levels (mean \pm SE).

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.

Income levels	Have a college degree% (n)	Not have a college degree% (n)
< \$10,000 - 39,999	9.5 (4)	43.5 (10)
\$40,000 - 79,999	17 (7)	30.4 (7)
\$80,000 <	74 (31)	26.1 (6)

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.

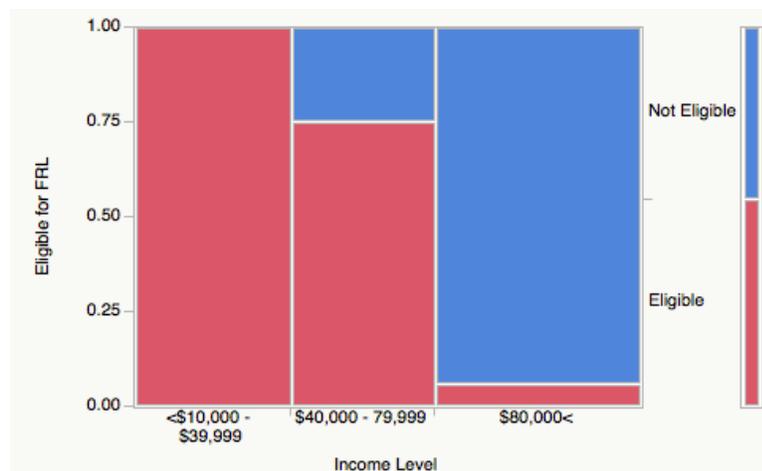


Fig 4. 2 Eligibility of students for receiving the free/reduced lunch based on family income.

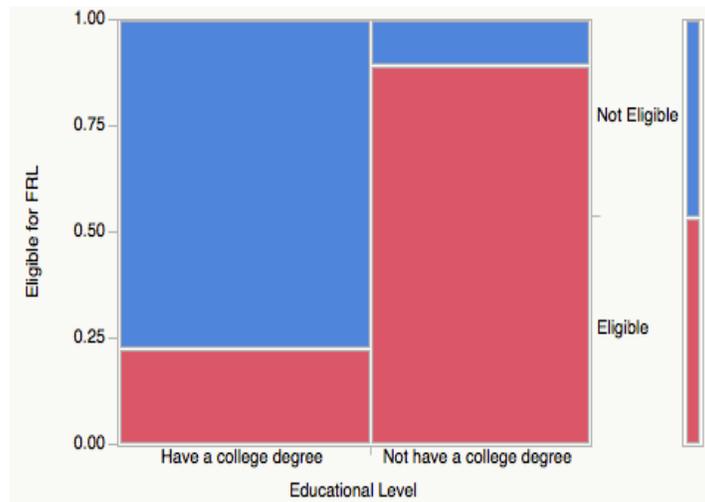


Fig 4. 3 Eligibility of students for receiving the free/reduced lunch based on family educational level.

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.

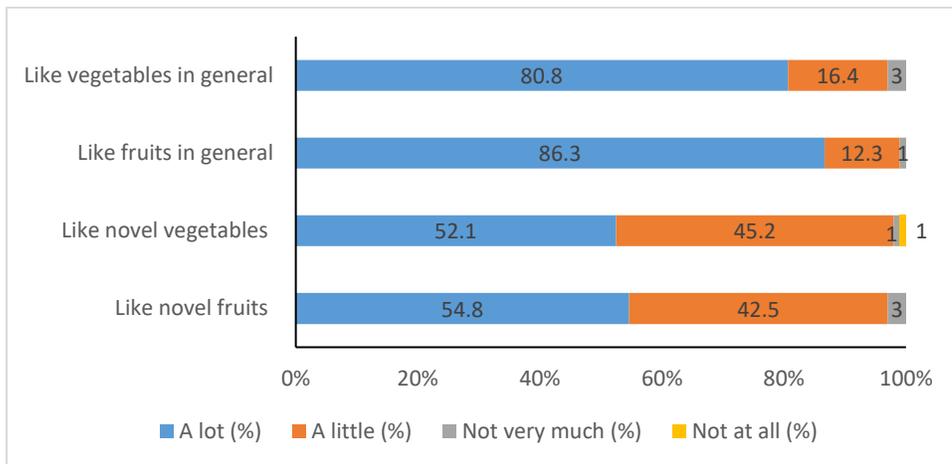


Fig 4. 4 Parents' attitude toward new FV intake (a).

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.

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).

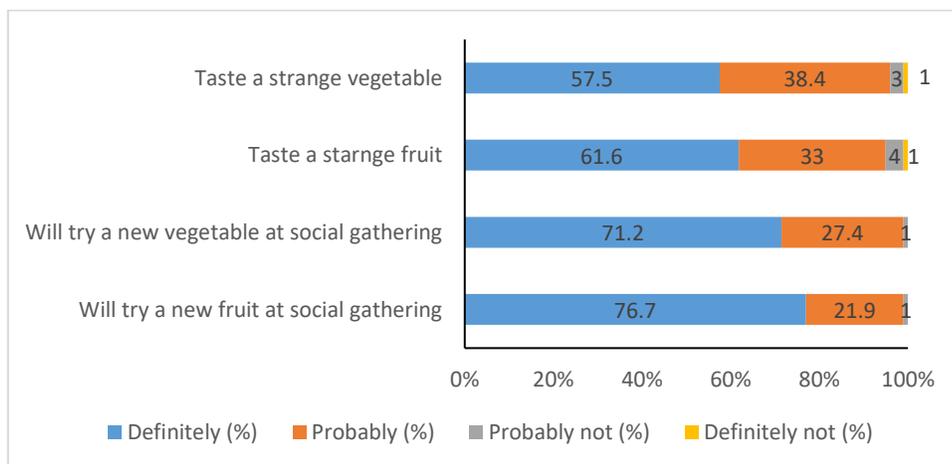


Fig 4. 5 Parents' attitude toward new FV intake (b).

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).

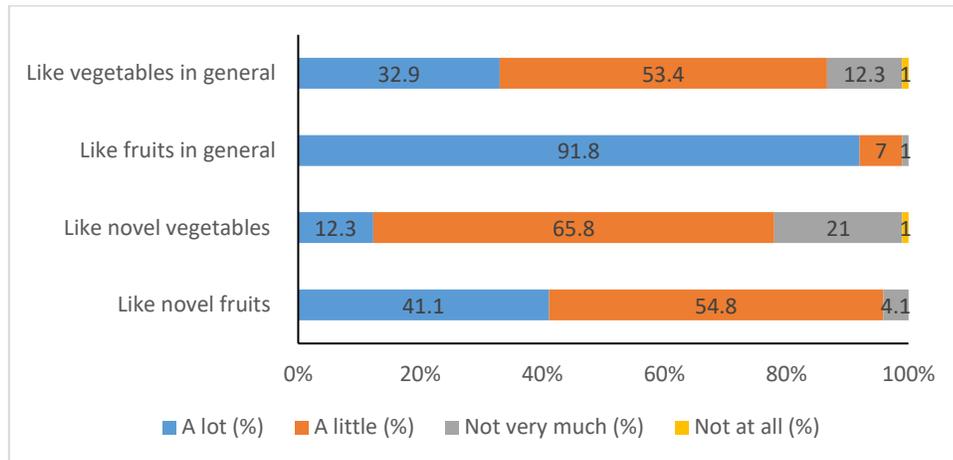


Fig 4. 6 Parents-reported their child’s attitude toward new FV intake (a). Values in the chart are the percentage of responses to each question. Scales were on a four-point scale from 1=A lot, 2=A little, 3=Not very much, and 4=Not at all.

