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Evaluating Maternal Eating Competence in Relation to Maternal and Child Fruit and Vegetable Intake

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Abstract

Introduction: Nutritional intake is often controlled and rationalized through an individual's status of eating competence (EC). EC is defined as allowing oneself to be comfortable, flexible, and positive with eating while respecting personal desires and enjoying nourishing food. EC is divided into 4 sub categories: eating attitudes, food regulation, food acceptance and contextual skills. Competent eaters are more likely to consume more essential vitamins and minerals for functional health, compared to those whose were not competent eaters. Researchers have examined the role mothers play on influencing children's eating pattern development and have found that modeling is thought to be a significant predictor of children's dietary intake, especially fruit and vegetable (F/V) consumption. The aim of this study was to examine possible relationships between maternal eating competence and its potential role on maternal and child F/V intake.

Methods: This is a cross-sectional study of mothers (n=68) recruited from preschools in Central New York and Central North Carolina. Maternal and child dietary data (maternal report for both) were collected using two online F/V screeners (2-Item and 16-Item). Maternal eating competence scores were assessed using Satter's Eating Competence Survey, ecSI 2.0. Income categories were calculated using guidelines determined by the Department of Health and Human Services (HHS). Federal poverty level (FPL) was computed based on the number of people in the household compared to annual income reported to determine whether a participant fell below or above the 2018 FPL. Comparisons were made between a mother's total eating competence score and the F/V intakes for both her and her child. The relationship between a mother's F/V intake and a child's F/V intake was also examined.

Results: Forty-five percent of mothers were considered to be eating competent with an average eating competency score of 31 ± 7.8 (eating competence = ≥ 32). As a whole, this population exhibited high aptitude in eating competence categories. Mothers' eating competence scores positively correlated with the number of cups of F/V children consumed ($p<0.05$). A mother's eating competence was significantly and positively associated with a child's total fruit intake (cups/day), salad intake (cups/day), and consumption of other vegetables (cups/day). Mothers' eating competence was also significantly and positively associated with the cups/day of vegetables she consumed ($p<0.05$), but not the number of cups/day of fruit and fruit juice consumed. No statistically significant differences were found in total fruit or vegetable intake of children with EC mothers compared to those with non-EC mothers.

Conclusions: There are significant associations between maternal and child fruit and vegetable intake in relation to maternal eating competence. Increased maternal eating competence plays a positive role in increased intake of F/V of preschool aged children. Eating competence supported increased vegetable intake in mothers based on current dietary recommendations (2.5-3 cups/d) but did not predict adequate intake. Less than half of the participants were found to be EC, creating an area of potential improvement. The relationship between maternal EC and child diet quality needs continued exploration as the current study provides initial evidence to expand upon this in future research.

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1. Literature Review

A. Introduction

Childhood obesity is a threat to the growth and development of today's youth. As such, there are many aspects of this ongoing trend that should be examined in detail. One factor often related to child dietary quality is maternal influence. The ways in which a mother's influence contributes to the formation of lifelong eating behaviors may affect the development of a child's eating competence. Eating competence (EC) is defined as the ability to allow oneself to be comfortable, flexible, and positive with eating while respecting personal desires and enjoying nourishing food (Satter 2007). This literature review explores our current understanding of the link between measures of maternal eating competence (EC) and the quality of diets being consumed by their children.

Ellyn Satter and colleagues have divided the concept of eating competence into four constructs, describing the idea in terms of eating attitudes, food acceptance, internal regulation of food intake, and eating context (Satter 2007, Lohse et al. 2012). Through this unconventional approach these categories are often used to define a state of aptitude by assessing a person on emotional integrity and the level of comfort a person has when engaging in eating behaviors. Nutritional intake is often controlled and rationalized through each individual's status of eating competence, which can affect not only quantity but quality of diet. Competent eaters are more likely to consume considerably more essential vitamins, such as vitamin C, A, B6, thiamin, niacin and folate, but also essential minerals for functional health, compared to those who are not competent eaters (Lohse et al. 2012). Children constantly observe their mothers. Maternal attitudes toward food are not only transferable through behavioral trends but also through diet quality, as mothers are generally the procurers, planners, and preparers of meals eaten in the home (Lohse et al. 2012). Maternal eating competence can be used as an effective eating management tool that allows for intra-individual approaches to eating, as well as transforms a child's attitude and behavior as related to food. Mothers can encourage positive bio-psychosocial outcomes in relation to more nutrient dense diet qualities through mother child interactions (Lohse et al. 2012).

B. Eating Competence

a. Eating Attitudes

Within the concept of eating competence, eating attitude is one of the largest contributors to attaining the status of a competent eater. According to the ecSatter model, having a positive outlook when eating leads to further significant ties to consuming foods. This consists of being excited about eating but also being more confident. Furthermore, one is more relaxed and able to accommodate unforeseen events in relation to eating without becoming distraught or agitated (Satter 2007). Eating attitudes come from an internal relationship with oneself in order to support one's own nutritional health and well-being.

i. <u>Internal Regulators of Eating Attitudes</u>

In connection to the external world, attaining self-trust in the ability to appropriately acquire the proper amount of food while simultaneously listening to the wants and needs of the individual is a fundamental aspect of eating competence (Satter 2007). The foundation of eating is centered around the attitudes formed early in development, which leads to the behaviors one will follow throughout life. These factors can affect an individual either positively or negatively in relation to eating (Satter 2007). More commonly referred to as mindfulness, this concept increases an individual's awareness of their 'internal experiences' while accepting their surroundings through emotional regulation (Alberts et al. 2012). These concepts are in line with the negation of creating problematic eating behaviors in both children and adults (Alberts et al. 2012).

In comparison to the aforementioned internal regulators of eating attitudes, environmental factors also contribute to the eating attitudes of an individual. Such factors consist of food availability, socioeconomic status, education level, interpretation of dietary recommendations, and psychological elements that can have immense control over an individual's thoughts or attitudes towards food (Satter 2007). A recent study evaluated the relationship between education level and diet and whether attitudes towards healthy diets mediated this relationship. Within the study researchers were able to identify that more highly educated people were significantly more likely to follow a diet that was consistent with the dietary guidelines (Le et al. 2013). Socioeconomic status has also been identified as a major component indicative of the creation of eating attitudes. This is troubling in that a 2012 Gallup Poll found that 21% of Americans are regularly concerned with having enough money to buy adequate amounts of food (Freeland-Graves and Nitzke 2013).

When faced with economic and social barriers people form their attitudes based on their surroundings. According to Nicklas et al. (2013), common perceptions that surround fruit and vegetable (F/V) consumption are less than positive (Nicklas et al. 2013). Perceptions such as preparation time, cost, skills needed, as well as taste and preference are major contributors to lack of consumption (Nicklas et al. 2013). In addition, cultural barriers and beliefs play a role in certain food items being neglected in the United States today. Consistent across the literature, specific sub-cultures such as African American, Asian, Hispanic, and American Indian are found with lower levels of adequate F/V consumption due to the items not being culturally specific in nature (Nicklas et al. 2013 and Freeland-Graves and Nitzke 2002).

According to Satter, there are four basic principles in attaining a positive eating attitude: (1) a positive interest in food and eating; (2) responsive attunement to inner and outer food experiences; (3) relaxed self-trust about managing food and eating; and (4) harmony among food desires, food choices, and amounts eaten (Satter 2007). However, in regards to the general public, negative eating attitudes have been expressed frequently in the past leading into the present day, due to lack of perceived consistency within nutrition policy (Satter 2007). This could be having negative consequences on the attitudes surrounding eating, leading to a decrease of eating competent Americans overall.

ii. Eating Attitudes: Reports

Recent surveys have been designed to gain insights into the average American's opinion of diet and the dietary advice available to them. In consideration of the Total Diet Approach implemented by the Academy of Nutrition and Dietetics, researchers have emphasized the avoidance of dichotomous thinking; such as 'good' or 'bad' food and instead focused on presenting the public with all food (Freeland-Graves and Nitzke 2013). The attitude of the American public reflects this idea. The International Food Information Council Foundation's *Food & Health Survey 2015* found that 78% of Americans would prefer to "hear what they should eat instead of what they shouldn't eat" (International 2015). When examining the latest Gallup poll (2016), there has been a slight, somewhat steady increase about the perceived healthy diets Americans believe they follow. Positively speaking, when asked "how much do you pay attention to the nutritional information listed on foods?," only 14% of Americans said they did not pay attention to nutrition facts information (Gallup 2016). This figure has increased according to the 2005-2006 National Health and Nutrition Examination Survey (NHANES) data, which showed that 61% of Americans reported using the Nutrition Facts Label when making purchasing considerations (Freeland-Graves and Nitzke 2013).

Furthermore, the Gallup Organization for the American Dietetic Association, now referred to as the Academy of Nutrition and Dietetics, surveyed Americans on the basis of how to eat a healthy diet. Overall from 1993 to 2002, there was a decrease in participants who reported being 'very confused' (5% to 3%) about being knowledgeable and capable of consuming a healthful diet. However, many participants still reported confusion on how to eat a healthy diet (Gallup 2016). This survey is helpful in identifying the attitudes that Americans have surrounding eating, but more importantly it portrays the desire most American have for eating a healthful diet. However, only 24% of Americans noted that they 'take a great deal of control over the healthfulness of their diet' according to the *Food & Health Survey 2015* (International 2015). These notions highlight the disconnect of actually attaining a healthy diet due to confusion and lack of confidence in achieving one.

According to the 2015 *PARADE magazine* survey, "What America Eats: Lunch 2015", Hartman Group researchers found that in today's accelerated food environment, snacking now is responsible for 50% of American eating (Ashton 2015). Researchers identified that current eating attitudes shifted to account for the speed of today's business, as well as social world. Americans have become distracted, losing the emotional and physical connection to eating, as it is seen as a tedious task deterring from the busy lifestyle of Americans today (Ashton 2015). There are many suggestions and recommendations found within the USDA's MyPlate, consisting of three meals a day with one or more snacks (Kant and Graubard 2015). What seems to be lacking however is the consideration of the increased rate of snacking occurring in the U.S. There has been an increasing need for coinciding recommendations on healthful snacking options within the recommendations for the general public (Kant and Graubard 2015).

This distance from past eating through mindful consideration and time is now modernized into attitudes surrounded by speed, convenience, and price. According to a study conducted in 2014, Jordan et al. (2014) found that 'mindfulness is associated with healthier snack choices' (Jordan et al. 2014). However, this idea is dependent on the subject's 'attitudinal preference', which is generally neglectful towards snacks such as fruits, and instead holds higher preferences for sweets (Jordan et al. 2014). These new attitudes are leading Americans to ignore their internal regulation system, losing the pleasure food brings when one is fully immersed in eating situations. Reported within the *Food & Health Survey 2015,* 28% of men spend less than 15 minutes per day preparing and cooking their food (International 2015). The new 'distracted eating' ideology is shown to create tendencies of overeating; further adding to the obesity concerns America is faced with today (Ashton 2015, Kant and Graubard 2015, and Jordan et al. 2014.).

As mentioned previously, Americans are showing interest in a healthy diet and lifestyle more frequently than in past decades (International 2015). However, the barriers they face in attaining helpful, factual information can bode difficult and sometimes negatively upon eating attitudes overall (Satter 2007). According to the *Food & Health Survey 2015,* 63% of Americans have at least seen the MyPlate graphic and 42% actually know how to utilize the MyPlate graphic (International 2015). This statistic leaves room for attainable access for the general public to properly use and understand the information found on the Internet today. Although the Internet has become a more user-friendly way to access everyday life information, particular research has alluded to certain difficulties faced by the general public when trying to attain accurate nutrition information (Sutherland et al. 2005). Americans generally obtain their nutritional information and guidance using television sources, the Internet, newspapers, doctors, as well as family and friends (Freeland-Graves and Nitzke 2013). In regards to attainable nutrition information, according to the 2010 American Dietetic Association Survey Says, 60% of Americans have difficulty locating 'accurate food and nutrition information on the Internet' (Survey Says 2010). Unfortunately, the reality is that many adults seeking nutrition information on the Internet are using unreliable sites that lack scientific evidence for the advice offered (Survey Says 2010).

According to Sutherland et al. (2005) the largest problems with Internet searches were content quality, usability, and readability. Within this study researchers found that the lack of scientific evidence to support specific claims found on .com sites contributed to the negative usability rating (Sutherland et al. 2005). Furthermore, the largest implication of Internet searches for nutrition was the lack of readability within sites that were referred to as the most accurate sources for nutrition information (Sutherland et al. 2005). Interpreting the readability using the Flesch Reading Scale, researchers found that "54.8% of U.S. adults would be able to read the information accessed through the general search; this drops to 37% for the sites regarded as scientifically based information"(Sutherland et al. 2005). As you can clearly see, there is a gap between the information that would be regarded as helpful and the lack of accessibility by those who need it. Also, the assumption that every American has Internet access could be inappropriate as well. These findings result in the furthering of mistrust and negative consequences on American eating attitudes. Furthermore, it propagates the continuing the cycle of hopeful life changes faced with unrealistic expectations and resistance both intrinsically and extrinsically (Survey Says 2010 and Satter 2007).

b. Food Acceptance

Like eating attitudes, food acceptance is portrayed as one's ability to be calm and excitable in the presence of food while maintaining biological demands for gustatory rewards (Satter 2007). The acceptance of food is a complex and ever changing aspect of human eating. According to the Hierarchy of Food Needs created by Ellyn Satter, food acceptance is a state where a person is no longer in danger of hunger and has the 'ability to acquire acceptable foods in socially acceptable ways' (Satter 2007*)*. This stems from the main principles of food acceptance based on positive attitudes that surround the eating experience (Satter 2007). A primary objective to attaining positive eating acceptance patterns is the capability to experience new foods without immediate rejection (Satter 2007). There are many motivating factors that affect an individual's eating, lending to both positive and negative eating behaviors that become encoded into personal habits (Satter 2007, Wadhera and Capaldi-Phillips 2014, Blissitt and Fogel 2013, and Mennella 2014). Researchers have examined both intrinsic and extrinsic factors that lend to habit formations on acceptable foods. This process of either accepting or rejecting foods is largely indicative of future patterns of consumption to be followed late into adulthood (Satter 2007 and Wadhera and Capaldi-Phillips 2014).

i. <u>Intrinsic Factors Influencing Food Acceptance</u>

In order for an individual to accept a food, they first must be willing to try it (Blissett and Fogel 2013). Sensory process or sensory sensitivity is thought to be the foremost influential factor impacting food acceptance. As of recently, researchers believed that taste or taste perception was the most powerful indicator of food acceptance for a new food. However, research is beginning to show that a person actually is more influenced by food through the eyes, otherwise known as sensory processing (Wadhera and Capaldi-Phillips 2014 and Blissett and Fogel 2013). This image develops early sensory processing that will contribute to future flavor preferences to be held later in life (Nicklaus 2009 and Mennella 2014). With each food having its own unique set of characteristics, children use their multiple sensory properties in order to distinguish good from bad (Blissett and Fogel 2013). Taste, smell, tactile (texture), as well as auditory perceptions create the wide range of sensory experiences one can have when engaging in an eating occasion (Blissett and Fogel 2013 and Wadhera and Capaldi-Phillips 2014). When children struggle with new food items or combinations of foods, it is most likely related to the fact that they process this new item as different. Different in the sense that it strays from the previous classifications of foods they have already mentally or 'internally' known as 'familiar' (Blissett and Fogel 2013). Nicklaus (2009) refers to this process as 'sensory imprinting', which occurs early in life and creates strong beliefs about foods that can be very hard, if not impossible, to alter later in life (Nicklaus 2009).

Created by the occurrences associated with sensory stimuli, taste preference or rejection is highly suggestive of early life experience that had imprinted as good, bad, or unfamiliar (Blissett and Fogel 2013, Nicklaus 2009, and Wadhera and Capaldi-Phillips 2014). An important concept researchers are investigating is the notion that taste portrays a child's sensitivity to rather bitter items. The most commonly cited vegetable, 'broccoli', is a strong predictor of future F/V consumption (Blissett and Fogel 2013). This concept is actually a biological response to a human's innate capability to reject and accept certain flavors in order to avoid being poisoned (Mennella 2014). Flavors that are interpreted as safe consist of salty, sweet, as well as the palatable fat, which increases acceptance and preference through satiety (Mennella 2014 and Satter 2007). Within the early years of life, taste perceptions are not only extremely heightened as a circumstance of the biology of infancy, but also from a lack of exposure to food items that begin to be rapidly introduced to the developing infant (Blissett and Fogel 2013 and Mennella 2014). As humans are predisposed to prefer sweet over bitter, researchers identified that even within a few hours after birth, infants will instinctually consume more of a sugar solution compared to water; while displaying a more relaxed demeanor and may even smile (Mennella 2014).

However changes in taste are not constant, as humans grow and develop, so does taste preference and acceptability (Satter 2007, Mennella 2014, and Blissett and Fogel 2013). Furthermore, researchers have begun to make the connection between the 'bitter taste' of most vegetables and food sensitivity among young children (Blissett and Fogel 2013). In a study conducted in order to examine this notion, researchers found that children 3 to 6 years old have a stronger 'bitter taste sensitivity' in relation to school children, in which have lower sensitivity and consume more 'bitter' vegetables such as broccoli (Blissett and Fogel 2013). In addition, researchers Wadhera and Capaldi-Phillips (2014) analyzed the influence that the color of foods can have on the perceived taste of food (Wadhera and Capaldi-Phillips 2014). Studies show that people are more likely to find foods more palatable if they are of familiar color that match the food item given. For example, researchers identified that individuals found brown milk chocolate candies to taste more 'chocolatey' compared to chocolate that was colored green, an unfamiliar chocolate color (Wadhera and Capaldi-Phillips 2014). This could provide insight for future studies in why seeing alarming colors (such as green) that often tend to interact with the olfactory senses, could inhibit or discourage young children as well as adults from eating such foreign substances, such as green vegetables.

Neophobia is a usual pattern of eating that creates the commonly referred to as 'food ruts' in young children. As per Nicklaus (2009), "19% of 4-6 month-old infants were judged to be "picky" by their mothers but this percentage rises to 50% in 19-24 months" (Nicklaus 2009). The concerning matter however is that neophobia is very common within this age group, certain behaviors or patterns of eating could become routine, creating a lifelong 'lower range' of acceptable foods (Blissett and Fogel 2013). Researchers have hypothesized that neophobia is a heritable trait, intensifying food restriction and rejection through maternal feeding practices (Blissett and Fogel 2013). This is a cause for concern since children are far less likely to be exposed to a variety of healthful foods if their parents already rejected those particular items themselves (Blissett and Fogel 2013). In conjunction with neophobia, a child's temperament is a key aspect in determining food acceptance. Within the literature, temperament is increasingly showing to be a major predictor in certain food behaviors as well as child weight outcomes. In a study looking at gender in relation to temperament, researchers identified that boys were more easily distracted compared to their counterparts (girls). Girls found more comfort in being soothed by food which was related to increasing weight status overall (Blissett and Fogel 2013). Furthermore, parents contribute to a child's temperament through action and/or reaction. Feeding situations are highly interactive and can often become a stressful event if a parent feels that they are not providing enough food for their child. Child temperament is shown to effect parental feeding strategies, which can give rise to less productive feeding, creating potential feeding problems (Blissett and Fogel 2013).

ii. Extrinsic Factors Influencing Food Acceptance

There is extensive research on the complexity of extrinsic factors that affect food acceptance. Three major contributors to food acceptance have been identified: parental modeling, the food environment and parental feeding practices (Blissett and Fogel 2013). Parental modeling is thought to be the largest indicator of a child's dietary intake, especially F/V consumption (Goldman et al. 2012, Tylka et al. 2013, Blissett and Fogel 2013, and Coulthard and Blissett 2009). Goldman et al. (2012) states that increased awareness of not only positive parental modeling such as the consumption of F/V in the presence of their child, but also the negative consequences of parental modeling such as not eating the F/V they serve to their children (Goldman et al. 2012). Furthermore, parental reactions to F/V consumption are also seen to provide connections to positive role modeling. Enjoyment in consuming F/V in the presence of developing children increases that child's probability of at least trying the new food (Goldman et al. 2012). From a global health perspective, this concept is important due to the fact that as of 2009, 51% of children and 54% of parents did not consume the recommended '5 a Day Fruits and Vegetables', in order to acquire proper nutrition (Coulthard and Blissett 2009). However, researchers are still unable to pinpoint the exact mechanism in which parental modeling effects child F/V consumption (Blissett and Fogel 2013). Many factors that contribute to increased consumption of F/V are unclear at this time. Consumption alone, facial expressions provided, or verbal messages during feeding interactions seen in regards to the effectiveness of providing dietary variety are still being considered (Blissett and Fogel 2013). Regardless of confounding variables, children are more likely to consume F/V if they are both freely available to them and if an adult or peer expresses enjoyment during consumption (Blissett and Fogel 2013 and Goldman et al. 2012).

A major predictor of food acceptance is prior parental modeling and food availability, in connection with the family food environment. With children, the environment in which they are first exposed to food is crucial in creating food preferences. Exposure to different food items allows for the opportunity to become familiar with the diverse sensory effects of different foods (Blissett and Fogel 2013). Without this initial exposure, the child is less likely to try novel foods outside of the home (Blissett and Fogel 2013). Accessibility is highly affected by socioeconomic status of the family (Blissett and Fogel 2013). In a study that focused on lower income families and their food purchasing habits, 17% of income was used for food procurement. This financial limitation led researchers to presume that high cost produce items were not regularly available due to affordability (Goldman et al. 2012). This situation, known as food insecurity, can lead to a cycle of obtaining foods that are energy dense, compared to nutrient dense, as satisfying hunger is more important than the nutritive value (Satter 2007). Furthermore. Satter asserts that poor dietary intake such as lower consumption of F/V, whole grains, and dairy products is responsible for the weight gain connected with food insecurity (Satter 2007).

It should now be clear that food acceptance is highly dependent on the parental feeding practices used. Food behaviors are shaped within the context of an interactive relationship known as the parent-child dyad (Schwartz et al. 2011). Satter initially identified the concept of the division of feeding responsibilities held by both parent and child as a harmonious feeding relationship that promotes healthful choices as well as proper portion sizes to maintain satiety and trust (Satter 2007 and Tylka et al. 2013). Within this relationship, parents (most commonly mothers) should provide eating situations that are regular in nature, but also timely, in a distraction free 'safe' area; most importantly a mother should use feeding practices as they see fit (Tylka et al. 2013). On the other hand, the child holds the responsibility of demonstrating to the parent that they have attained enough food and have become satiated (Tylka et al. 2013). Parental feeding practices can be both interactive and reactive due to the unforeseeable interactions parents and children have when eating (Blissett and Fogel 2013, Schwartz et al. 2011, and Tylka et al. 2013). Particular parental practices often observed include the restriction of foods, pressure to eat, control, physical prompting, as well as reward as a tool to eat unwanted foods (Blissett and Fogel 2013, Schwartz et al. 2011, Tylka et al. 2013, Peters et al. 2011). In addition, parental feeding styles have often been studied throughout the literature, with a focus on the effectiveness or lack thereof on each style; authoritative/democratic, permissive/indulgent, authoritarian, or neglectful (Schwartz et al. 2013).

Controlling parental feeding practices such as food restriction or pressuring a child to eat have been studied extensively in order to try to correlate parental practice with future behavior (Peters et al. 2011). Restricting an individual's food, especially in the developmental phases of food acceptance, can create strong desires for such forbidden foods creating lower self-regulation of an individual's appetite (Blissett and Fogel 2013, Peters et al. 2011 and Schwartz et al. 2011). Restricting practices often result in unhealthy diets leading to increased body weight and subsequent higher BMI scores (Peters et al.

2011 and Blissett and Fogel 2013). Similarly, controlling practices stem from trying to avoid weight gain or prevent the further weight gain of a child who is thought to be overweight in the eyes of parents or primary care physicians (Peters et al. 2011). Researchers have examined mothers who restrict their own diets and found that these particular mothers were more likely to restrict their child's food intake as well, leading to episodes of eating in the 'absence of hunger' (Tylka et al. 2013 and Schwartz et al. 2011). Pressuring a child to eat healthful foods such as F/V may also lead to particular responses associated with higher unhealthful snack consumption with higher amounts of sugar and fat (Peters et al. 2011). Tylka et al. (2013) found that the younger maternal age and being from the Hispanic or African American ethnicity were common predictors in the tendency to pressure one's child to eat (Tylka et al. 2013).

On the contrary, physical prompting when introducing novel food items has been suggested to be a beneficial tool when feeding young children (Blissett and Fogel 2013). In a particular study trying to identify the best facilitator to get children to consume F/V, researchers found that children were more likely to try, taste, or enjoy the new food if physical prompts were offered such as 'moving the food towards the child, passing it to the child, holding it up to the child's line of sight etc., assisting acceptance' (Blissett and Fogel 2013). Lastly, parents who utilize rewarding as a motivator for eating must be cognizant of the positive and negative consequences that this strategy has with children. Studies have shown that both positive and negative results can come from the use of rewards within the feeding domain. When children are offered food as a reward for another food item (such as the classic "you get dessert if you finish your broccoli") it is seen to have negative effects on that child's future acceptance of the non-reward foods. Furthermore, this practice also increases the desire to have the non-core reward foods more often (Blissett and Fogel 2013). However, positive attributes have been seen when a non-food item is used as the reward, such as offering stickers instead of cake (Blissett and Fogel 2013). This concept has not been rigorously studied, although it provides good insight on the two-fold scenario this strategy can have on food acceptance. Furthermore, a child's temperament is highly indicative of the effectiveness of this parental feeding strategy. Some children can be more susceptible to requiring a reward more frequently compared to other children, leading to a potentially dangerous feeding situation between parent and child, possibly affecting the child's future regulation of food (Schwartz et al. 2011).

c. Regulation of Food Intake

Internal regulation with respect to eating competence is derived from the dominating component of eating competence, attitudes and behaviors (Satter 2007). Internal regulation is a bidirectional human attribute in which hunger and satiety dictate the amounts and types of foods needed. Meanwhile, appetite dictates pleasure foods and variety (Satter 2007). In order to maintain homeostasis, the body's natural ability to somewhat regulate body weight, Satter expresses the importance of physical exercise (Satter 2007). According to Satter (2007), physical exercise in relation to the regulation of intake is not to control or intend for weight loss, but to merely increase one's health status and overall well being (Satter 2007). Allowing one's self to feel and respect internal cues, such as hunger and satiety in appropriate and efficient ways, is in agreement with EC ideology (Satter 2007). Regulation of intake is highly dependent on one's ability to discontinue eating when satisfied biologically; this is a potential factor in America's current obesity trend (Satter 2007). There are many factors that combat/support normative regulation of intake, but over the last few decades the general public has been less in tune with the physiological signs of eating. Furthermore, research has indicated that people are increasingly unable to estimate the amount of daily energy actually required compared to what is consumed (Satter 2007 and Piernas and Popkin 2011).

i. Intrinsic and Extrinsic Goals (motivation)

Motivation is a key concept with reference to the regulation of intake. Each individual has their own set of motivators that lead to an outcome of either healthy, restricted, or disordered eating; these in turn lead to specific health and mental outcomes (Verstuyf et al. 2012). Intrinsic motivation derives from an internal need or desire to change one's eating habits to better one's health (Satter 2007 and Verstuyf et al. 2012). However, researchers have found that when an individual claims that they want to attain better health, it is commonly not an intrinsic motivator that drives their behavior change. More common to human regulation of food is the extrinsic motivator of physical attributes and overall physique (Verstuyf et al. 2012). The desire to be thin for means of attractiveness has been found to not only be disruptive to the body's diverse defense mechanisms against losing certain fat reserves, but also psychologically detrimental in terms of self-control (Verstuyf et al. 2012). The literature suggests that the underlying control aspect of food regulation leads to an unhealthy relationship between self and food, first leading to weight loss by restriction and then regain by the suspension of restriction (Satter 2007 and Verstuyf et al. 2012).

Gender differences exist in this area of research. Leblanc et al. (2015) reports that men have significantly lower eating related self-determination index or SDI scores, thus decreasing men's intrinsic motivation for food regulation (Leblanc et al. 2015).

Furthermore, the amount of self-control one has in relation to eating and emotional stressors, both positive and negative, suggests specific dietary patterns in conjunction with subsequent body mass index (BMI) (Sproesser et al. 2011). Eating in the form of a stress regulator or as a subsequent coping strategy has been linked to the overconsumption of 'forbidden foods.' This leads to significantly less healthy dietary patterns compared to those who did not express their emotions through eating (Sproesser et al. 2011).

ii. Restrictive Eating Disorders

According to The National Association of Anorexia Nervosa and Associated Disorders, approximately eight million people, or 3% of Americans, suffer from a form of restrictive disordered eating (Eating 2016). Researchers believe that sociocultural influences are the primary reasons behind changes in dietary intake (Verstuyf et al. 2012). Individuals who use intake tactics such as avoidance and negativity to control their personal dietary intake regulation can be considered to fit within the Thin-Ideal Internalization Model (Verstuyf et al. 2012). Within this model, body dissatisfaction coupled with disordered regulation of food intake, creates an idealistic situation where one exerts immense control over their limited food intake. This is in order to maintain their extrinsically motivated goal of a socially appropriate body image (Verstuyf et al. 2012 and Satter 2007).

The Keys Minnesota starvation study, a primary study within this field, examined the effect disordered eating patterns have on the body (Muller et al. 2015 and Satter 2007). By looking at self-induced starvation, Keys and later Muller, were able to identify the body's innate ability to hold on to body fat reserves for as long as possible (Muller et al. 2015). Muller et al. (2015) found that the body in a starvation state for a period of 3 weeks began to lose skeletal, liver, and kidney muscle mass before allowing fat reserves to be accessed for energy (Muller et al. 2015). Coupled with this phenomenon is an increase in the resting energy expenditure of these individuals due to a decrease in overall organ efficiency (Muller et al. 2015).

According to Verstuyf et al. (2012), "heightened attention to food intake can create a cognitive boundary, which replaces a more intuitive regulation of food intake. This overly-cognitive focus reduces people's sensitivity toward physiological signs of satiety and hunger and instead creates a preoccupation with psychological, cultural, or social signs to eat" (Verstuyf et al. 2012). Furthermore, high levels of internal control encourage overcompensation when a person is faced with psychological or social pressure (Verstuyf et al. 2012). Known as dietary break down or disinhibited eating, researchers have observed this loss of cognitive control that results in episodes of binge eating (Verstuyf et al. 2012). Cycles of extreme internal control alternated with bouts of disinhibited eating produce a pattern of weight gain and weight loss referred to as a dieting 'yo-yo'. People who are inclined to maintain their initial intrinsic regulation of food intake often become overwhelmed by their bodily need for increased caloric intake. This can create circumstances where an individual is drawn to 'forbidden' calorically dense foods, and overeating occurs (Satter 2007 and Verstuyf et al. 2012).

iii. Obesity, Binge Eating, and Disinhibited Eating

While studies of restrictive disordered eating patterns are well documented in the literature, an increasing number of studies also focus on the obesity epidemic we face as a nation. According to the 2009-2010 NHANES, more than 2 in 3 adults are considered overweight or obese while 1 out of every 20 American adults are considered to be extremely obese (HHS, NIH, 2012 and Flegal et al. 2012*)*. Furthermore, NHANES data suggests that 1 in 6 children ages 6-19 are considered to be obese (HHS, NIH, 2012). In a recent study using 2003-2006 NHANES data, researchers looked at the associations between physical activity, diet quality and weight status. Researchers found that "diet quality was inversely associated with BMI and waist circumference in those aged 30 to 60 years old; leading to the conclusion of possible contributable factors of America's increased obesity rates over the past 2 decades" (Pate et al. 2015)

Researchers are trying to identify the preliminary reasoning behind overeating in relation to negative intake regulation patterns in both adults and children. According to McCrory et al. (2011) humans are susceptible to an increased body weight due to our innate physiological adaptation to store fat (McCrory et al. 2011). Furthermore, this adaptation is stifling regulation through the current excess in today's food supply (McCrory et al. 2011). With this observed increase in caloric intake and decreased physical activity, the general public is portraying more severe and chronic illnesses that are correlated to body weight (Satter 2007).

The common themes that emerge when examining dietary intake regulation are self-control, emotional eating, gender, and body mass index (Davis et al. 2010, Leblanc et al. 2014, Verstuyf et al. 2012, and Sproesser et al. 2011). Dietary patterns are highly variable and tend to conform to situational tendencies of the individual. Self-control is highly indicative of intake regulation as it pertains to an individual's ability to react competently to an eating situation. This occurs by either conforming to a situation or altering one's reaction in order to control natural tendencies of overeating (Sproesser et al. 2011).

Self-control is difficult to quantify; researchers therefore focus on other actions associated with self-control such as emotional eating, overeating, or episodes of binge eating. Researchers have found that healthful dietary patterns are often observed in individuals that identify self-control as a major motivator in intake (Sproesser et al. 2011 and Verstuyf et al. 2012). Furthermore, the presence of an emotional response to decreased regulation of intake is repeatedly mentioned in the literature related to this topic. This emotional link connects an individual's increased tendency to indulge in calorically dense snack foods to lower self-control and increased BMI (Davis et al. 2010 and Sproesser et al. 2011). Gender was also studied as a potential moderator of BMI and intake regulation. Leblanc et al. (2014) found that women with increased global self-determination index (SDI) scores are significantly more likely to partake in emotional disinhibited eating (Leblanc et al. 2014).

iv. Parental Contribution

Many researchers have looked into the way in which early life experiences might influence the development of intake regulation. Beginning in infancy, parents are known to have particular influence on the way their child eats, how much, and the emotional responses both parent and child have with food (Frankel et al. 2012). Negative responses in the context of intake have been shown to have profound effects on a child's response to food (Frankel et al. 2012). Certain parental feeding practices such as responding to hunger and satiety cues, forcing the child to eat, or restrictive behaviors are all seen to have inverse effects on the child's internal regulation of intake (Frankel et al. 2012). This conceptualization of parental influence on child intake regulation suggests that when children are unable to comply with or maintain behaviors expected by their parents, or peers; that they become 'psychologically thwarted' which can cause detrimental feelings of guilt or shame in the context of eating (Verstuyf et al. 2012). The disruption of a child's unique ability to self-regulate can be related to an increase risk of childhood obesity. Which in turn, obesity is forecasted to continue into adulthood as intake regulation is no longer optimal (Frankel et al. 2012). In a recent study attempting to quantify the parental contribution on child internal regulation, researchers found that a caloric increase of 60.5% was observed when food items were deemed restricted (Rollins et al. 2014). Moreover, this attributable cause of increased desire for restricted food items was hypothesized as being a behavioral response to parental restriction as opposed to a hunger directed response. This leads to an increased risk of creating lifelong behaviors detached from physiological hunger cues for developing children (Rollins et al. 2014).

v. Genetic Component of Regulation of Food Intake

The primal instinct of humans to consume food is driven by a biological need to consume energy in order for the body to function properly. The hypothalamus is the portion of the brain in which is stimulated by 'reward and motivational neurocircuitry to modify eating behaviors' (Volkow et al. 2011). These particular genetic factors are thought to account for between '45% and 85% of variability in BMI' of an individual (Volkow et al. 2011). It is difficult to fully explain the genetic implications for obesity due to a large number of contributing factors, such as environmental influences and an individual's desire to eat. Although these factors influence genetic variability, they cannot be the sole reason for obesity (Volkow et al. 2011).