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).

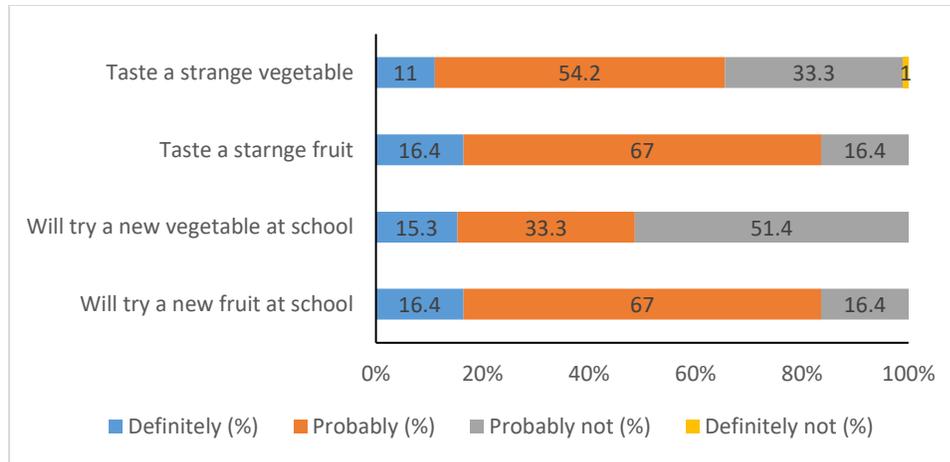


Fig 4. 7 Parents-reported their child's attitude toward new FV intake (b). Values in the chart are the percentage of responses to each question. Scales were on a four-point scale from 1=A lot, 2=A little, 3=Not very much, and 4=Not at all.

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).

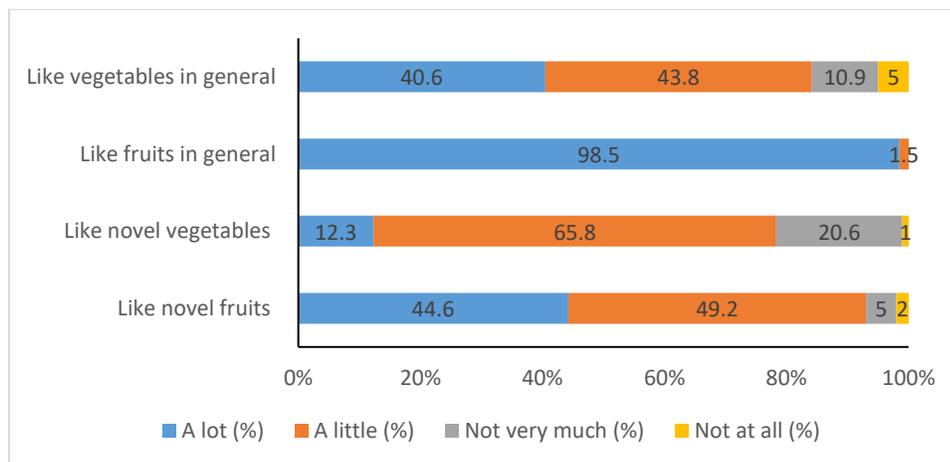


Fig 4. 8 Children self-reported their attitude toward new FV intake (a). Values in the chart are the percentage of responses to each question. Scales were on a four-point scale from 1=Definitely, 2=Probably, 3=Probably not, and 4=Definitely not.

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).

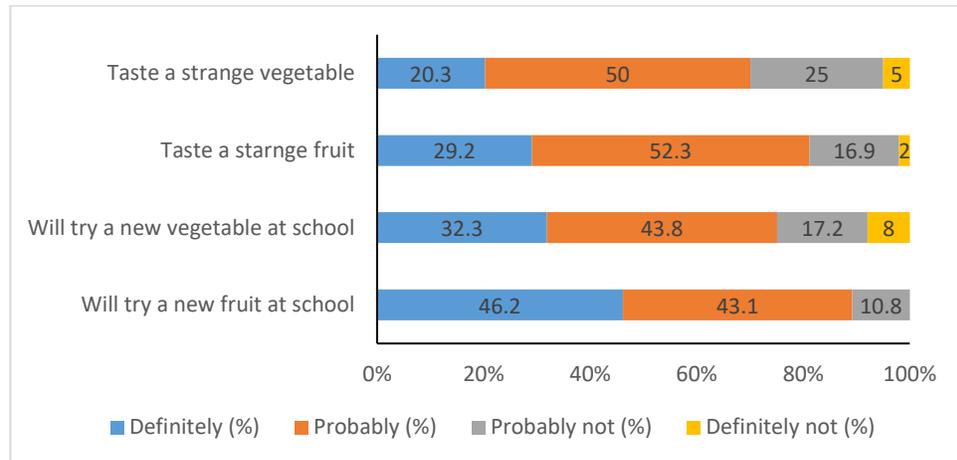


Fig 4. 9 Children self-reported their attitude toward new FV intake (b). Values in the chart are the percentage of responses to each question. Scales were on a four-point scale from 1=Definitely, 2=Probably, 3=Probably not, and 4=Definitely not.

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.

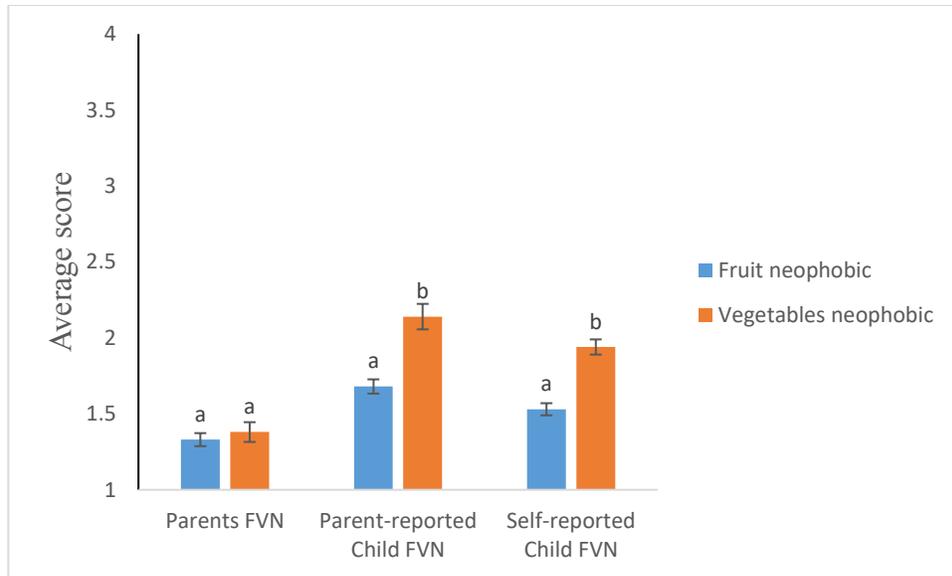


Fig 4. 10 Fruit and vegetable neophobia scores among participants (mean \pm SE). Letters indicate the differences between Fruit and Vegetable Neophobia (FVN) within each group ($p < 0.05$). Higher scores indicate greater neophobia behavior. Scales were on a four-point scale.