In some animal studies researchers have seen certain biochemical variations arise when test animals are exposed to high fat and high sugar foods. Although the reward system in the brain becomes hypersensitive to the incoming reward, it is desensitized to the actual rewarding feeling of satiation. This response leaves the individual subject to overconsumption and disinhibits the regulation of food intake (Volkow et al. 2011). The motivational mechanism of reward through food intake can also develop in utero; specifically, "changes in early postnatal nutritional status have been shown to influence DNA metabolism and lead to altered patterns of both genome-wide and gene-specific DNA methylation" (Vucetic et al. 2010). Certain neurotransmitters, such as dopamine, are also known to regulate food intake (Vucetic et al. 2010). Vucetic et al. (2010) hypothesizes that when the dopamine system of the offspring is altered in utero due to a high fat/high sugar maternal diet, specific changes in the offspring's underlying food intake regulation circuitry is altered. This leads to preferred taste and palatability of high fat/high sugar foods later in life (Vucetic et al. 2010). However, it should be noted that literature focused on genetics and food intake regulation is still within the developmental stages and requires more definitive research is required.

d. Eating Context

The way in which humans interact with food is dependent upon the context in which they encounter eating. Eating context is a multifaceted interaction between human and food; involving reliable access to food, structured eating, as well as the means to be able to plan and prepare food for oneself (Satter 2007). The social importance that surrounds eating also plays an important role within the eating context. This influences the choice of foods for consumption and the times at which they are consumed (Satter 2007). The attitudes and behaviors that encompass eating context are highly dependent upon one's ability to procure appropriate food items, the skills in which to prepare them properly, and the capability to plan or manage meals around individual and family schedules (Satter 2007). Within this final area of eating competence, eating context is derived from four major categories of EC; meal planning, food management, mealtime structure, and meal frequency and consistency (Satter 2007).

i. Meal Planning

Within the literature, meal planning and intentionality are used as synonymous terms (Wilkinson et al. 2013 and Brunstrom 2014). Meal planning consists of using cognitive effort to assess what should be eaten, what needs to be procured, and how one may prepare chosen food items (Wilkinson et al. 2013). By planning one's intake, individuals are more likely to have greater nutritional variety within a meal (Wilkinson et al. 2013). Through the so called 'variety effect' multiple foods are chosen to create a 'balanced' meal which is demonstrated within the literature to increase pleasure in eating (Wilkinson et al. 2013 and Brunstrom 2014). Meal planning also aids in the idea of portion size consumed, as Brunstrom supports that meal planning assists in the memory of appropriate portions of meals previously planned and prepared (Brunstrom 2014). Recent research on the 'variety effect' found that significantly larger portions were consumed when in an eating situation deemed 'different' compared to 'similar' (Wilkinson et al. 2013). Expectations about meal satiation and satiety properties play a large role in an individual's consumption (Brunstrum 2014). From this ideology, portion size is individually determined based on the expected physiological return. The literature iterates that meal planning creates a more stable eating context, as expected palatability and satiation are predetermined. This in turn governs portion size control through planned behavior (Brunstrum 2014, Wilkinson et al. 2013, and Satter 2007).

Another factor in meal planning is the family dynamic and who takes responsibility as the primary meal planner. Historically the head female or mother of the household has been considered the primary food procurer and meal planner (Flagg et al. 2013). Age, gender, ethnicity, marital status, employment status, and number of children play major roles in the appointment of the family meal planner (Flagg et al. 2013 and Morin et al. 2013). Certain difficulties such as individual food preferences of each family member, planning a meal that coincides with each family member, having sufficient time and money to procure food items, and creating a household with a sufficient amount of food for each member creates obstacles to meal planning for parents (Flagg et al. 2013). These factors influence family meal planners and lead them to seek convenient family meals, such as fast food restaurants and/or convenience buying (Flagg et al. 2013). Lack of meal planning as well as accessibility and convenience may coincide with America's increasing rates of obesity seen in the last decade, although many other confounding variables are also involved (Satter 2007 and Flagg et al. 2013).

ii. Food Management

Food management within the ecSatter perspective creates an internal dynamic of discipline as well as permission within the eating context (Satter 2007). Coinciding with the first component of EC, eating attitudes and beliefs are the controlling factors when managing food. Food management strategies are continually tested or subjected to life events such as time constraints, unexpected plans, or engaging with others around food during holidays or events (Morin et al. 2013). Meal or food management is interconnected with self-trust as well as desire and ability to adhere to particular 'food management coping strategies' (Morin et al. 2013). Within the literature, researchers identified that people ty to maintain a particular ‘food identity’ or appearance in attempts to adhere to their particular food management skills or self-efficacy (Vartanian 2015)

In a study conducted to examine gender association with food management skills and expectations, researchers found that men were less inclined to order a food item if the name sounded feminine, such as ‘ladies cut’ in order to protect a particular masculine image within public situations (Vartanian 2015). This indicates that there are particular connotations (either masculine or feminine) contexts surrounding food, which may be threatening the food management skills of individuals based on societal views (Vartanian 2015). Furthermore this particular distinction placed on food items conflicts with one’s self-efficacy when planning daily meals and snacks (Morin et al. 2013 and Vartanian 2015). Interestingly, particular factors seemed to combat these societal views of food limitations such as education and work schedules; deeming that individuals with university degrees felt more enabled when choosing desired food items leading to healthier food choices (Morin et al. 2013).

In relation to food empowerment, self-efficacy was linked to food strategies used away from home, particularly studied among working parents (Morin et al. 2013). Morin et al. (2013) found a positive relationship between increased self-efficacy to increase food management skills inside and outside the home through the use of effective ‘food coping strategies’ (Morin et al. 2013). Researchers found that within self-efficacious working parents, 55% organized weekly menu plans for their families and 48% prepared family meals in advance (Morin et al. 2013). These particular management strategies are seen to reduce stress around eating as well as ensuring nutritional adequacy within the family (Morin et al. 2013).

iii. Mealtime Structure

Mealtime structure is among the most influential aspects on the early development of eating patterns. According to Neumark-Sztainer et al. (2004), "significantly fewer adolescents report extreme dieting behaviors when their parents assign priority to family mealtime" (Neurmark-Sztainer et al. 2004). More recent research has found that allotted family meals have supported a more healthful diet in children, leading to better success academically, socially, and emotionally (Powell et al. 2016 and Satter 2007). Mealtime structure according to Satter is the deliberate act of providing a safe and engaging mealtime where familial interactions and food habits are constructed and frequently observed in the remaining years of life (Satter 2007). However mealtime structure is highly dependent upon the family's social structure (Powell et al. 2016 and Levin et al. 2011). According to the Family Socialization model, the family structure, actions, and attitudes of the parents are highly indicative of the child's socialization process (Levin et al. 2011). Returning to child autonomy development, Satter's division of responsibility is a part of the family eating context and creates the mealtime structure that is unique to each family (Powell et al. 2016).

As a parent, certain actions should be a major consideration when determining mealtime structure. Creating an environment that is free from distraction and engaging in the eating experience cultivates the behaviors that become habit later in life (Powell et al. 2016). In a study conducted to assess the relationship between mealtime structures and whether the children displayed 'fussy eating behaviors', children whose mothers ate with them refused fewer foods compared to those children whose mothers did not (Powell et al. 2016). Furthermore, researchers identified that mothers who ate what the children were eating also refused significantly less foods than those children whose mothers ate something different from them (Powell et al. 2016). Mothers as parental models are shown to possess a strong determinate factor in the food acceptance of children within a mealtime setting (Powell et al. 2016 and Levin et al. 2011).

Family structure is also a crucial aspect in the creation of mealtimes. According to Levin et al. (2011), 48% of children from original two parent families consumed a family meal daily, 17% of children from stepfamilies ate a daily meal together, and only 9% of single parent families consumed daily meals together (Levin et al. 2011). As family structure declines and parental presence in the household decreases, there is also tends to be an increase in fighting, bullying, and smoking among boys (Levin et al. 2011). This phenomenon is also observed within the literature when assessing access to food or 'food poverty' (Levin et al. 2011). It is apparent to the literature that if food is not accessible there will be a lack of family meals eaten together (Levin et al. 2011). Moreover, family mealtime routines are seen to affect psychological health in every member of the family, not just the developing children (Levin et al. 2011). By creating a stable eating environment or context for every member to engage in is seen to create a more sound psychological standing for each individual, although studies reveal that it is more important when one is still psychologically developing (Levin et al. 2011).

A review of the literature suggests that 83% of daily energy consumption by school-aged children and 43% of daily energy consumption by younger children occurs outside of the home today (Lachat et al. 2012). Eating outside the home has increased over the last three decades, whether it is during school meals or at fast food restaurants (Lachet et al. 2012). For example, a study by Adair et al. (2005) showed that eating outside of the home increased from 23% to 35% from 1977 to 1996 (Adair et al. 2005). This pattern of eating "out" is associated with lower levels of vitamin C, iron, and calcium consumption and increased sodium and total fat intake (Lachet et al. 2012). Socioeconomic status is 'inversely associated with dietary quality' and is considered to be one of the contributing factors to eating outside the home (Lachet et al. 2012). One interesting aspect of this statistic is the number of children of lower socioeconomic status partaking in the National School Lunch Program. Children enrolled in this program are estimated to consume 39% of their total energy for (Lachet et al. 2012). Eating outside of the home creates a complex eating context for children by limiting exposure to the social rituals of family mealtime interactions and beneficial experiences that come from regular mealtime structure.

iv. <u>Meal Frequency and Snacking</u>

Eating context in terms of eating competence has been subjected to multiple transformations stemming from the changes within individual meal frequencies and defining eating occasions. However, researchers have had difficulty defining what an eating occasion truly is and what constitutes a meal compared to a snacking event (Bellisle 2014 and Murakami and Livingston 2016). Due to these incongruences within the literature, researchers primarily focus on the measurable outcomes, such as diet quality compared to intake frequency in order to examine this specific component of eating competence. According to a cross-sectional study which examined eating frequency components (snack frequency and meal frequency) through the use of multiple definitions using NHANES data (2003-2012), researchers found that men and women who reported higher meal and snack frequency had higher diet quality (Murakami and Livingston 2016). Bellisle also found similar results within the meta-analysis on meal frequency and diet quality, finding that those who report snacking as a regular eating occasion were found to have more lean body mass, be of younger age, and practice regular planned snacks daily (Bellisle 2014).

However, the eating context when determining eating frequency patterns are not a stagnant and routine event, but are continually changing and modifying to internal and external stimuli. Eating contexts are a product of an individual's surrounding environment (Kant et al. 2012 and Murakami and Livingston 2016). Eating events can be influenced by an individual's personal lifestyle, taste preferences, palatability of foods, personal mood, cultural backgrounds, as well as gender (Kant et al. 2012, Murakami and Livingston 2016 and Bellisle 2014). These factors are the reason a free-living environment is not preferred when trying to study eating frequencies and the subsequent diet qualities (Bellisle 2014). Some research findings suggest that humans are not affected physiologically by caloric intake or the time of a snacking event, and will still consume the subsequent meal (this case being dinner) at relatively the same time with no caloric decrease. This leads pattern of eating leads to an increased energy intake overall (Bellisle 2014). In general, consistent eating in the absence of hunger creates a positive energy intake, which could lead to weight gain (Bellisle 2014).

In regards to the increasing rates of childhood obesity, American children are reported to consume 27% of their daily caloric intake as snacks, consuming on average three snacks per day (Bellisle 2014). Children who are fed three main meals per day are more likely to deposit fat at a higher rate than those children who are eating more frequently in lower caloric amounts per eating occasion, i.e. snacking (Kaisari et al. 2013). Moreover, children and adolescents who ate more frequently throughout the day had a '22% lower probability of being overweight or obese compared with those who had fewer eating episodes' (Kaisari et al. 2013). However, the literature as well as *The Dietary Guidelines for Americans, 2015* still lacks definitive definitions regarding eating occasions as well as frequency of eating, making consistent comparison of this variable difficult.

C. Diet Quality

The *Dietary Guidelines for Americans, 2015*, is an extension to previous editions recommending an overall healthful diet consisting of major food groups; fruits, vegetables, grains (at least half consisting of whole wheat), protein sources, low-fat or fat free dairy products, and oils (USDA, DHHS, 2015). Consuming these recommended food categories is proven to be helpful in the prevention of specific chronic health complications such as cardiovascular disease, type 2 diabetes, as well as obesity (USDA, DHHS, 2015). Current trends show that about three-fourths of the population are exhibiting dietary patterns low in fruits, vegetables, dairy, as well as oils (USDA, DHHS, 2015). According to past population dietary data, from 2007 to 2010, '60% of children aged 1-18 years did not meet U.S. Department of Agriculture Food Patterns fruit intake recommendations, and 93% did not meet vegetable recommendations' (Kim et al. 2014). This trend remains true as research shows that the only population subgroup to approach significance in obtaining recommended amounts of fruits in the diet are children aged 1-8 years old (USDA, DHHS, 2015). Of particular concern is the noticeable increase in added sugars, saturated fats, and sodium seen in American diets today (USDA, Food Patterns, 2015). This increase in saturated fat, sugar sweetened beverages, and sodium intake is seen to leave little room for fruits, vegetables, and dairy products to be consumed in the diet (USDA, DHHS, 2015).

According to the Dietary Guidelines of 2015 Advisory Committee, there are a multitude of nutrient concerns, not only for preschool aged children, but for many American adults as well (USDA, DHHS, 2015). Vitamin D, calcium, potassium, fiber, and iron are stated to be continually under consumed by Americans today, leading to many nutritional concerns facing the growing population. As mothers' diet quality is frequently an indication of their children's diets; this suggests a potential risk of nutritional deficiencies within the diet at a crucial stage of development. Research shows that improving maternal diets though education can impact the quality of their preschooler's diet (Laster et al. 2013). Furthermore, if a mother is obese or overweight, her child has a greater chance of becoming obese or overweight in childhood or at some point in their lifetime (Lioret et al. 2012).

The rise in the prevalence of obesity has increased attention paid to factors that contribute to the trend. Decreased F/V consumption and lack of exercise within America's general population is associated with a rise in both adult and childhood obesity over the past three decades (Shim et al. 2016). However, the *Dietary Guidelines for Americans, 2015*, differs from previous editions in the fact that it promotes the idea that eating patterns are more indicative of an individual's eating. This is compared to looking at specific food groups in particular, acknowledging that personal eating habits are formed from multiple interactions, both interpersonally as well as socially (USDA, DHHS, 2015).

Recent data reports that childhood obesity has reached a point where 16.9% of children within the U.S. are considered obese (Gibbs et al. 2016). Lifestyle patterns and upbringing are being reported as major contributing factors leading to excess energy intake inside and outside the home. Patterns such as feeding practices, families feeding dynamics, family mealtime patterns, as well as parental nutrition literacy levels are all considered to play contributable roles in the consumption of F/V of young children (Gibbs et al. 2016, Fink et al. 2014, and Shim et al. 2016). Exposure is considered to be highly influential in child's willingness to consume F/V (Fink et al. 2014). Also seen to be significant determinants in F/V consumption in children ages 6-18 are parental consumption of F/V and home food availability (Shim et al. 2016 and Fink et al. 2014). In addition to parental modeling aspects within the home, Fink et al. (2014) found that children who ate at least 5 family meals per week had a greater chance in consuming at least 3 vegetables per day and ≥ 3 fruits per day, creating better opportunities for improving diet quality (Fink et al. 2014). Furthermore, research has shown that parents who have greater nutrition literacy are seen to have children with increased diet quality parameters (Gibbs et al. 2016). Interestingly, Gibbs et al. (2016) found that among confounding variables such as parental age, education, and income level, the only significant predictor of child diet quality was parental nutrition literacy (Gibbs et al. 2016). Awareness of the specific dietary guidelines and recommendations of F/V consumption increases an individual's likelihood of reaching adequate dietary intake leading to improved diet quality.

2. Manuscript

A. Introduction

Childhood obesity in America has now reached a point where 16.9% of children within the U.S. are considered to be obese (Gibbs et al. 2016). Particular lifestyle factors are being examined as researchers aim to understand why such escalations in obesity continue to be a national problem. Particular components that have been seen influencing this issue have been parental modeling, feeding practices, family mealtime patterns and dynamics, as well as family meal frequency and snacking patterns (Gibbs et al. 2016, Fink et al. 2014, Shim et al. 2016, and Bellisle 2014). Researchers have examined the role mothers play on influencing children's eating pattern development and have found that modeling is thought to be the largest indicator of children's dietary intake, especially F/V consumption (Goldman et al. 2012, Tylka et al. 2013, Blissett and Fogel 2013, and Coulthard and Blissett 2009).

There is a complexity seen between the mother child dyad and eating which is difficult to rationalize through analysis due to the many confounding factors within examination. Many areas of research aim to quantify such relationships through the ideology of eating competence. Eating competence is divided into four main constructs: eating attitudes, food acceptance, internal regulation, and eating context as described by Satter and colleagues (Satter 2007 and Lohse et al. 2012). By looking at eating using an unconventional approach such as eating competence, researchers are able to comprehend particular behaviors and attitudes based on a person's emotional integrity and level of comfort when engaging with food and eating. Food intake is often controlled and justified through each individual's status of eating competence, which dictates both quantity and quality of the foods chosen for both the individual as well as the family unit.

Maternal influence plays a large role when examining the eating habit formations of children. With mother's being constantly watched by their children, these behaviors are not only transferable through behavioral trends, but also through diet quality as mothers are generally the procurers, planners, and preparers of meals eating in the home (Lohse et al. 2012). Researchers have found that competent eaters were more likely to consume considerably more essential vitamins, such as vitamin C, A, B6, Thiamin, Niacin, and Folate, but also minerals for functional health, compared to those who were not competent eaters (Lohse et al. 2012). Mothers can be used as the main motivators when changing and forming child eating behaviors through both intrinsic and extrinsic factors of eating competence, as it is seen as an effective eating management tool within the literature (Lohse et al. 2012). By attempting to control for these underlying factors of maternal characteristics, identifying their importance, this research aims to assess their relationship to their child's F/V intake. New findings can potentially help navigate through past attempts to make such connections.

Creating beneficial health habits is imperative in early childhood, leading to lifelong eating patterns. The primary objective of this research study is to examine maternal eating competence and evaluate this in relation to maternal and child F/V consumption. The researchers hypothesize that mothers who are identified as being eating competent will have a higher frequency of consuming F/V and will have children with a higher frequency of consuming F/V.

The aims of this research study are to: 1) Determine if maternal eating competence relates to maternal dietary quality based on individual F/V intake. 2) Assess perceived factors of maternal eating competence and their relationship to the children's F/V intake. 3) Examine at the relationship between maternal and child F/V intake independent of the maternal eating competence component.

B. METHODS

Study Design and Participants

The Institutional Review Board at Syracuse University approved this study. All participants provided informed consent prior to completing the study.

This cross-sectional study examined maternal eating competence in relation to maternal and child F/V intake. Inclusion criteria included mothers over the age of 18 with at least one child between the ages of 3 and 5 years old. Participants were excluded if they had undergone weight loss surgery or were considered medically compromised. Medically compromised for the purpose of this study was defined as having a disease state that affected nutritional intake such as Crohn's disease, ulcerative colitis, gluten intolerance, diabetes, cancer, and any other gastrointestinal disorder. If either the mothers or the children required a specialized diet (pertaining to the above circumstances), they were excluded from study participation.

Participants were primarily recruited from preschools within Central New York and Central North Carolina. Over the 14 month data collection period, 200 individuals viewed the consent form and, of those, 90 participants consented to participate and completed some or all of the survey questions. Five participants were excluded from the study because they indicated that they were either medically compromised (n=4) or had undergone weight loss surgery (n=1). Due to extensive missing data, 17 participants were excluded from the analysis. Sixty-eight participants were included in the final analysis with 64 having complete data and 4 having nearly complete data.