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.

Variable	Variable	Pearson Correlation
Parent FrN	Parent VN	0.8**
Parent-reported CFrN	Parent-reported CVN	0.4*
Child self-reported CFrN	Child self-reported VN	0.6**

* $p < 0.05$, ** $p < 0.01$

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. 10 1 The relationship between measures of food neophobia with fruit and vegetable neophobia scores using Pearson correlation.

FVN	FN
	Parent FN
Parent FrN	0.52**
Parent VN	0.56**
	Parent-reported CFN
Parent-reported CFrN	0.61**
Parent-reported CVN	0.60**
	Child self-reported FN
Child self-reported FrN	0.48**
Child self-reported VN	0.32*

* $p < 0.05$, ** $p < 0.01$

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.

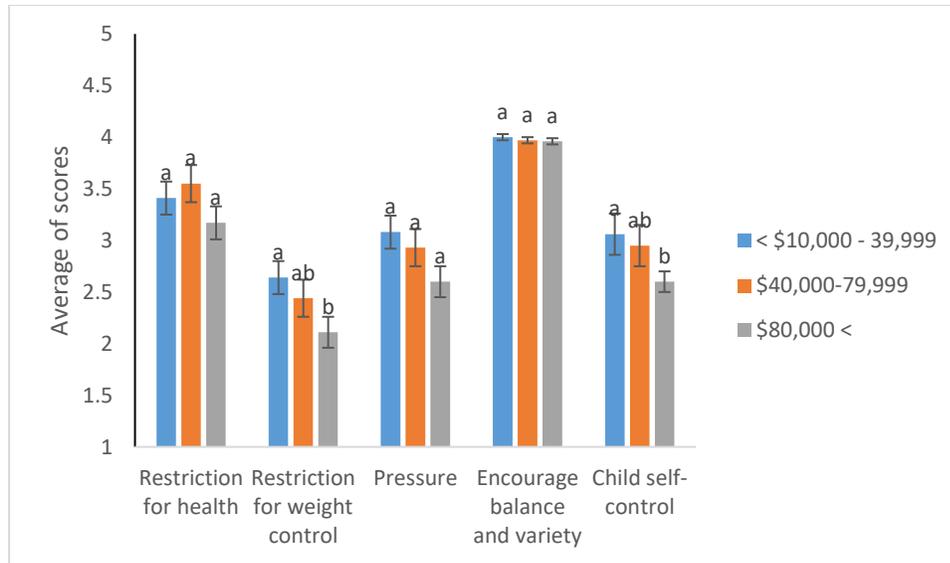


Fig 4. 11 Association between parental income levels with their feeding practices (mean \pm SE).

Letters indicate the differences between parental income levels 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.

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.

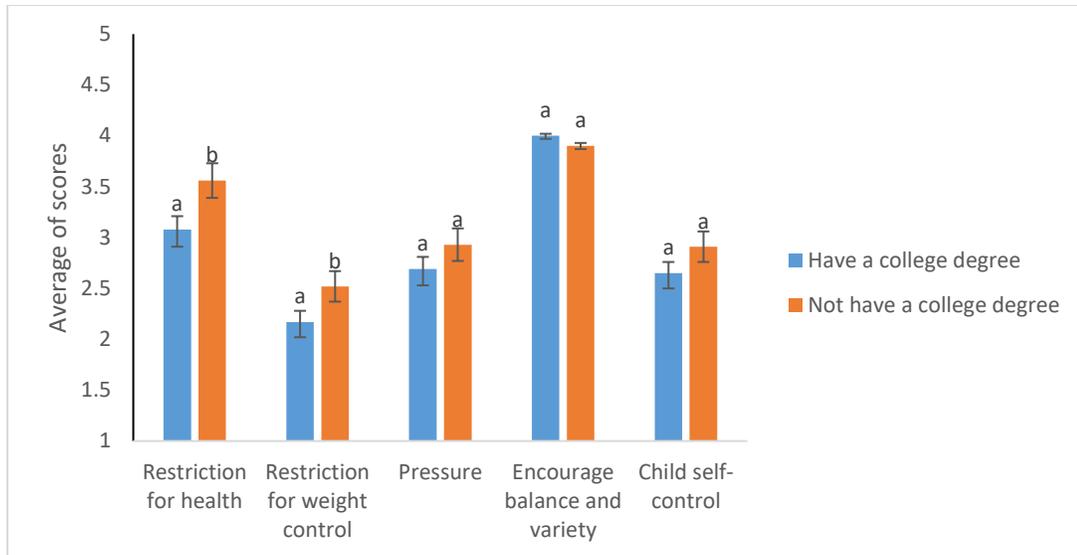


Fig 4. 12 Association between educational levels of parents with their feeding practices (mean \pm SE).

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.

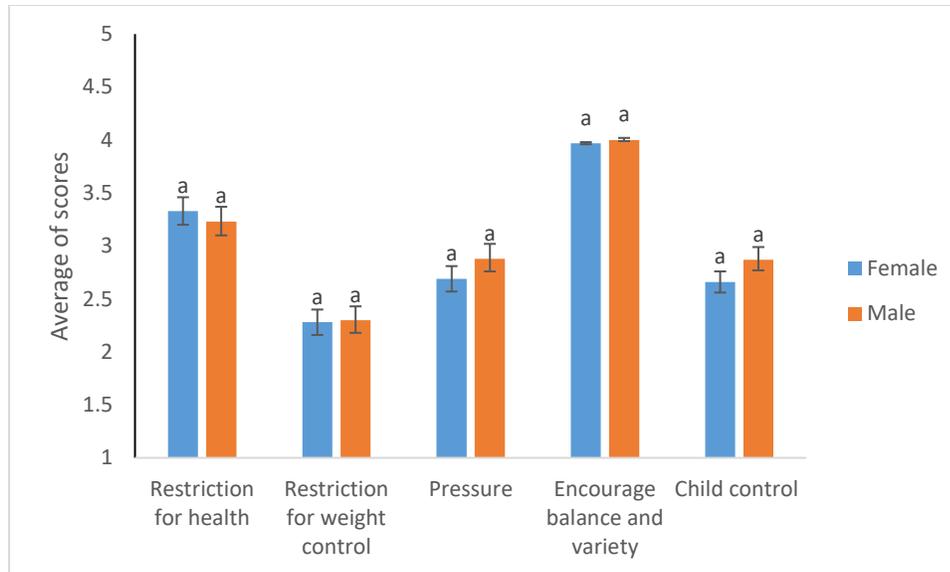


Fig 4. 13 Association between the gender of children with parental feeding practices (mean \pm SE).

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.

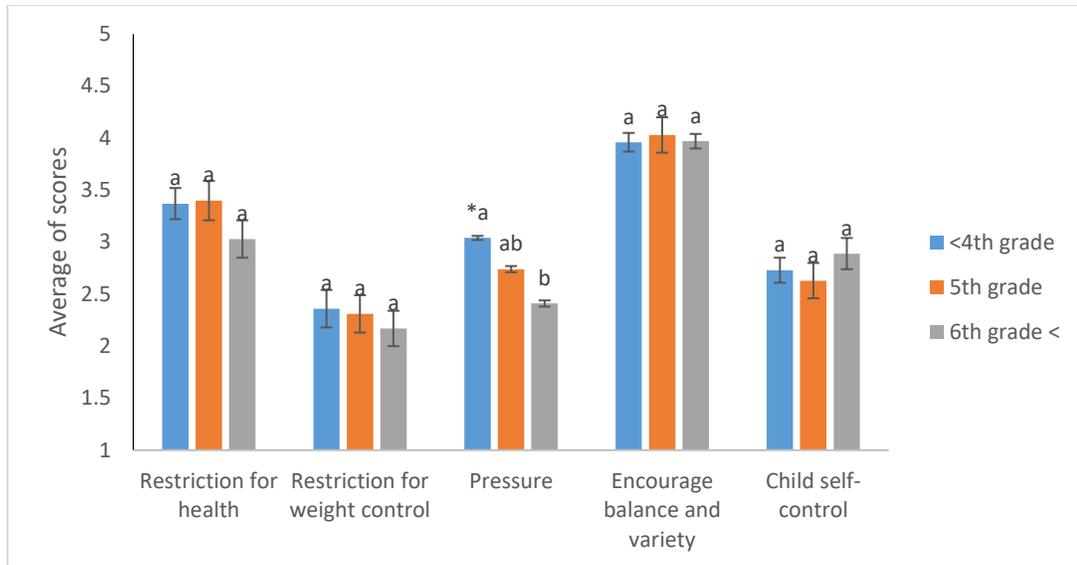


Fig 4. 14 Association between students' grade with parental feeding practices (mean \pm SE).

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).

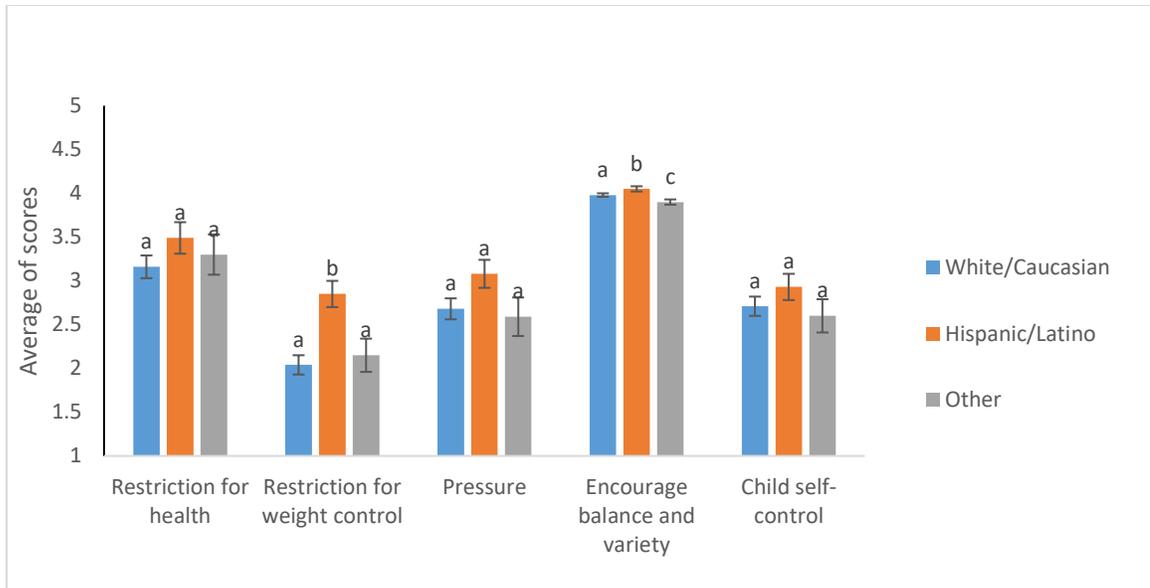


Fig 4. 15 Association between ethnicity with parental feeding practices (mean \pm SE). Letters indicate the differences between ethnicity within each parental feeding practice using Student's t test. Sample size ranged from 71 to 73. Scales were from 1=Never to 5=Always and/or 1=Disagree to 5=Agree. 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).

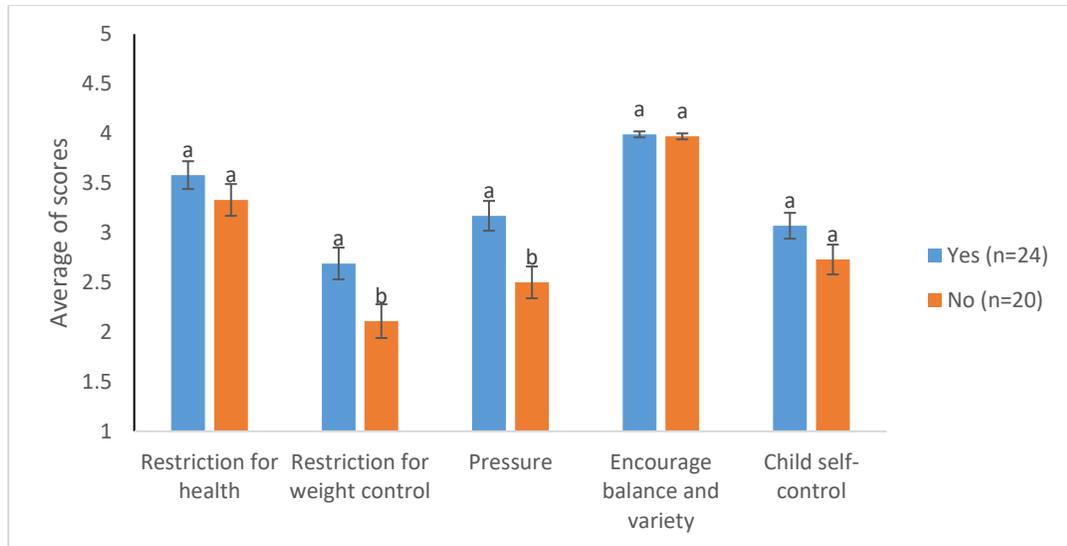


Fig 4. 16 Association between eligibility of students for free/reduced price school lunch programs with their parental feeding practices (mean \pm SE). Letters indicate the differences between ethnicity within each parental feeding practice using Student's t test. Sample size ranged from 40 to 44. Scales 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.

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).