Participants that completed the survey at their convenience were offered the opportunity to enter their name and email address to be entered into a raffle for a 6% chance to receive a $25 grocery gift card (4 gift cards total).

Measures

Anthropometric Data

Participants self-reported their height (feet, inches) and weight (pounds). Maternal body mass index (BMI; kg/m^2) was calculated. Mothers were asked to self-report their children's height (feet, inches) and weight (pounds). The researchers were unable to calculate child BMI because exact information on birth date and anthropometric measurement dates were not collected; these data would be necessary to calculate BMI percentiles.

Personal Characteristics

Participants self-reported both their age and their child's age. Participants reported their race, marital status, education, income, as well as hours worked per week. Furthermore, participants were asked to report their child's gender and categorize how many hours their child spent in childcare per week.

Eating Patterns, Dieting, and Diet Ratings

Eating patterns were assessed by asking participants to quantify approximately how many times per week their household ate meals prepared at home as well as how many times per week their household consumed fast food or ate at a convenience restaurant.

Dieting was evaluated by having mothers report how many times in the last year they dieted. Diet was defined as changing the way you eat so you can lose weight. The participants were also asked to rate both their own diet, as well as their child's diet based on a likert scale from 1-10, with 1 equaling least healthy to 10 being the most healthy.

Eating Competence

Maternal eating competence scores were assessed by Ellyn Satter's Eating Competence Survey, ecSI 2.0, which is a validated tool for measuring eating competence in adults (Satter 2007, Lohse et al. 2015, and Satter 2015) (Appendix 1). This measure was selected as the literature has inferred that child eating behaviors are continually formed by parental influence pertaining to their own eating behaviors. This tool assesses maternal eating competence as it pertains to foods eaten, as well as patterns and behaviors. A 5-point likert-scale is used to assess each of the 16 questions. The constructs of (1) eating attitudes, (2) food acceptance skills, (3) internal regulation skills, and (4) contextual skills were measured through the ecSI 2.0 scoring system in order to quantify an eating competency score for each category and for overall eating competence. Sub categories of ecSI 2.0 utilizes a 5-point likert scale from 1-15 for eating attitudes and contextual skills and 1-9 for food acceptance and food regulation skills. Overall, calculations were done within a 5-point likert scale ranging from Always=3, Often=2, Sometimes=1, Rarely=0 and Never =0 (Satter 2015). Participants scoring a 32 or above (out of a total of 48 points available) are deemed eating competent. Participants were categorized into either the Eating Competent or Not Eating Competent groups based on their scores.

Maternal and Child F/V Intake

Participants completed two short F/V dietary screeners (Yaroch et al. 2012). These screeners were placed strategically within the survey in different locations in order to attempt to gain less participant bias due to reactivity (Yaroch et al. 2012). Dietary intake was used as the dependent or outcome variable in order to quantify diet quality based upon F/V consumption.

The first screener, the 2-Item Cup F/V Screener, was developed to measure approximately how many cups of F/V, as well as 100% fruit and 100% vegetable juices, were consumed daily in an individual of 2 years of age and older (Yaroch et al. 2012). The 2-Item Cup F/V diet screener was developed utilizing the information pertaining to portion sizes from the U.S. Department of Agriculture (USDA) 2005 edition of MyPyramid (Yaroch et al. 2012). The portion size recommendations remain consistent within the currently used USDA Myplate model (Food Groups 2016). In order to obtain consistent measures of 1 cup portions from participants, this F/V screener has been validated through a cognitive interview process prior to its use within research (Yaroch et al. 2012). Furthermore, visual guides (Appendix 2) were used as a reference guide for participants to ensure uniformity in data collection (Yaroch et al. 2012).

The second dietary screener used for this survey was a 16-Item F/V screener (Yarach et al. 2012). Modeled after the National Cancer Institute's 19-Item screener, the 16-Item F/V screener was validated through its use within the Eating at America's Table Study (Thompson et al. 2002 and Subar et al. 2001). This screener was used to assess both mother's and children's intakes of F/V over the previous month, consisting of frequency and portion size questions similar to the NHANES process of dietary recall data collection (Yaroch et al. 2012). The 8 food items included are fruit juice, fruit, lettuce/salad, fried potatoes, other potatoes, dried beans, other vegetables, and tomato sauce (Yaroch et al. 2012). The one-cup portion guide (Appendix 2) was also available to participants in order to maintain consistency with portion sizes. Categories used to quantify portion sizes consumed were the same four categories of portion sizes offered within The 2-Item cup F/V Screener (Yaroch et al. 2012). In order to measure frequency of consumption, categories of frequency offered for each food item consisted of never to ≥ 5 times per day (Yaroch et al. 2012).

Short dietary screeners have been found appropriate for use within cross-sectional studies in order to assess one or only a few aspects of the diet (Thompson et al. 2015). Dietary screeners are a recommended mode of dietary data collection for research due to their ability to 'estimate the mean intake of few dietary factors, such as F/V when researchers lack extended research time and or resources' (Thompson et al. 2015). Measuring maternal F/V consumption as well as child F/V consumption using the 2-Item Cup F/V diet screener allowed for assessment of typical portions of F/V intake in frequency measures of daily. Finally, the 16-Item F/V Screener permitted an additional, more in depth, analysis of F/V frequency and portions for both mother and child over the previous month (i.e. fruit juice, lettuce/salad, fried potatoes, other potatoes, dried beans, other vegetables, and tomato sauce) (Yaroch et al. 2012).

For convenience and to increase participation, the dietary data for both mothers and children were collected electronically via maternal submission; this method of data collection has the added benefit of decreasing attrition rates (Wyse et al. 2014). Maternal reporting of child dietary data was necessary due to age and ethical boundaries. By providing easy, understandable questions based on portion size and frequency of consumption for specific food items, this portion of the screener provided an easy way to collect meaningful data while decreasing participant confusion and burden.

Data Analysis

Survey data were generated using Qualtrics software (Qualtrics, Provo, UT) and imported into SPSS statistical software (IBM Corp. Released 2016. IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp.) for analysis. The data were screened and proofed for accuracy and consistency (e.g., months were converted to years for age of child). Dietary variables were converted into cup units for all comparisons. Mean responses from the 2-item cup F/V screener were calculated in cups (eg, ½ to 1= 0.75 cup). Mean responses from the 16-item F/V screener were computed using the scoring system outlined in NCI for fruits, vegetables, F/V, vegetables without fried potatoes, and F/V without fried potatoes (Yaroch et al. 2012 and Scoring 2010). Descriptive statistics were computed (means, medians, standard deviations, frequencies).

Observations were separated into two subgroups using the ecSI 2.0 survey scores of Satter (Satter 2015). A score of greater than or equal to 32 was considered eating competent, while scores below 32 were considered to be non-eating competent. The eating competence score was further divided into 4 sub-scores: 1) eating attitudes (1-15 points), 2) food acceptance (1-9 points), 3) food regulation (1-9 points), and 4) contextual skills (1-15 points). Within these sub-categories, specific cut offs have not been established but 'general impressions' can be made based on the number of points allotted for each sub category and the subsequent score being either high, moderate, or low (Satter 2015). A lower score would indicate a sub category as a problem area for that individual. Eating competence sub categories were scored and analyzed using linear regression analysis against both mother and child intake variables. Differences in mothers' perceptions of the quality of their diets and the diets of their children were examined using a paired-samples t-test.

Poverty level is dependent upon both the household income and the number of persons residing in the household (Poverty 2018). To control for socio-economic status in statistical analysis, all observations were categorized as above or below the federal poverty level (FPL) using guidelines determined by the Department of Health and Human Services (HHS). FPL was computed based on the number of people in the household compared to annual income reported to examine whether the participant fell below or above the current 2018 FPL. When observations were missing, cases were excluded pairwise from analyses. Variables were checked for normality using the Kolmogorov-Smirnov statistic and descriptive statistics (means, SDs, and ranges) were computed for data from both the mother and child. When data were not normally distributed and transformation did not improve the distribution, non-parametric tests were used for means comparisons (e.g., Wilcoxon signed ranked test, Mann-Whitney U tests). A Mann-Whitney U test was used to assess the differences between eating competent and non-eating competent mothers and their F/V consumption as well as their child's F/V consumption.

Pearson and Spearman correlation models were used to explore relationships between variables for both mother and child data. Logistic (binary data) and Poisson (non-normal distributed data) regression models were used to explore particular relationships of interest to the research questions. ANOVA was used to test for interaction effect between variables of interest. The significance level (alpha) for all tests was set to 95 CI and $p<0.05$.

C. RESULTS

Participant Characteristics

The participant characteristics of both mothers and children are found in Table 1. Mothers were mostly white (82.1%). Based on mother's reports, the average age of the children was 4.0 ± 0.7 years old (y). Slightly more than half of the children were male, and mothers reported that 60% of the children spent greater than 6 hours a day in childcare. All but one of the participants were high school graduates and 75% had at least a 4-year college degree. Mean maternal age was 34.8 ± 5.1 y. Approximately three-quarters of the mothers reported being married as well as working greater than 30 hours per week. Based on income and number of people in the household, 88% of the participants were above the federal poverty level. Average maternal BMI was 25.7 ± 6.0, with approximately half considered to be a healthy weight.

Thirty-eight percent of the mothers reported preparing more than 7 meals per week at home, while only 7.4% of mothers reported that their families consumed 4-5 meals per week from fast food or convenience restaurants (Table 2). On average, mothers rated their own diets a 6.6 ± 1.6 on a 10-point scale, with a 10 being the healthiest. They rated their children's diets higher with an average of 7.2 ± 1.6. This difference was statistically significant ($p < 0.001$).

Forty-five percent of mothers were considered to be eating competent with an average eating competency score of 31 ± 7.8, (N=64, Table 3). Sub categories of ecSI 2.0 were evaluated using means, SD, and medians on a scale from 1 to 15 for eating attitudes and contextual skills and 1 to 9 for food acceptance and food regulation. Overall, eating attitudes were found to have the highest overall average of 10.3 ± 2.7. This is in comparison to a similar, yet differently scaled food acceptance, which showed a mean score of 5.1 ± 2.4. As a whole, the sub categories were all found to be above the sub score ranges, revealing a potential higher aptitude in eating competence categories for participants.

Maternal and Child F/V Intake

Descriptive statistics for each question from the 2- and 16-item screeners for both mothers and children are shown in Tables 4 and 5, respectively. In general, the dietary data were not normally distributed (Appendix 7). Square root, natural log, and exponential transformations did not improve any of the distributions, therefore non-parametric test were performed.

For the 2-item F/V screener, mothers reported that children consumed 1.9 ± 0.9 cups of fruit (including 100% fruit juice) and 1.2 ± 0.7 cups of vegetable (including 100% vegetable juice) daily. Mothers reported slightly lower intakes for themselves of fruit (including 100% fruit juice) with a mean intake of 1.3 ± 1.1 cups. This could be attributed to the increased intake of juice by the preschool aged children, compared to adult juice intake. Maternal vegetable intake was found to be slightly higher than child intake with mean maternal intake being 1.5 ± 1.1 cups (including 100% vegetable juice). Increased energy needs could help explain greater quantity of F/V consumption of mothers.

For the 16-item F/V screener, mothers reported that children consumed an average of 2.6 ± 1.5 cups of total fruit per day (Table 5). Other vegetables (broccoli, green beans, carrots, etc.) were consumed on average at 2.1 ± 1.9 cups/day, with a median value of 1.9. The third highest dietary component for child intake was fruit juice with a mean intake of 1.2 ± 2.0 cups per day. The highest reported dietary component for mothers was other vegetables (2.4 ± 2.2) followed by fruit (1.7 ± 1.6). Mothers' reported their salad intake at 0.7 ± 0.7 cups/day. Interestingly, mothers' total intake for both fried and other potatoes as well as dried beans was higher than their children's intake of these categories.

Eating Competence, Non-Dietary, and Dietary Influences

Non-parametric Spearman's rank order correlations were used to investigate the relationships between the sample population's demographic variables, eating competence, and F/V intake (Table 6). The lower a mother scored in eating competence the higher her BMI tended to be ($r=-0.416$, $p<0.01$). A mother's BMI was also higher with more hours she worked per week ($r=0.264$, $P<0.05$). Higher maternal eating competence was associated with higher maternal ($r=0.575$) and child ($r=0.249$) dieting rating scores, higher intakes of fruit ($r=0.252$) and vegetables ($r=0.287$) for the child, higher maternal intake of vegetables ($r=0.439$), an increased number of meals prepared at home per week ($r=0.363$), the mother's education level ($r=0.288$), and the number of adults residing in the household ($r=0.215$, $p<0.05$ for all variables).

Higher mother and child diet ratings were associated with an increase in the number of meals prepared in the home per week ($r=0.343$ and $r= 0.400$ respectively; $p<0.05$). Maternal diet ratings positively correlated with increasing education level ($r=0.369$) and the number of adults residing in the household ($r=0.230$, $p<0.01$ for both variables). Maternal diet rating was negatively related to the number of meals obtained at fast food or convenience restaurants ($r=-0.385$, $p<0.01$). A mother's rating of her child's diet increased with an increase in the number of hours the child spent in child care ($r=0.319$, $p<0.01$). Fewer children in a household was associated with a higher maternal rating for a pre-schooled child's diet ($r=-0.189$, $p<0.05$). Likewise, the number of hours per week that a pre-school aged child spent in childcare increased with fewer total children in the household (r=-0.253, p<0.05).

Education level and the number of adults in the household were positively correlated with the number of meals prepared in the household per week (r=0.383 and r=0.323respectively, p<0.01). Marital status was related to the number of meals prepared in the household per week, with single and divorced mothers preparing fewer meals per week (r=-0.331 and r=0.360 respectively, p<0.01). Single and divorced mothers also tended to have less education compared to their married counterparts (r=-0.370, p<0.01). In general, the number of adults residing in the household was positively correlated with the number of children in the household (r=0.892, p<0.01).

Maternal and Child F/V Consumption in relation to Maternal Eating Competence

The relationships between a mother's total eating competence score and both the mother and child's F/V intakes were investigated using non-parametric Spearman's rank order correlations (rho; Table 7). The relationship between a mother's F/V intake and a child's F/V intake was also examined in this way (Table 7). Mothers' eating competence scores positively correlated with the number of cups of F/V children consumed (p<0.05). A mother's eating competence was significantly and positively associated with a children's total fruit intake (cups/day), salad intake (cups/day), and consumption of other vegetables (cups/day). Mothers' eating competence was also significantly and positively associated with the cups/day of vegetables she consumed (p<0.05), but not the number of cups/day of fruit and fruit juice consumed. When mothers did consume fruit juice, their consumption was positively associated with children's fruit juice consumption (p<0.01). Mother's consumption of vegetables other than salad and potatoes was significantly and positively associated with both mother's and children's consumption of fruit, salad, and fried potatoes (p<0.05). Mother's salad consumption was also positively and significantly correlated with children's consumption of fruit juice, fruit, salad, and fried potatoes (p<0.05). When a mother consumed other types of potatoes, the child did as well (p<0.05). A mother's consumption of fried potatoes correlated significantly with increased consumption of fruit juice, fried potatoes, and other potatoes (p<0.05). When mothers consumed more tomato sauce, children consumed more dried beans and tomato sauce as well (p<0.05)

Mann-Whitney U tests were used to assess the differences between eating competent and non-eating competent mothers and both their F/V consumption and their child's F/V consumption (Appendix 8). There was no significant difference in overall fruit intake between EC mothers (*Md*=0.97, n=27) and non-EC mothers (*Md*=1.03, n=34), U= 450.50, z=-0.126, p=0.90, r=-0.016. There was, however, a significant difference in overall vegetable intake between EC (*Md*=1.9, n=27) and non-EC mothers (*Md* = 1.04, n=34), U=302.5, z=-2.32, p=0.02, r=-0.19. Although statistically significant, it should be noted that the low value for r (-0.19) indicates the effect size for this difference is small.

There was no significant difference in total fruit intake between children of EC mothers (*Md*=2.5, n=29) and non-EC mothers (*Md*=1.5, n=35) U=396.5, z=-1.60, p=0.110, r=-0.20. Likewise, there was no significant different between the two groups for vegetable intake (EC mothers, *Md*=1.50, n=29; non-EC mothers *Md*=0.75, n= 35) U=406.00, z=-1.44, p=0.150, r=-0.18)

<u>Predictors of Maternal Eating Competence</u>

Direct logistic regression was used to determine the impact of a mother's BMI, diet, and FPL (Federal Poverty Level) on her eating competence score. The model contained nine independent maternal variables, including maternal BMI, fruit juice (cups/day), fruit (cups/day), salad (cups/day), other potato (cups/day), dried beans (cups/day), other vegetable (cups/day), tomato sauce (cups/day), and FPL. A Hosmer-Lemeshow test for the dichotomous eating competence categories (EC or non-EC) supported the model as being worthwhile. A goodness of fit test indicated support for the model's validity (X^2 = 4.395, df=8, and p= 0.820).

The full model containing all predictors was statistically significant, X^2 (9, *N*=68) = 24.4, p= 0.004, showing FPL as a key significant predictor, indicating that the model was able to distinguish the dietary patterns of respondents who were above the FPL from those who were below. The model as a whole explained between 36.4% (Cox and Snell R squared) and 48.6% (Nagelkerke R squared) of the variance in eating competence and correctly classified 74.1% of cases. Notably, those who are above the FPL have increased levels of eating competence than those below the FPL. Only one of the independent variables made a unique statistically significant contribution to the model (maternal intake of other potato (cups/day)). Two variables had borderline significance (maternal intake of other vegetable (cups/day) and household income level). A mother's consumption of types of potatoes other than fried, was the strongest predictor of eating competence in this model. The odds ratio of 98.9 indicates that individuals who reported eating "other potatoes" were 98 times more likely to score above the cut off for eating competence with each reported cup of potatoes consumed. Although the result was of borderline significance, individuals were more likely to score above the eating competence cutoff for each 1.49 cups of vegetables consumed. Similarly, respondents above the federal poverty level were 37 times more likely to score above the eating competence cut off.