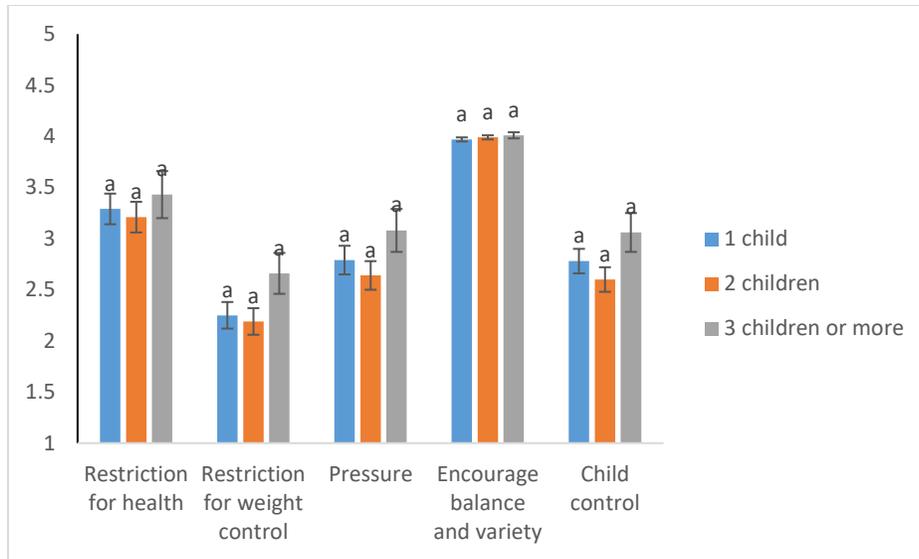


Fig 4. 17 Association between number of sibling (ages 7-12 years) with parental feeding practices (mean \pm SE).

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. 11 Correlations between parental feeding practices and participants’ neophobia scores.

	Controlling			Autonomy promoting	Unstructured practices
	Restriction for health	Restriction for weight control	Pressure	Encourage balance	Child self-control
Parent					
FN	0.02	0.09	-0.16	-0.10	0.18
FrN	0.08	0.2	0.04	-0.01	0.02
VN	0.19	0.29**	0.03	0.03	0.19
Child (parent-reported)					
FN	0.25*	0.11	0.28*	-0.14	0.06
FrN	0.15	0.15	0.48**	-0.08	0.27*
VN	0.27*	0.17	0.33**	-0.24	0.06
Child (self-reported)					
FN	0.20	0.13	0.28*	-0.09	0.10
FrN	0.02	0.06	0.03	-0.20	0.01
VN	0.01	0.11	0.1	-0.15	0.00

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 ± 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 6th grade compared to those on 4th 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. These 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

1. Addessi, E., Galloway, A. T., Visalberghi, E., & Birch, L. L. (2005). Specific social influences on the acceptance of novel foods in 2-5-year-old children. *Appetite*, 45(3), 264-71.
2. Attorp, A., Scott, J. E., Yew, A. C., & Rhodes, R. E. (2014). Associations between socioeconomic, parental and home environment factors and fruit and vegetable consumption of children in grades five and six in British Columbia, Canada. *Public Health*, 14, 150.
3. Benton, D. (2004). Role of parents in the determination of the food preferences of children and the development of obesity. *International Journal of Obesity*, 28, 858-869.
4. Birch, L. L., McPhee, L., Shoba, B. C., Pirok, E., & Steinberg, L. (1987). What kind of exposure reduces children's food neophobia?: Looking vs. tasting. *Appetite*, 9(3), 171-178.
5. Birch, L. L., & Fisher, J. O. (1998). Development of eating behaviors among children and adolescents. *Pediatrics*, 101(3 Pt 2), 539-49.
6. Borgers, N., & Hox, J. J. (2000). Reliability of responses in questionnaire research with children plus coding scheme: A technical report, 5th International conference on logic and methodology.
7. Brown, K. A., Ogden, J., Vögele, C., & Gibson, E. L. (2008). The role of parental control practices in explaining children's diet and BMI. *Appetite*, 50(2-3), 252–259.
8. California Department of Education, Education Data partnership. <http://www.ed-data.org/>.
9. California Fresh Fruit and Vegetable Program (FFVP). (2010). <https://www.cde.ca.gov/ls/nu/sn/caffvpguidelines.asp>.

10. California Health Interview Survey (2015-2016). UCLA Center for Health Policy Research. <http://healthpolicy.ucla.edu/chis/Pages/default.aspx>.
11. California State Auditor Report. (2006). Compliance with Translation Requirements is High for Spanish but Significantly Lower for Some Other Languages. Report number 2005-137 (<https://www.bsa.ca.gov/pdfs/sr2007/2005-137.pdf>).
12. Campbell, K., Andrianopoulos N, Hesketh K, Ball K, Crawford D, Brennan L, Corsini N. (2010). Parental use of restrictive feeding practices and child BMI z-score. A 3-year prospective cohort study. *Appetite*. 55(1), 84-88.
13. Capiola, A., & Raudenbush, B. (2012). The effects of food neophobia and food neophilia on diet and metabolic processing. *Food and Nutrition Sciences*, 3(10), 1397.
14. Cardel, M., Willig, A. L., Dulin-Keita, A., Casazza, K., Beasley, T. M., Fernández, J. R. (2012). Parental feeding practices and socioeconomic status are associated with child adiposity in a multi-ethnic sample of children. *Appetite*, 58, 347–353.
15. Carnell, S., & Wardle, J. (2007). Associations between Multiple Measures of Parental Feeding and Children’s Adiposity in United Kingdom Preschoolers. *Obesity (Silver Spring)*, 15(1), 137-144.
16. Chu, Y. L., Farmer, A., Fung, C., Kuhle, S., & Veugelers, P. (2013). Fruit and vegetable preferences and intake among children in Alberta. *Canadian Journal of Dietetic Practice and Research*, 74, 21–27.
17. Cooke, L. J., Carnell, S., & Wardle, J. (2003). Relationship between parental report of food neophobia and everyday food consumption in 2–6-year-old children. *Appetite*, 41, 205–206.
18. Cooke, L. J., Wardle, J., Gibson, E. L., Sapochnik, M., Sheiham, A., & Lawson, M. (2004). Demographic, familial and trait predictors of fruit and vegetable consumption by pre-school children. *Public Health Nutrition*, 7(2), 295–302.