Eating Competence Sub-Scores in Relation to Maternal and Child F/V Intake

Food Regulation (Appendix 3)

Simple linear regressions were used to assess the effect of a mother's food regulation EC sub-score on both mother and child F/V intake. A mother's food regulation score significantly predicted her child's fruit intake (cups/day), b = 0.20, t(2.25) = 1.47, $p < 0.05$ and explained a significant proportion of variance in the child's fruit intake (cups/day), $R^2 = 0.72$, F(1,65) = 5.04, p=0.03. Food regulation also predicted a mother's intake of other potatoes (cups/day), b=0.07, t(2.92) = -0.32, $p<0.05$ and some of the variance in the intake of other potatoes (cups/day), $R^2=0.12$, F (1,60) = 8.50, p= 0.01. No other variables were statistically significant in this model.

Food Acceptance (Appendix 4)

A mother's food acceptance sub-score significantly predicted her child's fruit intake (cups/day), b=0.18, t(2.42) = 1.72, $p <0.05$ and a significant proportion of the variance in a child's fruit intake (cups/day), $R^2= 0.81$, F (1,66)= 5.8, p=0.02. Food acceptance also predicted a child's intake of other vegetables (cups/day), b=0.23, t(2.43) = 0.99, $p<0.05$ and the variance for other vegetable intake, $R^2=0.08$, F(1.64)=5.89, p=0.02. A child's intake of dried beans (cups/day) was significantly correlated with the mother's food acceptance sub-score as well, b=0.02, t(2.25) = -0.00, $p<0.05$; $R^2=0.07$, F(1,66) = 5.07, p=0.03.

Food acceptance sub-scores also predicted maternal fruit and salad intake. (Maternal fruit intake (cups/day), b=0.23, t(2.71) = 0.59, $p<0.01$; $R^2=0.11$, F(1,60)=7.32, p=0.01; maternal salad intake (cups/day), b=0.72, t(2.04)=0.36; $R^2=0.06$, F(1,62)=4.15, p=0.05). All other variables were not statistically significant within this model.

Eating Attitudes (Appendix 5)

Although the eating attitudes sub category of eating competence predicted maternal intake of other potatoes (cups/day), b=0.04, t(3.41) = -0.15, $p<0.01$; $R^2=0.17$, $F(1,59) = 11.63$, $p=0.00$, it did not significantly predict any other variable.

Contextual Skills (Appendix 6)

The contextual skills sub category of maternal eating competence significantly predicted a child's intake of both fruit and salad, and was marginally significant in predicting a child's intake of fried potatoes. Child fruit intake (cups/day), b=1.15, t(2.83) = 0.62, $p<0.01$, $R^2=0.11$, $F(1,64) = 8.02$, $p=0.00$; child salad intake (cups/day), b=0.24, t(2.17) = -0.20, $p<0.05$, $R^2=0.07$, $F(1,63) = 4.73$, $p=0.03$). Maternal fruit and salad intake were also predicted by contextual skills sub-scores (mother fruit intake (cups/day), b=0.19, t(3.23) = -0.09, $p<0.01$., $R^2=0.15$, $F(1,59) = 10.46$, $p=0.00$. Mother salad intake (cups/day), b=0.06, t(2.36) = 0.15, $p<0.05$, $R^2=0.08$, $F(1,61) = 5.56$, $p=0.02$).

D. DISCUSSION

This research study expands upon past literature by exploring the relationship between maternal eating competence and maternal and child F/V intake from 68 mother-child dyads. The reported findings support the hypothesis that eating competency plays a role in both maternal and child F/V intake. Higher eating competence translates to higher F/V consumption intake in both mothers and children.

The mean age of the mothers in this study was 34.8 years old. Approximately half could be considered to be at a healthy weight. Approximately three quarters of these women reported being married. In recent literature, Potacha and Jecukowicz (2017) looked at maternal characteristics and their potential influences upon preschool age children's nutritional status (Potacha and Jecukowicz 2017). A mother's marital status was found to be positively significant when assessing child nutritional status (Potacha and Jecukowicz 2017). Marital status within this study was related to the number of meals prepared in the household per week, with single and divorced mothers preparing fewer meals per week in the home. The results presented here are thus consistent with prior research; a mother's marital status may influences her child's diet and nutrition.

It is possible that younger, less educated mothers are working longer or atypical hours, decreasing the potential to procure or prepare healthful meals or simply due to time constraints, leading to reliance on affordable quick meal options. This study identified that a negative correlation was associated with maternal education level and meals obtained from fast food or convenience restaurants per week. Darmon and Drewnowski (2008) reviewed common barriers to diet quality among low income individuals, finding that food price is considered very important to low income women and that they were more likely to have energy dense diets (Darmon and Drewnowski 2008). Similarly, Spence et al. (2018), conducted a longitudinal study utilizing the Melbourne Infant Feeding Activity and Nutrition Trial Program early childhood lifestyle intervention trial, found that children aged 3.5 years old, of lower socioeconomic status (SES), had higher discretionary food intake but had similar fruit intake as children aged 9 months to 1.5 years old, indicating intake of F/V for these 3.5 year old children were below federal recommendations (Spence et al. 2018) Spence et al. (2018) also found that at age 5, those with lower SES were found to have lower vegetable intake compared to their increased SES counterparts (Spence et al. 2018).

Approximately three-quarters of the mothers reported working greater than 30 hours per week outside of the home. According to the National Center for Education

Statistics, 54.1% of 3-5 year olds were enrolled in full day (>6 hours) preschool centers in 2016. (US Dept. Commerce 2017). Sixty percent of our study population was found to spend greater than 6 hours a day in childcare which is higher than national average. It is, however, important to note that primary recruitment for this study was done through daycare centers for increased access to the child age study inclusion criteria of 3-5 years old.

In a prior study of maternal eating behaviors, researchers attempted to predict child feeding practices of children attending childcare. They examined types of food, frequency of meals/snacks, and the feeding environment the child is exposed to while away from their mother (Tylka et al. 2013). Tylka et al. (2013) found that mothers with increased contextual skills, a sub category of EC, were more likely to utilize the division of responsibility of eating with their children, allowing children to respect their hunger and fullness cues in order to self-determine how much to eat (Tylka et al. 2013). Mothers within our study reported higher child diet quality rating scores the more hours their children spent in childcare.

Programs that support childcare facilities, such as the Child and Adult Care Food Programs (CACFP), must be considered when interpreting our study's data. The CACFP provides federal dietary guidelines for the reimbursable meals and snacks offered at childcare facilities following the 2015 edition of the Dietary Guidelines for Americans. This would potentially increase intake of F/V, whole grains, and less added sugars and saturated fats; increasing overall diet quality for children who attend childcare regularly. Depending on site to site variability, if two meals and one snack are provided five days a week in childcare, children would receive approximately 1 ¼ cups of F/V per day (CACFP 2018). If snacks are primarily provided, fruit intake would probably increase due to preschooler taste preferences. Results from the current study, as well those from previous research studies, suggest fruit is one of the highest dietary intake categories within the childcare population (Kim et al. 2014), further supporting the idea that children consume more fruits than vegetables daily. The children in this study, over half of whom were enrolled in full time childcare programs, met the USDA daily recommendation for fruit consumption. This is probably indicative of the F/V exposure within the daycare setting, as formal childcare programs are likely to be required to follow CACFP regulations.

Consistent with existing literature, the current study found that mothers generally believe their child's diet is more healthful than their own. A cross sectional analysis conducted by Kourlaba et al. (2009) examined maternal perceptions of their preschool aged children's diets. They found that 82.5% of mothers overestimated the quality of their children's diet compared to calculated Healthy Eating Index (HEI) scores (Kourlaba et al. 2009). While 80% of mothers in that study reported that their child had a 'good diet, only 0.2% of the preschoolers actually had a 'good' diet as assessed by the HEI (Kourlaba et al. 2009). The method of data collection employed by this study (i.e., questioning mothers on the healthfulness of their child's diet) may have unintentionally skewed the results. As protective caregivers, mothers may have misrepresented actual intake to indicate a more healthful intake. Interestingly, other studies have also found similar misrepresentative data concerning the perception of diet quality. Mothers are likely unaware of the types and quantities of fruits and vegetables consumed by their children when in childcare, making reporting of diet quality and intake somewhat limited.

In the current study, total fruit, other vegetables, as well as 100% fruit juice were the largest proponents of children's intake according to the 16-item screener used. This study found that 87% of children met current fruit recommendations, and 50% met vegetable recommendations. According to the 2018 Centers for Disease Control (CDC) state indicator report on F/V intake, American adults only meet 12.2% and 9.3% of daily intake recommendations for fruit and vegetables, respectively (State 2018). These percentages are found to be lower if the individual is considered to be below the FPL (State 2018). According to the 2-Item screener used, mothers in the current study consume inadequate amounts of both fruits (1.3 $\pm$ 1.1 cups/day) and vegetables (1.5 $\pm$1.1 cups/day) according to current recommendations. Forty three percent and 31% of mothers within this study were found to meet current federal recommendations for fruit and vegetable intake respectively. The current USDA MyPlate recommendations for adults are 1.5-2 cups/day of fruits and 2.5-3 cups/day of vegetables per day (USDA 2015). It is possible that the 2-item screener used in this study marginally underestimated maternal F/V intake due to the fact that fruit and vegetable juices were included. This could have created the perception of limited intake as adults are typically less inclined to consume juice compared to children. Children were found to meet fruit recommendations (1.9 $\pm$ 0.9 cups/d) according to national guidelines but were marginally inadequate in vegetable intake (1.2 $\pm$ 0.7 cups/d) depending on age of the child. Current recommendations for children aged 3-5 are 1 cup/d for fruits and 1-1.5 cups/d for vegetables (USDA, 2015).

Parental modeling is thought to be the greatest indicator of a child's dietary intake, especially F/V consumption (Goldman et al. 2012, Tylka et al. 2013, Blissett and Fogel 2013, and Coulthard and Blissett 2009). Goldman et al. (2012) caution that this includes both increased awareness of positive parental modeling such as the consumption of F/V in the presence of their child, as well as the negative consequences of parental modeling such as not eating the F/V they serve to their children (Goldman et al. 2012). In a study examining the influence parental modeling has upon child F/V intake, a significant relationship was found between parent modeling and vegetable consumption; this was, however, not seen with fruit consumption (Goldman et al. 2012). Recent research has shown that demonstrating parental intake of same or similar food items can influence a preschool aged child's intake of commonly rejected foods; such as vegetables (Blissett and Fogel 2013).

Our data indicate that mothers have a slightly higher vegetable intake compared to their children. This presents a modeling opportunity, as mothers can influence their child's acceptance of vegetables they may normally avoid with continued exposure. However, when considering a child's lower intake of vegetables compared to their maternal counterpart, we must also consider that the higher caloric requirements of adults may drive increased maternal vegetable intake. Regardless of the underlying cause for increased vegetable intake, when mothers eat what their children eat, the children tend to refuse significantly fewer foods than children whose mothers eat different foods from what they are offered (Powell et al. 2016). Beyond the home, there are many other environments responsible for modeling positive and/or negative dietary intake patterns; schools, daycares, as well as work environments all play their part in eating choices and preference development. As such, it is possible that maternal modeling of F/V intake and acceptability is no longer be the most influential factor determining F/V intake for the preschool demographic. Further work should to be done to evaluate the different factors that influence dietary intake based on both the food environment and those who inhabit these environments.

Parental modeling has also been related to eating competence scores, with parental modeling behaviors being significantly related to the higher consumption of F/V in eating competent compared to non-eating competent parents (Lohse et al. 2012). Furthermore, in a study investigating F/V modeling behaviors and F/V availability, fruits, vegetables, and 100% fruit juices were found to be more available in the homes of eating competent than non-eating-competent parents (Lohse et al. 2012).

Interestingly, the current study found that a mother's intake of fried potatoes correlated significantly with increased consumption of children's fruit juice, fried potatoes and other potatoes. Intakes of these types of foods may imply a connection with maternal and child intake of convenience or fast foods. When looking at studies assessing the time consuming aspects of preparing a healthy meal for one's family in working mothers, researchers found that 60% of mothers would prefer spending less than 15 minutes in meal preparation (Freeland-Graves and Nitzke 2013). This indicates that choosing an easier solution, such as stopping for convenience foods, would be more often sought after to decrease time and work. In opposition, our study found that 38% of households prepare greater than 7 meals per week at home, while 7.4% of mothers reported that their families consumed 4-5 meals per week from fast food or convenience restaurants. The time involved in of meal preparation, however, was not examined within this study.

Prior research that examined child eating behavior and nutritional health at mealtime, suggested that intake did not differ significantly when a child's father or siblings were present while eating (Powell et al. 2016 and Dallacker et al. 2018). This study, however, showed that marital status was a contributing factor to eating patterns (in regard to content and context) within the home. Our results indicate that child diet quality rating scores were positively and significantly associated with higher educated, married mothers; inferring a possible 'team work' aspect of dual parenting. Furthermore, results indicated that divorced or single mothers were more likely to report a higher incidence of meals not eaten at home and from fast food or convenience restaurants within this study.

In this study maternal BMI was found to be negatively associated with EC scores, and positively associated with an increase in the number of hours worked per week. In a study examining working and its effects on BMI in the American adult, Abramowitz (2016) found using an increment of 10 hours of work, was associated with a 0.424 increase in BMI. This represents an increase of 2.5 lb for each additional 10 hours added to the work week (Abramowitz 2016). The similarities in these findings indicates a relationship between the difference in dietary choices mothers make whether they are working full time, part time, or are at home the majority of the day. One could speculate that mothers who do not work outside of the home and have food procurement and preparation as some of their primary responsibilities, would have increased intake of healthful foods. Mothers who work outside of the home, may have less time to prioritize nutrition, and merely need to make sure food is provided to their children daily however they are able. This is supported by a 14 year longitudinal study conducted in Australia that found a positive association between mothers who did not work when their child was 2, 3, and 5 years old and an increase in diet quality at age 14, as compared to mothers who worked full time when their children were young (Li et al. 2011). That study found that paternal employment status had no long-term effect on child diet quality, implying that an important connection is made during the early years of life between mother, child, and dietary characteristics that form future dietary ramifications (Li et al. 2011).

The current study shows that child dietary intake was characterized by maternal influence in regard to maternal intake, maternal BMI and eating competence scores. Maternal eating competence in particular was seen to have the greatest association with child's intake of F/V consumed. This study also found that mothers considered to be eating competent had children who consumed higher amounts of F/V. This finding aligns with research that indicates eating competent parents are models for healthful eating behaviors, and that modeling through consumption of similar foods and food availability is particularly important (Lohse and Cunningham-Sabo 2012). Although that particular study focused on individuals of Hispanic ethnicity, its findings are broadly relevant, as child intake is generally highly dependent upon the home and eating environment.

Mothers are continually regarded as the primary influencer on dietary behaviors throughout the literature; not only when the child is dependent upon them, but for lifelong habit formation as well. It is imperative that children see role modeling of healthful eating early in development to combat chronic disease formation that coincides with consistent poor dietary choices. Interestingly, in this study a mother's total intake of both fried and other potatoes, as well as dried beans, was higher than their children's, suggesting that these mothers may not be eating/serving the same meal components to their children. Another possible speculation is that this finding is related in some way to extended time spent in childcare; it is possible that the meals served at day care centers do not contain the same food components as meals served at home or by their mother counterparts.

Furthermore, adults have increased energy needs; this could explain some of the differences in intake quantities seen within this study as well as past literature.

Socioeconomic status has been expressed as a major component indicative of the creation of eating attitudes. A 2012 Gallup Poll expressed that 21% of Americans are regularly concerned with having enough money to buy adequate amounts of food (Freeland-Graves and Nitzke 2013). Although not it was not initially considered an explicit objective for this study, we did explore the effect SES had on eating competence and reported intake.

Our results show that household income level could significantly predict the eating competence levels of mothers. Respondents above the FPL were 37 times more likely to score above the eating competence cutoff. Other studies have examined the effect of household income upon preschool aged children's dietary intake in regard to quality and have found similar results (Kunaratnam et al. 2018, Darmon and Drewnowski 2008, and Spence et al. 2018). A recent study conducted in Australia found that children of lower SES have a decreased overall intake of vegetables as they age, and generally fail to meet current recommendation standards (Spence et al. 2018). This is true of US data as well; a current trend that seems to span all income levels. Similar results are found throughout the literature; the dietary intake of fruit often meets general guidelines although vegetable intake continues to fall short of current recommendations (Kunaratnam et al. 2018). Our study supports this finding, as the highest intake component for children was found to be fruit consistently across the participants. This could be attributed to children's decreased food acceptance to new foods and/or foods that are not as flavorful as common fruits.

Rejection of foods such as vegetables or unfamiliar foods is commonly observed within the preschool population due to a number of developmental circumstances (Kim et al. 2014).

As Satter and colleagues (Satter 2007 and Tylka et al. 2013) have shown, eating competence is a multifaceted concept that not only affects the adult within the context of food and personal autonomy, but may also influence the way their children develop into eaters. Tylka et al. (2013) further established that mothers with higher eating competence levels were more likely to utilize the division of responsibility theory created by Satter, and share feeding responsibilities with their child (Tylka et al. 2013). The current study attempted to elaborate on these earlier lines of inquiry by examining sub-categories of eating competence in hopes of understanding deeper influences of food choices and consumption patterns.

Food regulation, a sub-category of Satter's eating competence, highlights a biological as well as psychological component of eating that a person faces every day. Our study found that food regulation was significantly correlated to child fruit intake as well as mother's consumption of potatoes other than fried. Food regulation concepts can be complicated, as the food supply can be very diverse in nature and people must navigate through what is desired, needed, and chosen for daily intake. Looking at the feeding dynamic between mothers and their children, Frankel et al. (2012) observed that the manner in which parent's interact with their children around food influences their own self-regulatory skill development of both emotions and eating (Frankel et al. 2012). To understand the motivation for food regulation studies attempt to explain the complex relationship one has with food and what drives particular intake choices. Verstuyf et al. (2012) speculates that there are both intrinsic and extrinsic motivation factors of eating and food choice directing someone towards regulatory development skills (Verstuyf et al. 2012). Disordered eating, along with a tendency to mistrust one's bodily cues of hunger, cravings, and fullness can alter certain regulatory skills that are often observed in a mother can be mirrored by a child. The food regulation results in this study show a particular acceptance to fruit intake as a positive dietary choice for both child and mother, as mother fruit intake was found to be marginally significant. Another thing to consider is the acceptability aspect of the studied demographic; children of preschool age are more willing to eat fruits versus vegetables, which could have dictated overall methods of child feeding strategies and food regulation of the child for mothers.