19. Cooke, L. J., & Wardle, J. (2005). Age and gender differences in children's food preferences. *The British Journal of Nutrition*, *93*(5), 741-746.
20. Cooke, L. J., Carnell, S., & Wardle, J. (2005). Food neophobia and mealtime food consumption in 4–5-year-old children. *International Journal of Behavioral Nutrition and Physical Activity*, *3*:14.
21. Coulthard, H., & Blissett, J. F. (2009). Fruit and vegetable consumption in children and their mothers. Moderating effects of child sensory sensitivity. *Appetite*, *52*, 410–415.
22. Damsbo-Svendsen, M., Frøst, M. B., & Olsen, A. (2017). A review of instruments developed to measure food neophobia. *Appetite*, *113*, 358-367.
23. Daniel, C. (2016). Economic constraints on taste formation and the true cost of healthy eating. *Social Science & Medicine*, *148*, 34-41.
24. Darmon, N., & Drewnowski, A. (2008). Does social class predict diet quality? *The American journal of clinical nutrition*, *87*(5), 1107–1117.
25. Dave, J. M., Evans, A. E., Saunders, R. P., Watkins, K. W., & Pfeiffer, K. A. (2009). Associations among food insecurity, acculturation, demographic factors, and fruit and vegetable intake at home in Hispanic children. *Journal of the American Dietetic Association*, *109*(4), 697-701.
26. Dovey, T. M., Staples, P. A., Gibson, E. L., & Halford, J. C. G. (2008). Food neophobia and “picky/fussy” eating in children: A review. *Appetite*, *50*(2–3), 181–193.
27. Eaton, D. K., Kann, L., Kinchen, S., & Wechsler, H. (2012). Youth Risk Behavior Surveillance – United States, 2011. *Morbidity & Mortality Weekly Report*, *61*(4), 1-162.
28. El Dine, A. N., & Olabi, A. (2009). Effect of reference foods in repeated acceptability tests: testing familiar and novel foods using 2 acceptability scales. *Journal of Food Science*, *74*(2), 97-106.
29. Ellis, J. M., Galloway, A. T., Webb, R. M., Martz, D. M., & Farrow, C. V. (2016). Recollections of pressure to eat during childhood, but not picky eating, predict young adult eating behavior. *Appetite*, *97*, 58–63.
30. Elkins, A., & Zickgraf, H. F. (2018). Picky eating and food neophobia: Resemblance and agreement in parent/young adult dyads. *Appetite*, *126*, 36-42.

31. Faith, M. S. Scanlon, K. S. Birch, L. L., and Francis, L. A. (2004). Parent-Child Feeding Strategies and Their Relationships to Child Eating and Weight Status. *Obesity Research, 12*(11), 1711-1722.
32. Falciglia, G. A., Couch, S. C., Gribble, L. S., Pabst, S. M., & Frank, R. (2000). Food neophobia in childhood affects dietary variety. *Journal of the American Dietetic Association, 100*(12), 1474-1481.
33. Falciglia, G. A., Pabst, S., Couch, S., & Goody, C. (2004). Impact of parental food choices on child food neophobia. *Children's Health Care, 33*, 217-225.
34. Fernandez-Ruiz, V., Claret, A., & Chaya, C. (2013). Testing a Spanish-version of the Food Neophobia Scale. *Food Quality and Preference, 28*, 222-225.
35. Fisher, J., & Birch, L. (2000). Parents' restrictive feeding practices are associated with young girls' negative self-evaluation of eating. *Journal of the American Dietetic Association, 100*(11), 1341-1346.
36. Fisher, J., Mitchell, D., Smiciklas-Wright, H., & Birch, L. (2002). Parental influences on young girls' fruit and vegetable, micronutrient, and fat intakes. *Journal of the American Dietetic Association, 102*, 58-64.
37. Fisher, J. O., Mitchell, D. C., Smiciklas-Wright, H., Mannino, M. L., & Birch, L. L. (2004). Meeting calcium recommendations during middle childhood reflects mother-daughter beverage choices and predicts bone mineral status. *The American Journal of Clinical Nutrition, 79*(4), 698-706.
38. Flight, I., Leppard, P., & Cox, D. V. (2003). Food neophobia and associations with cultural diversity and socio-economic status amongst rural and urban Australian adolescents. *Appetite, 41*, 51-59.
39. Forrest, C. B., & Riley, A. W. (2004). Childhood origins of adult health: a basis for life-course health policy. *Health Affairs (Millwood), 23*(5), 155-164.
40. Frank, R. A., & Vander Klaauw, N. J. (1994). The contribution of chemosensory factors to individual differences in reported food preferences. *Appetite, 22*(2), 101-23.
41. Frank, R. A., Reilley, S. P., Schroth, F. E., Werk, C. D., & Wehner, B. (1997). Food neophobia reflects novelty seeking, not sensation seeking, or anxiety. Paper presented at the Annual Meeting of the Society for Ingestive Behavior, Baltimore, MD.
42. Galloway, A. T., Lee, Y., & Birch, L. L. (2003). Predictors and consequences of food neophobia and pickiness in young girls. *Journal American Diet Association, 103*, 692-698.

43. Galloway, A. T., Fiorito, L., Lee, Y., & Birch, L. L. (2005). Parental pressure, dietary patterns, and weight status among girls who were “picky eaters”. *Journal of American Diet Association, 105*, 541-548.
44. Galloway, A. T., Fiorito, L. M., Francis, L. A., & Birch, L. L. (2006). “Finish your soup”: counterproductive effects of pressuring children to eat on intake and affect. *Appetite, 46*(3), 820, 318-323.
45. George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference. 11.0 update (4th ed.)*. Boston: Allyn & Bacon
46. Gramm, M., Harpel, T., McDaniel, B., Schumacher, J., and Vollmer, R. L. (2017). Technology at Mealtimes: Exploring the Relationship Between Food Parenting Practices, Parental Technology Distraction and Child Food Neophobia. *Federation of American Societies for Experimental Biology, 31*, No.1_supplement.
47. Grolnick WS, Pomerantz EM. Issues and challenges in studying parental control: Toward a new conceptualization. *Child Development Perspectives. 2009;3*(3):165–170.
48. Gubbels, J. S., Kremers, S. P., Stafleu, A., Dagnelie, P. C., Goldbohmd, R. A., de Vries, N. K., & Thijs, C. (2009). Diet-related restrictive parenting practices. Impact on dietary intake of 2- year-old children and interactions with child characteristics. *Appetite, 52*(2), 423-429.
49. Guenther, P. M., Dodd, K. W., Reedy, J., & Smith, S. M. (2006). Most Americans eat much less than recommended amounts of fruits and vegetables. *Journal of American Diet Association, 106*(9), 1371-1379.
50. Guzek, D., Glabska, D., Lange, E., & Jezewska-Zychowicz, M. (2017). A Polish Study on the Influence of Food Neophobia in Children (10–12 Years Old) on the Intake of Vegetables and Fruits. *Nutrients, 9*, 563.
51. Harrington, A. (2016). Fruit and Vegetable Intake, Attitudes, and Beliefs of Multicultural Middle School Students in Central Massachusetts. Master’s thesis, University of Massachusetts Amherst.
52. Healthy People 2010. Understanding and Improving Health. 2nd ed US Department of Health and Human Services; US Government Printing Office; Washington, DC: 2000.
53. Hennessy, E., Hughes, S. O., Goldberg, J. P., & Hyatt, R. R. (2012). Associated with an Increase in Intake of Low- Nutrient-Dense Foods among American Children Living in Rural Communities. *Journal of the Academy of Nutrition and Dietetics, 112*, 142-148.