According to Satter, eating attitudes are formed very early in life, developing lifelong perceptions and beliefs pertaining to eating and particular food choices (Satter 2007). Seen within the current study, food acceptance was significantly correlated with increased reporting of child fruit, vegetable, as well as dried beans consumption. This could indicate a certain level of comfort and allowance of new versus familiar food items at a crucial age, interconnecting two sub categories, eating attitudes with food acceptance. Looking at a mother's own personal food acceptance and attitudes shows how these particular qualities are able to trickle down onto the child's perception of normal and supportive eating in the context of different environments.

Parenting styles are consistently referenced within the literature when discussing food acceptance of children. Parents are seen as the food moderators. Couthard and Blissett (2009) found that mothers who utilized restrictive feeding practices had children who consumed significantly less F/V compared to mothers who did not use restrictive behaviors around eating (Couthard and Blissitt 2009). Furthermore, family meals were found to also increase food acceptance and were associated with higher F/V intake regardless of parental nutritional knowledge (Peters et al. 2012). Interestingly this could indicate that regardless of the mother's understanding of what makes up a healthy diet, using less dominant feeding styles and increasing the frequency of family meals induces an environment for increased acceptance and intake of healthful items subsequently. The current study found that increased meals prepared at home was positively and significantly correlated with increased EC scores. However, that is inferring that healthful items are offered daily by these parents, which was not asked within this study.

Modeling positive relationships with healthful foods in the home can act as an intake commonality between mother and child, increasing F/V intake when the child is not around their mother, such as in daycare. Eating attitudes are difficult to assess within a snapshot of time with minimal interaction on daily choices and emotions pertaining to eating. Although limited in observation, eating attitudes was significantly correlated with mother's intake of other potatoes. As eating attitudes are often discussed in conjunction with self-trust, or lack thereof, these results could coincide with increased ability to prepare and eat sufficiently while not over indulging to the point of losing control. In recent literature, supporting data has been seen in regards to attitudes towards healthy eating and increased education level (Le et al. 2013). Higher educational level could indicate more hours worked and increased hours children are found to be in childcare, which could lead to additional sources of influence upon attitudes (teachers, peers, etc.) towards what is seen as healthful, unhealthful, as well as a desire for consumption.

Contextual skills were significantly correlated with both maternal and child intake of fruit and salad. Studies of similar nature uncovered comparable results such as finding mothers who eat with openness and self-trust within the sub category of contextual skills, eat regular meals and are seen to choose foods that are of nutritive value, mirroring similar opportunities to their children (Tylka et al. 2013). Satter proposes similar thoughts on the nature of the mother child dyad of eating, in which the parent must provide the context in which to make healthy choices, whereas the child can create personal autonomy within a structured environment (Satter 2007). This expands upon the aforementioned concept that families that have regularly planned family meals are more likely to consume similar meal components. The literature expands this concept, looking into meal planning and nutritional adequacy based on the discipline of food management (Satter 2007). A study conducted with adolescents and the impact of planned family meals, found that those "who consumed five or more servings of F/V per day increased as frequency of family meals increased, 19% (infrequent meals), 25% (occasional meals), and 32% (frequent meals)" (Watts et al. 2017). Although the child demographic differs in age, this shows a pattern of choice and priority of family meals and increased F/V intake which would hypothetically begin early in life, cultivating lifelong importance of the context of healthful family meals. These results open up aspects of the family eating context, and creates opportunity for increased education pertaining to food preparation, possibly involving all family members in culinary education, leading to decreased obesity rates and more healthful families overall.

Strengths and Limitations

As a study strength, researchers were able to utilize various assessments tools that have been tested for reliability and validity, such as the ecSI 2.0 and two dietary screeners, which have been accepted within the literature as an appropriate dietary research tool for cross-sectional analysis. Furthermore, we had the opportunity to evaluate a population in attempts to determine newfound areas where change can be impactful for future lifestyle behaviors in conjunction with dietary choices, hopefully increasing overall health. However, our findings were preliminary in nature and would need further research to be able to implement behavior modification measures.

This study was not without limitations. Using a cross sectional study design leaves the researchers unable to make assessments based on cause and effect. A highly educated sample, limited ethnic diversity, as well as only accessing mothers from two regions within the United States needs to be taken into consideration. Dietary data were only assessed using screeners and lacked a second representation leading to a lack of cross referencing, which would have been helpful to assess overall patterns of intake within our population. Furthermore, in attempts to decrease participant burden, limited dietary data were collected in the form of screeners. It would have been beneficial to study outcomes to assess the diet as whole, looking at all variables of intake rather than just focusing on F/V intake. Due to lack of consistent reporting of dates for child height, weight and age, researchers were unable to calculate child BMI, which would have been advantageous to compare to their maternal counterpart. Furthermore, the researchers' reliance on maternal submission of both child as well as their own data could have led to participant burnout, mis-reporting, generalization of intake, as well as involvement bias which is not uncommon with studies of this nature (Kunartnam et al. 2018 and Robson et al. 2016).

The sub categories of Satter's eating competence scores play a role on mother's influence on feeding their child, especially when in conjunction with that child being enrolled in a child care center. Particularly difficult to examine is how maternal influence is in relation to the many eating environments the child may be exposed to on a daily basis. Tylka et al. (2013) found impacts of differing styles of feeding, effects of the children's peers, as well as time spent not eating with their own mothers on children's nutrition (Tylka et al. 2013). Keeping this in mind, our sample was primarily white, married, and of increased education level. Furthermore, participants were found to work greater than 30 hours a week with 88% of participants residing above the FPL. The aforementioned findings could indicate lack of generalizability to individuals who can likely afford or allocate more healthful foods such as F/V, or furthermore, can afford child care.

E. CONCLUSIONS

This cross sectional study found interesting associations between maternal and child F/V intake in relation to maternal eating competence. Increased maternal eating competence plays a positive role in increased intake of F/V of preschool aged children. According to our data, children consumed above the current dietary recommendations for fruit (1 cup/d), however half of that came from juice intake. Within or study, children were consuming slightly under (depending on the age of the child) the dietary recommendations for vegetable intake (1-1.5 cups/d). Eating competence was also seen to be effective in increasing vegetable intake in mothers based on current dietary recommendations (2.5-3 cups/d) but was unable to predict adequate intake. This is important to understand that although eating competence is seen to improve intake, it does not necessarily mean that it influences intake to the recommended levels of current federal guidelines. Also, directionality is in question due to the limitations of the study design. Primary findings were consistent with current literature, indicating that both children and adult women are under consuming F/V compared to federal recommendations. Less than half of our participants were found to be EC, creating an area of potential improvement. Having an increased eating competency and ability to comprehend eating events in an all-encompassing aspect of preference, trust, health, and need to eat creates increased opportunity to have a more balanced diet for both self and their developing child. The relationship between maternal EC and child diet quality needs continued exploration as the current study provides initial evidence to expand upon in future research.

3. Illustrative Materials

TABLE 1. CHARACTERISTICS OF STUDY POPULATION

VARIABLE	N (%)
CHILDREN (N=67)	
AGE IN YEARS, MEAN ± SD	4.0 ± 0.74
GENDER	
MALE	42 (62)
FEMALE	25 (37)
HOURS SPENT IN CHILDCARE	
NONE	11 (16.2)
1-5 HOURS/DAY	16 (23.5)
> 6 HOURS/DAY	41 (60.3)
MOTHERS (N=67)	
AGE IN YEARS, MEAN (RANGE)	34.8 (19-43)
RACE	
CAUCASIAN	55 (82.1)
BLACK	1 (1.5)
ASIAN	5 (7.5)
PACIFIC ISLANDER	1 (1.5)
OTHER	5 (7.4)
MARITAL STATUS	
MARRIED	53 (77.9)
DIVORCED	5 (7.4)
NEVER MARRIED	10 (14.7)
EDUCATION	
LESS THAN HIGH SCHOOL	1 (1.5)
HIGH SCHOOL GRADUATE	3 (4.5)
SOME COLLEGE	7 (10.6)
2 YEAR DEGREE	4 (6.1)
4 YEAR DEGREE	21 (31.8)
PROFESSIONAL DEGREE	20 (30.3)
DOCTORATE	10 (15.2)
INCOME	
ABOVE FEDERAL POVERTY LEVEL*	60 (88.2)
BELOW FEDERAL POVERTY LEVEL *	8 (11.8)
HOURS WORKED/WEEK	
<20 HOURS/WEEK	16 (23.9)
20-30 HOURS/WEEK	2 (3.0)
>30 HOURS/WEEK	49 (73.1)
MATERNAL BODY MASS INDEX	
MEAN (RANGE)	25.7 (17.7-43.5)
UNDERWEIGHT	3 (4.4)
HEALTHY	36 (50)
OVERWEIGHT	17 (28)
OBESE	12 (17.6)

*Federal Poverty Line: calculated using total persons (children and adults) per household compared to annual income using 2018 HHS poverty guidelines. 1 persons = $12,140; 2 persons = $26,460; 3 persons = $20,780; 4 persons = $25,100; 5 persons = $29,420 (Poverty 2018)

TABLE 2. MATERNAL REPORTING OF EATING PATTERNS AND DIET RATING

VARIABLE	N (%)
HOW MANY TIMES PER WEEK EAT MEALS PREPARED AT HOME	
0-3 MEALS/WEEK	4 (5.9)
4-5 MEALS/WEEK	15 (22.1)
6-7 MEALS/WEEK	23 (33.8)
>7 MEALS/WEEK	26 (38.2)
HOW MANY TIMES PER WEEK EATING FAST FOOD	
0-3 MEALS/WEEK	62 (91.2)
4-5 MEALS/WEEK	5 (7.4)
6-7 MEALS/WEEK	1 (1.5)
MATERNAL DIET RATING*, MEAN (RANGE)	6.6 (2-9)
CHILD DIET RATING*, MEAN (RANGE)	7.2 (1-10)
DIETED IN THE LAST YEAR	
NEVER	42 (61.8)
1-4 TIMES	25 (36.8)
MORE THAN 10 TIMES	1 (1.5)

*Diet rating scale: Likert scale from 1-10, 1 = least healthy to 10 = healthiest.

TABLE 3. MATERNAL (N=64) EATING COMPETENCE SCORES

	N (%)
EATING COMPETENCE, TOTAL, MEAN ± SD	31 ± 7.8
EATING COMPETENT	29 (45)
NOT EATING COMPETENT	35 (55)
EATING COMPETENCE FACTORS (MEAN ± SD)	
EATING ATTITUDES	10.3 ± 2.7
FOOD ACCEPTANCE	5.1 ± 2.4
FOOD REGULATION	5.9 ± 1.9
CONTEXTUAL SKILLS	9.5 ± 3.3

Table 4. Characteristics of Study Population: Intake Variables (2 Item Screener)

	N	Min.	Max.	Mean	Median	Std. Deviation
Children						
Fruit/fruit juice (cups/day)	68	0.5	4.0	1.9	1.5	0.9
Veg/veg juice (cups/day)	68	0.0	3.5	1.2	1.1	0.7
Mothers						
Fruit/fruit juice (cups/day)	65	0.0	4.0	1.3	0.8	1.1
Veg/veg juice (cups/day)	65	0.0	4.0	1.5	1.5	1.1

Table 5. Characteristics of Study Population: Intake Variables (16 Item Screener)

	N	Min.	Max.	Mean	Median	Std. Dev
Children						
Fruit juice (cups/day)	67	0.0	8.8	1.2	0.2	2.0
Fruit total (cups/day)	68	0.0	5.3	2.6	3.0	1.5
Salad total (cups/day)	67	0.0	2.0	0.2	0.1	0.4
Fried potato (cups/day)	65	0.0	0.3	0.1	0.0	0.1
Other potato (cups/day)	66	0.0	1.0	0.1	0.1	0.2
Dried bean (cups/day)	68	0.0	1.0	0.1	0.2	0.2
Other vegetable (cups/day)	66	0.0	7.9	2.1	1.9	1.9
Tomato sauce (cups/day)	66	0.0	0.5	0.1	0.1	0.1
Mothers						
Fruit juice (cups/day)	65	0.0	2.5	0.2	0.0	0.4
Fruit total (cups/day)	62	0.0	7.5	1.7	1.5	1.6
Salad total (cups/day)	64	0.0	3.0	0.7	0.8	0.7
Fried potato (cups/day)	65	0.0	0.7	0.1	0.0	0.1
Other potato (cups/day)	63	0.0	1.0	0.2	0.1	0.3
Dried bean (cups/day)	65	0.0	2.5	0.3	0.1	0.5
Other vegetable (cups/day)	63	0.0	7.9	2.4	2.3	2.2
Tomato sauce (cups/day)	62	0.0	0.8	0.2	0.1	0.1

Table 6. Correlation Matrix for Eating Competence and Non-Dietary Variables

Spearman's rho	EC Total	BMI	C-F (cups/d)	C-V (cups/d)	C-F Juice (cups/d)	M-veg/juice (cups/d)	M-F/juice (cups/d)	M-Diet Rating	C-Diet Rating	C-Age	C-Hours spent in childcare	Meals prepared at home/week	Meals obtained from FF/ CR	Hours worked/week	Highest education	Marital Status	Adults in the HH	Total in the HH	Children in the HH
HH Income	0.2	-0.0						0.2	0.2								0.2	0.1	0.0
EC Total	1.0	-.4**	0.3*	.3*	-0.1	0.4**	0.2	0.6**	0.2**	-0.2	0.1	0.4**	-0.1	-0.1	0.3*	-0.2	0.2*	0.1	0.1
BMI		1.0	-0.3*	-0.3*	-0.0	-0.2	-0.2	-0.5**	-0.2**	0.1	-0.1	-0.3*	0.1	0.3*	-0.1	0.1	-0.1	0.0	0.0
C-F (cups/d)			1.0	0.4**	0.17	.3*	.3**	0.2	0.2	-.3*	.3*	.2*	-0.1	-0.2	-0.0	-0.1	0.1		-0.0
C-V (cups/d)				1.0	-0.1	0.4**	0.4**	0.3**	0.4**	-0.2	0.2*	0.4**	-0.1	-0.0	0.1	-0.1	0.2		-0.1
C-F Juice (cups/d)					1.0	-0.1	-0.1	-0.2	-0.0	0.2*	0.1	-0.2	0.0	0.0	-0.2	0.2*	-0.2		0.2
M-veg/juice (cups/d)						1.0	0.5**	0.5**	-0.0	0.0	0.3*	0.4**	-0.2	-0.1	0.2	-0.4**	0.4**		0.1
M-F/juice (cups/d)							1.0	0.3*	0.1	0.0	0.2	0.3**	-0.1	-0.2	0.1	-0.2*	0.2		0.1
M-Diet Rating								1.0	0.2*	0.0	0.2	0.4**	-.4**	-0.2	0.4**	-0.2	0.2**	0.1	0.0
C-Diet Rating									1.0	-0.2	0.3**	0.2	0.0	0.1	0.1	-0.1	0.1	-0.1	-.2*
C-Age										1.0	-0.0	-0.2	-0.2	-0.0	-0.0	0.1	-0.1		-0.0
C-Hours spent in childcare											1.0	0.2	0.2	0.2	0.2	-0.1	0.1		-.3*
Meals prepared at home/week												1.0	-0.1	-0.1	0.4**	-.3**	0.3**		0.1
Meals obtained from FF/ CR													1.0	0.1	-0.1	0.2	-0.2		-0.0
Hours worked/week														1.0	0.2	0.1	-0.2		-0.1
Highest education															1.0	-.4**	0.4**		0.1
Marital Status																1.0	-.99**		-0.2
Adults in the HH																	1.0	0.6**	0.2**
Total in the HH																		1.0	0.9**

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
HH=household, d=day, C=child, M=mother, F=fruit
V=vegetable, FF= fast food, CR=convenience restaurant

Table 7. Correlation Matrix for Maternal Eating Competence and Dietary Variables

	EC Total	child fruit juice (cups/d)	child fruit (cups/d)	child salad (cups/d)	child fried potato (cups/d)	child other potato (cups/d)	child dried beans (cups/d)
EC Total	1.000	-0.169	***0.371*****	***0.356*****	-0.066	0.027	0.232
Child Data (16-Item)							
Fruit juice (cups/day)	-0.169	1.000	-0.236	-0.241	***0.334*****	0.138	-0.139
Fruit (cups/day)	***0.371*****	-0.236	1.000	***0.267****	***-0.277****	-0.119	0.158
Salad (cups/day)	***0.356*****	-0.241	***0.267****	1.000	-0.103	***0.346*****	***0.317*****
Fried potato (cups/day)	-0.066	***0.334*****	-.277*	-0.103	1.000	***0.297****	-0.005
Other potato (cups/day)	0.027	0.138	-0.119	***0.346*****	***.297****	1.000	***0.330*****
Dried beans (cups/day)	0.232	-0.139	0.158	***0.317*****	-0.005	***0.330*****	1.000
Other vegetable (cups/day)	***0.265****	***-0.255****	***0.598*****	***0.402*****	***-.299****	0.092	0.218
Tomato sauce (cups/day)	0.088	0.042	0.103	0.105	0.118	0.161	***0.243****
Mother Data (16-item)							
Fruit juice (cups/day)	0.061	***0.446*****	-0.150	0.097	0.167	0.084	0.099
Fruit (cups/day)	***0.327****	-0.039	***0.373*****	0.240	-0.227	0.069	-0.020
Salad (cups/day)	***0.352*****	***-0.317****	***0.308****	***0.477*****	***-0.286****	0.027	0.087
Fried potato (cups/day)	-0.128	***0.408*****	-0.187	0.025	***0.540*****	***0.324*****	-0.102
Other potato (cups/day)	0.173	***0.329*****	-0.123	0.007	***0.308****	***0.422*****	0.002
Dried beans (cups/day)	0.208	0.057	0.208	0.207	0.086	0.079	***0.692*****
Other vegetable (cups/day)	***0.422*****	-0.199	***0.476*****	***0.360*****	***-0.301****	-0.006	0.243
Tomato sauce (cups/day)	-0.139	0.217	0.064	-0.017	0.153	0.099	0.077
Child Data (2-Item)							
Fruit/fruit juice (cups/day)	***0.252****	0.150	***0.461*****	0.198	-0.044	-0.021	0.091
Veg/veg juice (cups/day)	***0.287****	-0.187	***0.386*****	***0.558*****	-0.207	***.244****	***0.254****
Mother Data (2-Item)							
Fruit/fruit juice (cups/day)	0.217	-0.112	0.093	***0.355*****	-0.005	0.103	-0.023
Veg/veg juice (cups/day)	***0.439*****	-0.151	0.231	***0.287****	-0.034	0.036	0.138