54. Hollar, D., Paxton-Aiken, A., & Fleming, P. (2013). Exploratory validation of the Fruit and Vegetable Neophobia Instrument among third- to fifth-grade students. *Appetite, 60*, 226–230.
55. Houston-Price, C., Butler, L., & Shiba, P. (2009). Visual exposure impacts on toddlers' willingness to taste fruits and vegetables. *Appetite, 53*(3), 450-453.
56. Howard, A. J., Mallan, K. M., Byrne, R., Magarey, A., & Dani, L. A. (2012). Toddlers' food preferences. The impact of novel food exposure, maternal preferences and food neophobia. *Appetite, 59*, 818–825.
57. Hupkens, C. L., Knibbe, R. A., Van Otterloo, A. H., & Drop, M. J. (1998). Class differences in the food rules mothers impose on their children: a cross-national study. *Social Science & Medicine, 47*(9), 1331–1339.
58. Hursti, U. K., & Sjöden, P. (1997). Food and general neophobia and their relationship with self-reported food choice: familial resemblance in Swedish families with children of ages 7-17 years. *Appetite, 29*(1), 89-103.
59. Irala-Estevez, J. D., Groth, M., Johansson, L., Oltersdorf, U., Prattala, R., & Martinez-Gonzalez, M. A. (2000). A systematic review of socio-economic differences in food habits in Europe: consumption of fruit and vegetables. *European Journal of Clinical Nutrition, 54*(9), 706-714.
60. Jansen, E., Mulken, S., & Jansen, A. (2010). How to promote fruit consumption in children. Visual appeal versus restriction. *Appetite, 54*(3), 599-602.
61. Kaar, J. L., Shapiro, A. L. B., Fell, D. M., & Johnson, S. L. (2016). Parental feeding practices, food neophobia, and child food preferences: What combination of factors results in children eating a variety of foods?. *Food Quality and Preference, 50*, 57-64.
62. Kelder, S. H., Perry, C. L., Klepp, K. I. & Lytle, L. L. (1994). Longitudinal tracking of adolescent smoking, physical activity and food choice behaviors. *American Journal of Public Health, 84*, 1121–1126.
63. Kröller K., & Warschburger, P. (2008). Associations between maternal feeding style and food intake of children with a higher risk for overweight. *Appetite, 51*(1), 166-72.
64. Lafraire, J., Rioux, C., Giboreau, A., & Picard, D. (2016). Food rejections in children: Cognitive and social/environmental factors involved in food neophobia and picky/fussy eating behavior. *Appetite, 1*(96), 347-357.

65. Laureati, M., Bergamaschi, V., & Pagliarini, E. (2014). School-based intervention with children. Peer-modeling, reward and repeated exposure reduce food neophobia and increase liking of fruits and vegetables. *Appetite*, *83*, 26-32.
66. Loewen, p., & Pliner., P. (1999). Effects of Prior Exposure to Palatable and Unpalatable Novel Foods on Children's Willingness to Taste Other Novel Foods. *Appetite*, *32*, 3.
67. Maier-Noth, A., Schaal, B., Leathwood, P., & Issanchou, S. (2016). The lasting influences of early food-related variety experience: a longitudinal study of vegetable acceptance from 5 months to 6 years in two populations. *Plos One*, *11*(3), 151-356.
68. Mata, J., Scheibehenne, B., & Todd, P. M. (2008). Predicting children's meal preferences: How much do parents know? *Appetite*, *50*, 367-375.
69. Meiselman, H. L., King, S. C., & Gillette, M. (2010). The demographics of neophobia in a large commercial US sample. *Food Quality and Preference*, *21*(7), 893-897.
70. Melbye, E. L., Øverby, N. C., & Øgaard, T. (2012). Child consumption of fruit and vegetables: the roles of child cognitions and parental feeding practices. *Public Health Nutrition*: *15*(6), 1047-1055.
71. Mennella, J. A., Jagnow, C. P., & Beauchamp, G. K. (2001). Prenatal and postnatal flavor learning by human infants. *Pediatrics*, *107*, E88.
72. Moding, K. J., & Stifter, C. A. (2016). Stability of food neophobia from infancy through early childhood. *Appetite*, *97*, 72-78.
73. Montgomery, C., Jackson, D. M., Kelly, L. A., & Reilly, J. J. (2006). Parental feeding style, energy intake and weight status in young Scottish children. *British Journal of Nutrition*, *96*(6), 1149-1153.
74. Musher-Eizenman, D. R., & Holub, S. C. (2007). Comprehensive Feeding Practices Questionnaire: validation of a new measure of parental feeding practices. *Journal of Pediatric Psychology*, *32*, 960-972.
75. Nicklaus, S., Boggio, V., Chabanet, C., & Issanchou, S. (2005). A prospective study of food variety seeking in childhood, adolescence and early adult life. *Appetite*, *44*(3), 289-297.
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

vegetable intake among ethnically diverse, low-income children. *Journal of School Health*, 80(10), 487-492.

77. Olabi, A., Najm, N. E O., Baghdadi, O. K., & Morton, J. M. (2009). Food neophobia levels of Lebanese and American college students. *Food Quality and Preference*, 20, 353-362.
78. Orrell-Valentea, J. K., Hillb, L. G., Brechwaldc, W. A., & Dodged, K. A. (2007). “Just three more bites’’: An observational analysis of parents’ socialization of children’s eating at mealtime. *Appetite*, 48, 37–45.
79. Pechey, R., Monsivais, P., Ng, Y. L., & Marteau, T. M. (2015). Why don’t poor men eat fruit? Socioeconomic differences in motivations for fruit consumption. *Appetite*, 84, 271–279.
80. Perry, R. A., Mallan, K. M., Koo, J., Mauch, C. E., & Daniels, L. A. (2015). Food neophobia and its association with diet quality and weight in children aged 24 months: a cross sectional study. *International Journal of Behavioral Nutrition and Physical Activity*, 12, 13.
81. Pliner, P. (1994). Development of measures of food neophobia in children. *Appetite*, 23(2), 147-163.
82. Pliner, P., & Hobden., K. (1992). Development of a scale to measure the trait of food neophobia in humans. *Appetite*, 19(2), 105-120.
83. Pliner, P., & Loewen, E. R. (1997). Temperament and food neophobia in children and their mothers. *Appetite*, 28, 239–254.
84. Pliner, P., & Loewen, E. R. (2002). The effects of manipulated arousal on children’s willingness to taste novel foods. *Physiology & Behavior*, 76, 551–558.
85. Pulley, C, Galloway, A. T., Webb, R. M., & Payne, L. O. (2014). Parental child feeding practices: how do perceptions of mother, father, sibling, and self vary?. *Appetite*, 80, 96-102.
86. Ritchey, P. N., Frank, R. A., Hursti, U. K., & Tuorila, H. (2003). Validation and cross-national comparison of the food neophobia scale (FNS) using confirmatory factor analysis. *Appetite*, 40(2), 163-173.
87. Rogers, R., Eagle, T. F., Sheetz, A., Woodward, A., & Leibowitz, R. (2015). The Relationship between Childhood Obesity, Low Socioeconomic Status, and Race/Ethnicity: Lessons from Massachusetts. *Childhood Obesity*, 11(6), 691–695.

88. Rubio, B., Rigal, N., Boireau-Ducept, N., Mallet, P., & Meyer, T. (2008). Measuring willingness to try new foods: A self-report questionnaire for French-speaking children. *Appetite, 50*(2-3), 408-414.
89. Russell, C. G., & Worsley, A. (2008). A population-based study of preschoolers' food neophobia and its associations with food preferences. *Journal of Nutrition Education and Behavior, 40*(1), 11-19.
90. San Luis Obispo, CA/Data USA. (2017). <https://datausa.io/profile/geo/san-luis-obispo-ca/>.
91. Shim, J. E., Kim, J., & Lee, Y. (2016). Fruit and Vegetable Intakes of Preschool Children Are Associated With Feeding Practices Facilitating Internalization of Extrinsic Motivation. *Journal of Nutrition Education and Behavior, 48*(5), 311-317.
92. Shloim, N., Edelson, L. R., Martin, N., and Hetherington, M. M. (2015). Parenting styles, feeding styles, feeding practices, and weight status in 4–12-year-old children: A Systematic Review of the Literature. *Frontiers in Psychology, 6*, 1849.
93. Siegrist, M., Hartmann, C., & Keller, C. (2013). Antecedents of food neophobia and its association with eating behavior and food choices. *Food Quality and Preference, 30*(2), 293-298.
94. Spruijt-Metz, D., Li, C., Cohen, E., Birch, L., & Goran, M. (2006). Longitudinal influence of mother's child-feeding practices on adiposity in children. *Journal of Pediatrics, 148*(3), 314-320.
95. Spruijt-Metz, D., Lindquist, C. H., Birch, L. L., Fisher, J. O., & Goran, M. I. (2002). Relation between mothers' child-feeding practices and children's adiposity. *The American Journal of Clinical Nutrition, 75*, 581-586.
96. Sud, S., Tamayo, N. C., Faith, M. S., & Keller, K. L. (2010). Increased restrictive feeding practices are associated with reduced energy density in 4-6-year-old, multi-ethnic children at ad libitum laboratory test-meals. *Appetite, 55*(2), 201-207.
97. Sullivan, S. A., & Birch, L. L. (1994). Infant dietary experience and acceptance of solid foods. *Pediatrics, 93*(2), 271-277.
98. Tan, C. C., & Holub, S. C. (2012). Maternal feeding practices associated with food neophobia. *Appetite, 59*, 483–487.

99. Tuorila, H., Lähteenmäki, L., Pohjalainen, L., & Lotti, L. (2001). Food neophobia among the Finns and related responses to familiar and unfamiliar foods. *Food Quality and Preference, 12*, 29-37.
100. USDA Fresh Fruit and Vegetable Program (FFVP). (2010). Handbook for Schools.
101. Van Strien, T., Van Niekerk, R., & Ouwens, M.A. (2009). Perceived parental food controlling practices are related to obesogenic or leptogenic child lifestyle behaviors. *Appetite, 53*(1), 151-154.
102. Vaughn, A. E., Ward, D. S., & Fisher, J. o. (2016). Fundamental constructs in food parenting practices: a content map to guide future research. *Nutrition Reviews, 74*, (2), 98–117.
103. Vereecken CA, Keukelier E, Maes L (2004). Influence of mother’s educational level on food parenting practices and food habits of young children. *Appetite 43*, 93–103.
104. Wardle, J., Cooke, L. J., Gibson, E. L., Sapochnik, M., Sheiham, A., Lawson M. (2003). Increasing children’s acceptance of vegetables; a randomized trial of parent-led exposure. *Appetite, 40*, 155–162.
105. Wardle, J., Carnell, S., & Cook, L. (2005). Parental control over feeding and children’s fruit and vegetable intake: How are they related? *Journal of American Diet Association, 105*, 227-232.
106. Warkentin, S., Mais, L. A., Latorre, M., Carnell, S., & Taddei, J. (2018). Parents Matter: Associations of Parental BMI and Feeding Behaviors With Child BMI in Brazilian Preschool and School-Aged Children. *Frontiers in Nutrition, 10*(5), 69.
107. Webber, L., Cooke, L., Hill, C., & Wardle, J. (2010). Associations between children’s appetitive traits and maternal feeding practices. *Journal of the American Dietetic Association, 110*(11), 1718-1722.
108. Wehrly, S. E., Bonilla, C., Perez, M., and Liew, J. (2014). Controlling Parental Feeding Practices and Child Body Composition in Ethnically and Economically Diverse Preschool Children. *Appetite, 73*, 163–171.
109. WHO. (2005). Tohill BC. Dietary intake of fruit and vegetables and management of body weight. Geneva: World Health Organization.
<http://www.who.int/iris/handle/10665/43145>.
110. Yamborisut, U., Visetchart, P., Thasanasuwan, W., & Srichan W. (2018). Parental feeding practice is associated with child’s body mass index in Thai school-aged children. *Journal of Health Research, 32*(1), 82-94.

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 then 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?

- Hawthorne Elementary School
 - Bishop's Peak Elementary School
 - Other (please specify)
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

14. My CHILD trusts new foods.

- 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:

Name:

Phone number:

Email:

Family code:

Other:

A3: Spanish Parents' survey #1

FORMA DE AUTORIZACION PARA PARTICIPAR EN UN ESTUDIO DE
INVESTIGACION

Un proyecto de investigacion esta siendo llevado a cabo por la estudiante de postgrado Farnoosh Ayoughi, bajo la supervision 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 disposición 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 protegida 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 respect 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 a el número (805) 756-2754 o a el 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 electrónico 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 demográfica

3. ¿Cuántos 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. ¿Cuál 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?
- Si
 - No
 - No se
8. ¿Es su hijo/a legible para recibir almuerzo gratis o de bajo costo por medio del programa escolar?
- Si
 - No
 - No se
9. ¿Cual 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. ¿Cual es su parentezco con el estudiante?
- Padre- Madre o Padre
 - Abuelo o Abuela
 - Tutor legal
11. ¿En el 2017, cual fué 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. ¿Como se identifica? (puede escojer uno o más si es necesario)
- Nativo Americano
 - Asiático

- Afro- Americano
- Hispano o Latino
- Isleño Pacifico
- Blanco o Caucásico
- Prefiero no contestar
- Otro (por favor especifique)

Favor de escoger 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

- Probablemente
- Probablemente no
- Definitivamente no

24. ¿Que 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. ¿Que 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 constratamente.
- 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 extraña 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 REUNION, 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 alimentacion 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 sirvió, 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 she 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 hjo/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

- En desacuerdo
 - Totalmente 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

- En desacuerdo
- Totalmente en desacuerdo

59. Usted anima a su hijo a comer comidas saludable 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 participacion en la encuesta. Si le gustaría recibir la tarjeta de regalo de \$25 dolares 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 electronico para que nosotros nos comuniquemos con usted y darle la tarjeta.

Su 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:

Nombre:

Numero de telefono:

Correo electronico:

El código de familia

Otro:

Appendix B: Comparison of demographics

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

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

All values indicate the percentage of population.