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
d=day

Correlations: Spearman's rho

	child other veg (cups/d)	child tomato sauce (cups/d)	mother fruit juice (cups/d)	mother fruit (cups/d)	mother salad (cups/d)	mother fried potato (cups/d)	mother other potato (cups/d)	mother dried beans (cups/d)
EC Total	***.265****	0.088	0.061	***.327****	***.352*****	-0.128	0.173	0.208
Child Data (16-Item)								
Fruit juice (cups/day	***-.255****	0.042	***.446*****	-0.039	***-.317****	***.408*****	***.329*****	0.057
Fruit (cups/day)	***.598*****	0.103	-0.150	***.373*****	***.308****	-0.187	-0.123	0.208
Salad (cups/day)	***.402*****	0.105	0.097	0.240	***.477*****	0.025	0.007	0.207
Fried potato (cups/day)	***-.299****	0.118	0.167	-0.227	***-.286****	***.540*****	***.308****	0.086
Other potato (cups/day)	0.092	0.161	0.084	0.069	0.027	***.324*****	***.422*****	0.079
Dried beans (cups/day)	0.218	***.243****	0.099	-0.020	0.087	-0.102	0.002	***.692*****
Other vegetable (cups/day)	1.000	0.095	-0.009	0.245	***.403*****	-0.204	-0.111	0.128
Tomato sauce (cups/day)	0.095	1.000	-0.119	-0.025	-0.061	0.217	0.021	0.078
Mother Data (16-Item)								
Fruit juice (cups/day	-0.009	-0.119	1.000	0.036	0.035	0.206	***.305****	***.246****
Fruit (cups/day)	0.245	-0.025	0.036	1.000	0.240	-0.015	0.129	0.165
Salad (cups/day)	***.403*****	-0.061	0.035	0.240	1.000	-0.241	-0.104	0.047
Fried potato (cups/day)	-0.204	0.217	0.206	-0.015	-0.241	1.000	***.494*****	0.152
Other potato (cups/day)	-0.111	0.021	***.305****	0.129	-0.104	***.494*****	1.000	0.234
Dried beans (cups/day)	0.128	0.078	***.246****	0.165	0.047	0.152	0.234	1.000
Other vegetable (cups/day)	***.602*****	0.195	0.059	***.422*****	***.376*****	***-.400*****	-0.207	0.133
Tomato sauce (cups/day)	0.107	***.525*****	0.049	0.123	-0.130	***.294****	0.226	0.118
Child Data (2-Item)								
Fruit/fruit juice (cups/day)	0.103	0.076	0.029	0.209	0.090	0.130	0.124	0.181
Veg/veg juice (cups/day)	***.616*****	-0.043	0.101	0.192	0.246	0.062	0.078	0.211
Mother Data (2-Item)								
Fruit/fruit juice (cups/day)	0.083	0.006	0.117	***.530*****	***.280****	0.178	0.107	0.125
Veg/veg juice (cups/day)	***.322*****	-0.022	0.023	***.301****	***.429*****	-0.196	-0.148	0.050

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
d=day

F. Appendices

1. ecSI2.0 Eating competence Survey

	Always (3)	Often (2	Sometimes (3)	Rarely (0)	Never (0)
I am relaxed about eating.					
I am comfortable about eating enough.					
I have regular meals.					
I feel it is okay to eat food that I like.					
I experiment with new food and learn to like it.					
If the situation demands, I can "make do" by eating food I don't care for.					
I eat a wide variety of foods.					
I am comfortable with my enjoyment of food and eating.					
I trust myself to eat enough for me.					
I eat as much as I am hungry for.					
I tune in to food and pay attention to eating.					
I make time to eat.					
I eat until I feel satisfied.					
I enjoy food and eating.					
I consider what is good for me when I eat.					
I plan for feeding myself.					

2. 1 Cup Portion Guide

1 c fruit=	**1 c vegetables=**
1 small apple	3 broccoli spears, 5-in long
1 large banana	1 c cooked leafy greens
1 large orange	2 c lettuce or raw greens
8 large strawberries	12 baby carrots
1 medium pear	1 medium potato
2 large plums	1 large sweet potato
32 seedless grapes	1 large ear of corn
8 oz 100% juice	1 large raw tomato
½ c dried fruit	2 large celery stalks

(Yaroch et al. 2012)

½ Cup Portion Guide Table

½ c fruit=	½ c vegetables=
½ small apple	1-2 broccoli spears, 5-in long
½ large banana	½ c cooked leafy greens
½ large orange	1 c lettuce or raw greens
4 large strawberries	6 baby carrots
½ medium pear	½ medium potato
1 large plum	½ large sweet potato
16 seedless grapes	½ large ear of corn
4 oz 100% juice	½ large raw tomato
¼ c dried fruit	1 large celery stalk

(Yaroch et al. 2012)

Portion sizes were listed as close ended questions within the survey shown as none, ½ cup or less, ½ to 1 cup, 1 to 2 cups, 3 to 4 cups, and ≥ 4 cups.

3. **Food Regulation Linear Regressions**

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Regulation_Total[b]	.	Enter

a. Dependent Variable: child_fruit_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.268[a]	.072	.058	1.42695

a. Predictors: (Constant), Food_Regulation_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.271	1	10.271	5.044	.028[b]

	Residual	132.352	65	2.036		
	Total	142.623	66			

a. Dependent Variable: child_fruit_total

b. Predictors: (Constant), Food_Regulation_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.465	.562		2.608	.011
	Food_Regulation_Total	.204	.091	.268	2.246	.028

a. Dependent Variable: child_fruit_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Regulation_Total[b]	.	Enter

a. Dependent Variable: child_lettucesalad_total

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.210[a]	.044	.029	.37896

a. Predictors: (Constant), Food_Regulation_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.425	1	.425	2.961	.090[b]
	Residual	9.191	64	.144		
	Total	9.616	65			

a. Dependent Variable: child_lettucesalad_total

b. Predictors: (Constant), Food_Regulation_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.008	.149		-.056	.955
	Food_Regulation_Total	.042	.024	.210	1.721	.090

a. Dependent Variable: child_lettucesalad_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Regulation_Total[b]	.	Enter

a. Dependent Variable: child_friedpot_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.071[a]	.005	-.011	.08012

a. Predictors: (Constant), Food_Regulation_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.002	1	.002	.311	.579[b]
	Residual	.398	62	.006		
	Total	.400	63			

a. Dependent Variable: child_friedpot_total
b. Predictors: (Constant), Food_Regulation_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.042	.033		1.268	.210
	Food_Regulation_Total	.003	.005	.071	.558	.579

a. Dependent Variable: child_friedpot_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Regulation_Total[b]	.	Enter

a. Dependent Variable: child_otherpot_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.161[a]	.026	.010	.18515

a. Predictors: (Constant), Food_Regulation_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.057	1	.057	1.668	.201[b]
	Residual	2.160	63	.034		
	Total	2.217	64			

a. Dependent Variable: child_otherpot_total
b. Predictors: (Constant), Food_Regulation_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.042	.074		.575	.567
	Food_Regulation_Total	.015	.012	.161	1.292	.201

a. Dependent Variable: child_otherpot_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Regulation_Total[b]	.	Enter

a. Dependent Variable: child_otherveg_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.216[a]	.047	.032	1.81617

a. Predictors: (Constant), Food_Regulation_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.173	1	10.173	3.084	.084[b]
	Residual	207.804	63	3.298		
	Total	217.977	64			

a. Dependent Variable: child_otherveg_total
b. Predictors: (Constant), Food_Regulation_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.958	.724		1.324	.190
	Food_Regulation_Total	.205	.117	.216	1.756	.084

a. Dependent Variable: child_otherveg_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Regulation_Total[b]	.	Enter

a. Dependent Variable: child_tomatosauce_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.017[a]	.000	-.016	.12451

a. Predictors: (Constant), Food_Regulation_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.000	1	.000	.018	.895[b]
	Residual	.977	63	.016		
	Total	.977	64			

a. Dependent Variable: child_tomatosauce_total
b. Predictors: (Constant), Food_Regulation_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.120	.049		2.447	.017
	Food_Regulation_Total	.001	.008	.017	.133	.895

a. Dependent Variable: child_tomatosauce_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Regulation_Total[b]	.	Enter

a. Dependent Variable: child_driedbeans_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.184[a]	.034	.019	.20908

a. Predictors: (Constant), Food_Regulation_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.099	1	.099	2.274	.136[b]
	Residual	2.841	65	.044		
	Total	2.941	66			

a. Dependent Variable: child_driedbeans_total
b. Predictors: (Constant), Food_Regulation_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.004	.082		.049	.961
	Food_Regulation_Total	.020	.013	.184	1.508	.136

a. Dependent Variable: child_driedbeans_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Regulation_Total[b]	.	Enter

a. Dependent Variable: mother_fruit_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.244[a]	.060	.044	1.59013

a. Predictors: (Constant), Food_Regulation_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.444	1	9.444	3.735	.058[b]
	Residual	149.182	59	2.529		
	Total	158.626	60			

a. Dependent Variable: mother_fruit_total
b. Predictors: (Constant), Food_Regulation_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.502	.677		.742	.461
	Food_Regulation_Total	.210	.109	.244	1.933	.058

a. Dependent Variable: mother_fruit_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Regulation_Total[b]	.	Enter

a. Dependent Variable: mother_lettucesalad_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.183[a]	.034	.018	.67341

a. Predictors: (Constant), Food_Regulation_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.964	1	.964	2.125	.150[b]
	Residual	27.663	61	.453		
	Total	28.626	62			

a. Dependent Variable: mother_lettucesalad_total
b. Predictors: (Constant), Food_Regulation_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.344	.279		1.233	.222
	Food_Regulation_Total	.065	.045	.183	1.458	.150

a. Dependent Variable: mother_lettucesalad_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Regulation_Total[b]	.	Enter

a. Dependent Variable: mother_friedpot_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.087[a]	.008	-.008	.13720

a. Predictors: (Constant), Food_Regulation_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.009	1	.009	.472	.495[b]
	Residual	1.167	62	.019		
	Total	1.176	63			

a. Dependent Variable: mother_friedpot_total
b. Predictors: (Constant), Food_Regulation_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.059	.056		1.049	.298
	Food_Regulation_Total	.006	.009	.087	.687	.495

a. Dependent Variable: mother_friedpot_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Regulation_Total[b]	.	Enter

a. Dependent Variable: mother_otherpot_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.352[a]	.124	.109	.23816

a. Predictors: (Constant), Food_Regulation_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.482	1	.482	8.498	.005[b]
	Residual	3.403	60	.057		
	Total	3.885	61			

a. Dependent Variable: mother_otherpot_total
b. Predictors: (Constant), Food_Regulation_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.032	.098		-.323	.748
	Food_Regulation_Total	.046	.016	.352	2.915	.005

a. Dependent Variable: mother_otherpot_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Regulation_Total[b]	.	Enter

a. Dependent Variable: mother_otherveg_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.099[a]	.010	-.006	2.16366

a. Predictors: (Constant), Food_Regulation_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.822	1	2.822	.603	.440[b]
	Residual	285.568	61	4.681		
	Total	288.390	62			

a. Dependent Variable: mother_otherveg_total
b. Predictors: (Constant), Food_Regulation_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.710	.887		1.929	.058
	Food_Regulation_Total	.111	.142	.099	.776	.440

a. Dependent Variable: mother_otherveg_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Regulation_Total[b]	.	Enter

a. Dependent Variable: mother_tomatosauce_total

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.101[a]	.010	-.007	.14165

a. Predictors: (Constant), Food_Regulation_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.012	1	.012	.609	.438[b]
	Residual	1.184	59	.020		
	Total	1.196	60			

a. Dependent Variable: mother_tomatosauce_total

b. Predictors: (Constant), Food_Regulation_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.215	.060		3.614	.001
	Food_Regulation_Total	-.007	.009	-.101	-.781	.438

a. Dependent Variable: mother_tomatosauce_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Regulation_Total[b]	.	Enter

a. Dependent Variable: mother_driedbeans_total

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.088[a]	.008	-.008	.51147

a. Predictors: (Constant), Food_Regulation_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.128	1	.128	.489	.487[b]
	Residual	16.219	62	.262		
	Total	16.347	63			

a. Dependent Variable: mother_driedbeans_total

b. Predictors: (Constant), Food_Regulation_Total

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.152	.209		.728	.470
	Food_Regulation_Total	.024	.034	.088	.699	.487

a. Dependent Variable: mother_driedbeans_total

4. Food Acceptance Linear Regressions

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Acceptance_Total[b]	.	Enter

a. Dependent Variable: child_fruit_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.285[a]	.081	.067	1.42669

a. Predictors: (Constant), Food_Acceptance_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.894	1	11.894	5.843	.018[b]
	Residual	134.339	66	2.035		
	Total	146.233	67			

a. Dependent Variable: child_fruit_total
b. Predictors: (Constant), Food_Acceptance_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.721	.416		4.137	.000
	Food_Acceptance_Total	.179	.074	.285	2.417	.018

a. Dependent Variable: child_fruit_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Acceptance_Total[b]	.	Enter

a. Dependent Variable: child_lettucesalad_total

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.221[a]	.049	.034	.37606

a. Predictors: (Constant), Food_Acceptance_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.471	1	.471	3.331	.073[b]
	Residual	9.192	65	.141		
	Total	9.663	66			

a. Dependent Variable: child_lettucesalad_total

b. Predictors: (Constant), Food_Acceptance_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.041	.115		.354	.725
	Food_Acceptance_Total	.037	.020	.221	1.825	.073

a. Dependent Variable: child_lettucesalad_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Acceptance_Total[b]	.	Enter

a. Dependent Variable: child_friedpot_total

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.152[a]	.023	.008	.07896

a. Predictors: (Constant), Food_Acceptance_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.009	1	.009	1.492	.226[b]
	Residual	.393	63	.006		
	Total	.402	64			

a. Dependent Variable: child_friedpot_total

b. Predictors: (Constant), Food_Acceptance_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.085	.023		3.635	.001
	Food_Acceptance_Total	-.005	.004	-.152	-1.221	.226

a. Dependent Variable: child_friedpot_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Acceptance_Total[b]	.	Enter

a. Dependent Variable: child_otherpot_total

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.052[a]	.003	-.013	.18642

a. Predictors: (Constant), Food_Acceptance_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.006	1	.006	.171	.681[b]
	Residual	2.224	64	.035		
	Total	2.230	65			

a. Dependent Variable: child_otherpot_total

b. Predictors: (Constant), Food_Acceptance_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.110	.055		1.996	.050
	Food_Acceptance_Total	.004	.010	.052	.414	.681

a. Dependent Variable: child_otherpot_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Acceptance_Total[b]	.	Enter

a. Dependent Variable: child_otherveg_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.290[a]	.084	.070	1.78328

a. Predictors: (Constant), Food_Acceptance_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.736	1	18.736	5.892	.018[b]
	Residual	203.525	64	3.180		
	Total	222.260	65			

a. Dependent Variable: child_otherveg_total
b. Predictors: (Constant), Food_Acceptance_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.989	.520		1.900	.062
	Food_Acceptance_Total	.226	.093	.290	2.427	.018

a. Dependent Variable: child_otherveg_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Acceptance_Total[b]	.	Enter

a. Dependent Variable: child_tomatosauce_total

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.003[a]	.000	-.016	.12388

a. Predictors: (Constant), Food_Acceptance_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.000	1	.000	.001	.980[b]
	Residual	.982	64	.015		
	Total	.982	65			

a. Dependent Variable: child_tomatosauce_total

b. Predictors: (Constant), Food_Acceptance_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.126	.036		3.454	.001
	Food_Acceptance_Total	.000	.007	-.003	-.026	.980

a. Dependent Variable: child_tomatosauce_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Acceptance_Total[b]	.	Enter

a. Dependent Variable: child_driedbeans_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.267[a]	.071	.057	.20373

a. Predictors: (Constant), Food_Acceptance_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.210	1	.210	5.070	.028[b]
	Residual	2.739	66	.042		
	Total	2.950	67			

a. Dependent Variable: child_driedbeans_total
b. Predictors: (Constant), Food_Acceptance_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.001	.059		-.018	.986
	Food_Acceptance_Total	.024	.011	.267	2.252	.028

a. Dependent Variable: child_driedbeans_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Acceptance_Total[b]	.	Enter

a. Dependent Variable: mother_fruit_total

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.330[a]	.109	.094	1.54864

a. Predictors: (Constant), Food_Acceptance_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.558	1	17.558	7.321	.009[b]
	Residual	143.898	60	2.398		
	Total	161.456	61			

a. Dependent Variable: mother_fruit_total

b. Predictors: (Constant), Food_Acceptance_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.586	.464		1.263	.211
	Food_Acceptance_Total	.227	.084	.330	2.706	.009

a. Dependent Variable: mother_fruit_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Acceptance_Total[b]	.	Enter

a. Dependent Variable: mother_lettucesalad_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.250[a]	.063	.048	.66362

a. Predictors: (Constant), Food_Acceptance_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.826	1	1.826	4.146	.046[b]
	Residual	27.305	62	.440		
	Total	29.130	63			

a. Dependent Variable: mother_lettucesalad_total
b. Predictors: (Constant), Food_Acceptance_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.360	.196		1.842	.070
	Food_Acceptance_Total	.072	.035	.250	2.036	.046

a. Dependent Variable: mother_lettucesalad_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Acceptance_Total[b]	.	Enter

a. Dependent Variable: mother_friedpot_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.163[a]	.027	.011	.13500

a. Predictors: (Constant), Food_Acceptance_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.031	1	.031	1.725	.194[b]
	Residual	1.148	63	.018		
	Total	1.180	64			

a. Dependent Variable: mother_friedpot_total
b. Predictors: (Constant), Food_Acceptance_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.142	.040		3.571	.001
	Food_Acceptance_Total	-.009	.007	-.163	-1.313	.194

a. Dependent Variable: mother_friedpot_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Acceptance_Total[b]	.	Enter

a. Dependent Variable: mother_otherpot_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.062[a]	.004	-.012	.25299

a. Predictors: (Constant), Food_Acceptance_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.015	1	.015	.236	.629[b]
	Residual	3.904	61	.064		
	Total	3.919	62			

a. Dependent Variable: mother_otherpot_total
b. Predictors: (Constant), Food_Acceptance_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.203	.075		2.711	.009
	Food_Acceptance_Total	.007	.013	.062	.486	.629

a. Dependent Variable: mother_otherpot_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Acceptance_Total[b]	.	Enter

a. Dependent Variable: mother_otherveg_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.451[a]	.203	.190	1.94066

a. Predictors: (Constant), Food_Acceptance_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.656	1	58.656	15.574	.000[b]
	Residual	229.735	61	3.766		
	Total	288.390	62			

a. Dependent Variable: mother_otherveg_total
b. Predictors: (Constant), Food_Acceptance_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.296	.579		.511	.611
	Food_Acceptance_Total	.410	.104	.451	3.946	.000

a. Dependent Variable: mother_otherveg_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Acceptance_Total[b]	.	Enter

a. Dependent Variable: mother_tomatosauce_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.059[a]	.003	-.013	.14174

a. Predictors: (Constant), Food_Acceptance_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.004	1	.004	.210	.648[b]
	Residual	1.205	60	.020		
	Total	1.210	61			

a. Dependent Variable: mother_tomatosauce_total
b. Predictors: (Constant), Food_Acceptance_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.186	.042		4.462	.000
	Food_Acceptance_Total	-.003	.008	-.059	-.458	.648

a. Dependent Variable: mother_tomatosauce_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Food_Acceptance_Total[b]	.	Enter

a. Dependent Variable: mother_driedbeans_total

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.069[a]	.005	-.011	.50844

a. Predictors: (Constant), Food_Acceptance_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.078	1	.078	.300	.586[b]
	Residual	16.286	63	.259		
	Total	16.364	64			

a. Dependent Variable: mother_driedbeans_total

b. Predictors: (Constant), Food_Acceptance_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.215	.150		1.437	.156
	Food_Acceptance_Total	.015	.027	.069	.548	.586

a. Dependent Variable: mother_driedbeans_total

5. Eating Attitudes Linear Regressions

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Eating_Attitude_Separated[b]	.	Enter

a. Dependent Variable: child_fruit_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.075[a]	.006	-.010	1.469286943000000

a. Predictors: (Constant), Eating_Attitude_Separated

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.772	1	.772	.357	.552[b]
	Residual	138.163	64	2.159		
	Total	138.935	65			

a. Dependent Variable: child_fruit_total
b. Predictors: (Constant), Eating_Attitude_Separated

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.048	.950		2.157	.035
	Eating_Attitude_Separated	.302	.504	.075	.598	.552

a. Dependent Variable: child_fruit_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Eating_Attitude_Separated[b]	.	Enter

a. Dependent Variable: child_lettucesalad_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.102[a]	.010	-.005	.387074043000000

a. Predictors: (Constant), Eating_Attitude_Separated

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.098	1	.098	.657	.421[b]
	Residual	9.439	63	.150		
	Total	9.538	64			

a. Dependent Variable: child_lettucesalad_total
b. Predictors: (Constant), Eating_Attitude_Separated

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.022	.263		.083	.934
	Eating_Attitude_Separated	.113	.139	.102	.811	.421

a. Dependent Variable: child_lettucesalad_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Eating_Attitude_Separated[b]	.	Enter

a. Dependent Variable: child_friedpot_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.157[a]	.025	.009	.078930015100000

a. Predictors: (Constant), Eating_Attitude_Separated

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.010	1	.010	1.543	.219[b]
	Residual	.380	61	.006		
	Total	.390	62			

a. Dependent Variable: child_friedpot_total
b. Predictors: (Constant), Eating_Attitude_Separated

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.008	.054		-.142	.887
	Eating_Attitude_Separated	.035	.028	.157	1.242	.219

a. Dependent Variable: child_friedpot_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Eating_Attitude_Separated[b]	.	Enter

a. Dependent Variable: child_otherpot_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.025[a]	.001	-.015	.179857293000000

a. Predictors: (Constant), Eating_Attitude_Separated

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.001	1	.001	.039	.844[b]
	Residual	2.006	62	.032		
	Total	2.007	63			

a. Dependent Variable: child_otherpot_total
b. Predictors: (Constant), Eating_Attitude_Separated

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.101	.116		.871	.387
	Eating_Attitude_Separated	.012	.062	.025	.197	.844

a. Dependent Variable: child_otherpot_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Eating_Attitude_Separated[b]	.	Enter

a. Dependent Variable: child_otherveg_total

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.119[a]	.014	-.002	1.876632399000000

a. Predictors: (Constant), Eating_Attitude_Separated

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.134	1	3.134	.890	.349[b]
	Residual	218.348	62	3.522		
	Total	221.482	63			

a. Dependent Variable: child_otherveg_total

b. Predictors: (Constant), Eating_Attitude_Separated

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	3.242	1.214		2.671	.010
	Eating_Attitude_Separated	-.609	.646	-.119	-.943	.349

a. Dependent Variable: child_otherveg_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Eating_Attitude_total[b]	.	Enter

a. Dependent Variable: mother_fruit_total

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.230[a]	.053	.037	1.60798

a. Predictors: (Constant), Eating_Attitude_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.365	1	8.365	3.235	.077[b]
	Residual	149.965	58	2.586		
	Total	158.329	59			

a. Dependent Variable: mother_fruit_total

b. Predictors: (Constant), Eating_Attitude_total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.308	.813		.379	.706
	Eating_Attitude_total	.139	.077	.230	1.799	.077

a. Dependent Variable: mother_fruit_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Eating_Attitude_total[b]	.	Enter

a. Dependent Variable: mother_lettucesalad_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.031[a]	.001	-.016	.69186

a. Predictors: (Constant), Eating_Attitude_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.027	1	.027	.057	.813[b]
	Residual	28.720	60	.479		
	Total	28.747	61			

a. Dependent Variable: mother_lettucesalad_total
b. Predictors: (Constant), Eating_Attitude_total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.651	.343		1.897	.063
	Eating_Attitude_total	.008	.032	.031	.238	.813

a. Dependent Variable: mother_lettucesalad_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Eating_Attitude_total[b]	.	Enter

a. Dependent Variable: mother_friedpot_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.238[a]	.057	.041	.13315

a. Predictors: (Constant), Eating_Attitude_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.065	1	.065	3.675	.060[b]
	Residual	1.081	61	.018		
	Total	1.147	62			

a. Dependent Variable: mother_friedpot_total
b. Predictors: (Constant), Eating_Attitude_total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.028	.066		-.430	.669
	Eating_Attitude_total	.012	.006	.238	1.917	.060

a. Dependent Variable: mother_friedpot_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Eating_Attitude_total[b]	.	Enter

a. Dependent Variable: mother_otherpot_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.406[a]	.165	.150	.23443

a. Predictors: (Constant), Eating_Attitude_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.639	1	.639	11.627	.001[b]
	Residual	3.242	59	.055		
	Total	3.881	60			

a. Dependent Variable: mother_otherpot_total
b. Predictors: (Constant), Eating_Attitude_total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.150	.116		-1.290	.202
	Eating_Attitude_total	.037	.011	.406	3.410	.001

a. Dependent Variable: mother_otherpot_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Eating_Attitude_total[b]	.	Enter

a. Dependent Variable: mother_otherveg_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.008[a]	.000	-.017	2.19108

a. Predictors: (Constant), Eating_Attitude_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.017	1	.017	.004	.953[b]
	Residual	283.250	59	4.801		
	Total	283.267	60			

a. Dependent Variable: mother_otherveg_total
b. Predictors: (Constant), Eating_Attitude_total

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.468	1.102		2.238	.029
	Eating_Attitude_total	-.006	.103	-.008	-.060	.953

a. Dependent Variable: mother_otherveg_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Eating_Attitude_total[b]	.	Enter

a. Dependent Variable: mother_tomatosauce_total

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.134[a]	.018	.001	.14151

a. Predictors: (Constant), Eating_Attitude_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.021	1	.021	1.053	.309[b]
	Residual	1.161	58	.020		
	Total	1.183	59			

a. Dependent Variable: mother_tomatosauce_total

b. Predictors: (Constant), Eating_Attitude_total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.239	.072		3.315	.002
	Eating_Attitude_total	-.007	.007	-.134	-1.026	.309

a. Dependent Variable: mother_tomatosauce_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Eating_Attitude_total[b]	.	Enter

a. Dependent Variable: mother_driedbeans_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.140[a]	.020	.004	.51244

a. Predictors: (Constant), Eating_Attitude_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.320	1	.320	1.220	.274[b]
	Residual	16.018	61	.263		
	Total	16.339	62			

a. Dependent Variable: mother_driedbeans_total
b. Predictors: (Constant), Eating_Attitude_total

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.563	.253		2.223	.030
	Eating_Attitude_total	-.026	.024	-.140	-1.104	.274

a. Dependent Variable: mother_driedbeans_total

6. Contextual Skills Linear Regressions

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Contextual_Skills_Separated[b]	.	Enter

a. Dependent Variable: child_otherveg_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.309[a]	.095	.081	1.766708358000000

a. Predictors: (Constant), Contextual_Skills_Separated

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.406	1	20.406	6.538	.013[b]
	Residual	193.518	62	3.121		
	Total	213.924	63			

a. Dependent Variable: child_otherveg_total
b. Predictors: (Constant), Contextual_Skills_Separated

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.159	.919		-.173	.863
	Contextual_Skills_Separated	1.304	.510	.309	2.557	.013

a. Dependent Variable: child_otherveg_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Contextual_Skills_Separated[b]	.	Enter

a. Dependent Variable: child_fruit_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.334[a]	.111	.097	1.417985507000000

a. Predictors: (Constant), Contextual_Skills_Separated

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.117	1	16.117	8.016	.006[b]
	Residual	128.684	64	2.011		
	Total	144.801	65			

a. Dependent Variable: child_fruit_total
b. Predictors: (Constant), Contextual_Skills_Separated

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.621	.737		.843	.403
	Contextual_Skills_Separated	1.153	.407	.334	2.831	.006

a. Dependent Variable: child_fruit_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Contextual_Skills_Separated[b]	.	Enter

a. Dependent Variable: child_friedpot_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.241[a]	.058	.043	.078442290900000

a. Predictors: (Constant), Contextual_Skills_Separated

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.023	1	.023	3.762	.057[b]
	Residual	.375	61	.006		
	Total	.398	62			

a. Dependent Variable: child_friedpot_total
b. Predictors: (Constant), Contextual_Skills_Separated

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.139	.042		3.309	.002
	Contextual_Skills_Separated	-.045	.023	-.241	-1.939	.057

a. Dependent Variable: child_friedpot_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Contextual_Skills_Separated[b]	.	Enter

a. Dependent Variable: child_lettucesalad_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.264[a]	.070	.055	.377410888000000

a. Predictors: (Constant), Contextual_Skills_Separated

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.673	1	.673	4.727	.033[b]
	Residual	8.974	63	.142		
	Total	9.647	64			

a. Dependent Variable: child_lettucesalad_total
b. Predictors: (Constant), Contextual_Skills_Separated

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.198	.202		-.979	.331
	Contextual_Skills_Separated	.242	.111	.264	2.174	.033

a. Dependent Variable: child_lettucesalad_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Contextual_Skills_Separated[b]	.	Enter

a. Dependent Variable: child_otherpot_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.126[a]	.016	.000	.184245356000000

a. Predictors: (Constant), Contextual_Skills_Separated

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.034	1	.034	.995	.322[b]
	Residual	2.105	62	.034		
	Total	2.138	63			

a. Dependent Variable: child_otherpot_total
b. Predictors: (Constant), Contextual_Skills_Separated

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.028	.102		.278	.782
	Contextual_Skills_Separated	.056	.056	.126	.997	.322

a. Dependent Variable: child_otherpot_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Contextual_Skills_Total[b]	.	Enter

a. Dependent Variable: mother_fruit_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.388[a]	.151	.136	1.52012

a. Predictors: (Constant), Contextual_Skills_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.160	1	24.160	10.455	.002[b]
	Residual	136.336	59	2.311		
	Total	160.496	60			

a. Dependent Variable: mother_fruit_total
b. Predictors: (Constant), Contextual_Skills_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.088	.597		-.148	.883
	Contextual_Skills_Total	.192	.059	.388	3.233	.002

a. Dependent Variable: mother_fruit_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Contextual_Skills_Total[b]	.	Enter

a. Dependent Variable: mother_lettucesalad_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.289[a]	.084	.069	.65451

a. Predictors: (Constant), Contextual_Skills_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.383	1	2.383	5.562	.022[b]
	Residual	26.131	61	.428		
	Total	28.514	62			

a. Dependent Variable: mother_lettucesalad_total
b. Predictors: (Constant), Contextual_Skills_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.148	.252		.586	.560
	Contextual_Skills_Total	.059	.025	.289	2.358	.022

a. Dependent Variable: mother_lettucesalad_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Contextual_Skills_Total[b]	.	Enter

a. Dependent Variable: mother_friedpot_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.221[a]	.049	.033	.13401

a. Predictors: (Constant), Contextual_Skills_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.057	1	.057	3.183	.079[b]
	Residual	1.113	62	.018		
	Total	1.171	63			

a. Dependent Variable: mother_friedpot_total
b. Predictors: (Constant), Contextual_Skills_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.182	.051		3.577	.001
	Contextual_Skills_Total	-.009	.005	-.221	-1.784	.079

a. Dependent Variable: mother_friedpot_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Contextual_Skills_Total[b]	.	Enter

a. Dependent Variable: mother_otherpot_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.185[a]	.034	.018	.24957

a. Predictors: (Constant), Contextual_Skills_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.133	1	.133	2.137	.149[b]
	Residual	3.737	60	.062		
	Total	3.870	61			

a. Dependent Variable: mother_otherpot_total
b. Predictors: (Constant), Contextual_Skills_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.108	.096		1.122	.266
	Contextual_Skills_Total	.014	.010	.185	1.462	.149

a. Dependent Variable: mother_otherpot_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Contextual_Skills_Total[b]	.	Enter

a. Dependent Variable: mother_otherveg_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.035[a]	.001	-.016	.14286

a. Predictors: (Constant), Contextual_Skills_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.001	1	.001	.071	.791[b]
	Residual	1.204	59	.020		
	Total	1.206	60			

a. Dependent Variable: mother_tomatosauce_total
b. Predictors: (Constant), Contextual_Skills_Total

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.184	.055		3.338	.001
	Contextual_Skills_Total	-.001	.005	-.035	-.266	.791

a. Dependent Variable: mother_tomatosauce_total

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Contextual_Skills_Total[b]	.	Enter

a. Dependent Variable: mother_driedbeans_total
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.011[a]	.000	-.016	.51252

a. Predictors: (Constant), Contextual_Skills_Total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.002	1	.002	.008	.929[b]
	Residual	16.286	62	.263		
	Total	16.288	63			

a. Dependent Variable: mother_driedbeans_total
b. Predictors: (Constant), Contextual_Skills_Total

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.311	.194		1.597	.115
	Contextual_Skills_Total	-.002	.019	-.011	-.090	.929

a. Dependent Variable: mother_driedbeans_total

Appendix 7 Tests of normality for variables included in the 16-Item FFQ for both mother and child. Significance values below 0.05 indicate a non-normal distribution for the data.

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
child_fruitjuice_total	.276	67	***.000***	.656	67	.000
child_fruit_total	.241	68	***.000***	.881	68	.000
child_lettucesalad_total	.272	67	***.000***	.632	67	.000
child_friedpot_total	.296	65	***.000***	.689	65	.000
child_otherpot_total	.294	66	***.000***	.691	66	.000
child_driedbeans_total	.283	68	***.000***	.625	68	.000
child_otherveg_total	.192	66	***.000***	.859	66	.000
child_tomatosauce_total	.225	66	***.000***	.837	66	.000
mother_fruitjuice_total	.343	65	***.000***	.485	65	.000
mother_fruit_total	.216	62	***.000***	.842	62	.000
mother_lettucesalad_total	.296	64	***.000***	.769	64	.000
mother_friedpot_total	.250	65	***.000***	.672	65	.000
mother_otherpot_total	.213	63	***.000***	.781	63	.000
mother_driedbeans_total	.283	65	***.000***	.606	65	.000
mother_otherveg_total	.220	63	***.000***	.851	63	.000
mother_tomatosauce_total	.203	62	***.000***	.854	62	.000

a. Lilliefors Significance Correction

Appendix 8. NPAR Mann-Whitney U for Mothers eating competence vs. child's fruit and vegetable intake and mother's fruit and vegetable intake.

NPAR Mann-Whitney U

Vegetable intake by Mom's EC

r= -0.18 effect size small (r<0.1)

Ranks

Eating Competence		N	Mean Rank	Sum of Ranks
child_cupvegNew	.00	35	29.60	1036.00
	1.00	29	36.00	1044.00
	Total	64		

Test Statistics[a]

	child_cupvegNew
Mann-Whitney U	406.000
Wilcoxon W	1036.000
Z	-1.440
Asymp. Sig. (2-tailed)	0.150

a. Grouping Variable: Eating Competence

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
child_cupvegNew * Eating Competence	Between Groups	(Combined)	0.962	1	0.962	1.903	0.173
	Within Groups		31.350	62	0.506		
	Total		32.313	63			

Measures of Association

	Eta	Eta Squared
child_cupvegNew * Eating Competence	0.173	0.030

Report

child_cupvegNew

Eating Competence	Mean	N	Std. Deviation	Median
.00	1.1071	35	0.61022	0.7500
1.00	1.3534	29	0.81700	1.5000
Total	1.2188	64	0.71617	1.5000

NPAR MU Fruit intake by EC

Ranks

Eating Competence		N	Mean Rank	Sum of Ranks
child_cupsfruitNew	.00	35	29.33	1026.50
	1.00	29	36.33	1053.50
	Total	64		

Test Statistics[a]

	child_cupsfruitNew
Mann-Whitney U	396.500
Wilcoxon W	1026.500
Z	-1.600
Asymp. Sig. (2-tailed)	0.110

a. Grouping Variable: Eating Competence

r= -0.2 effect size medium (r<0.1)

Report

child_cupsfruitNew

Eating Competence	Mean	N	Std. Deviation	Median
.00	1.8429	35	0.88510	1.5000
1.00	2.1638	29	0.79697	2.5000
Total	1.9883	64	0.85499	1.5000

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
child_cupsfruitNew * Eating Competence	Between Groups	(Combined)	1.634	1	1.634	2.280	0.136
	Within Groups		44.420	62	0.716		
	Total		46.054	63			

Measures of Association

	Eta	Eta Squared
child_cupsfruitNew * Eating Competence	0.188	0.035

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