Parents’ Perception of Their Preschool Children’s Weight Status and Diet Quality: How Accurate It Is?

Taraneh Hazhin
taraneh.hazhin@student.shu.edu

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Parents’ Perception of Their Preschool Children’s Weight Status and Diet Quality: How Accurate It Is?

By

Taraneh Hazhin

Dissertation Committee

Dr. Genevieve Pinto Zipp, PT, EdD, FNAP (Chair)

Dr. Terrence F. Cahill, EdD, FACHE

Dr. Shahla Wunderlich, PhD, RDN

Submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy (PhD) in Health Sciences

Department of Interprofessional Health Sciences and Health Administration

Seton Hall University

2021
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Department of Health and Medical Sciences

APPROVAL FOR SUCCESSFUL DEFENSE

Doctoral Candidate, Taraneh Hazhin, has successfully defended and made required modifications to the text of the doctoral dissertation for the Ph.D. during the Spring Semester 2021.

DISSERTATION COMMITTEE

(please sign and date beside your name)

Chair: Genevieve Pinto Zipp

(enter signature & date) __________________________________________

Committee Member: Terrence F. Cahill

(enter signature & date) __________________________________________

Committee Member: Shahla Wunderlich

(enter signature & date) __________________________________________

Note: the chair and any other committee members who wish to review revisions will sign and date this document only when revisions have been completed. Please return this form to the Office of Graduate Studies, where it will be placed in the candidate’s file and submit a copy with your final dissertation to be bound as page number two.
Abstract

Childhood obesity is a major public health problem. Parents often have an inaccurate perception of their child’s weight status and diet quality. The purpose of this study was to assess the accuracy of parents’ perception of their 3-5 years old children’s weight status and diet quality; and to explore if there was a relationship between parental weight perception, parental diet perception, and children’s diet quality. A cross-sectional survey design was used to collect data from parents of healthy 3-5 years old preschool children (n=333) through convenient sampling method. Parents’ perception of their preschool children’s weight status was measured using a Likert-scale question, Linear visual, and Circular visual. Parents’ perception of their preschool children’s diet quality was measured using a Likert-scale question and parents’ Diet Score. 24-hour food recall was used for children’s dietary intake. ASA24-2018, an online dietary assessment tool, was used to analyze dietary intake for each child, to calculate children’s Healthy Eating Index-2015 scores. Children’s Body Mass Index and BMI percentiles were calculated according to CDC guidelines. The accuracy of parents’ weight perception was calculated by comparing children’s BMI percentiles to parents’ responses to the three weight perception questions. The accuracy of parents’ diet perception was calculated by comparing children’s HEI-2015 scores to parents’ responses to the two diet quality questions. Approximately half of parents underestimated their preschool child’s weight status. More than half of parents overestimated their preschool child’s diet quality. A negative relationship between parents’ BMI and the accuracy of parents’ weight perception was found; obese / overweight parents more likely to under-estimate their child’s weight. Parents’ level of education and parents’ socio-economic status were positively correlated with the accuracy of parents’ diet perception. Study
findings offer insight into parents’ perceptions which can be used to positively impact this major public health issue.

*Keywords*: perception, parental perception, accuracy, parents’ weight perception, parents’ diet perception, preschool children, children’s diet quality, Healthy Eating Index (HEI-2015), ASA24-2018.
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Dedication

This dissertation is dedicated:

To my husband, Dr. Mohammad H. Dorri, for his continuous support through every step of this long journey,

And

To our children - Dastan, Dorsa, Daniel, and Darian – our most valuable treasure, may God always protect you, and may you always remember that everything is possible if you believe in God and in yourselves.
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Chapter 1

Introduction

Introduction

Obesity has become a major public health problem all around the world both nationally in the US and internationally. Over the past few decades overweight and obesity rates have significantly increased among adults, and children and adolescents as well (Budd & Hayman, 2008; Lob-Corzilius, 2007). In the United States, the number of children and adolescents who are classified as obese has tripled since the 1970s (Fryar, Carroll, & Ogden, 2014). According to the CDC National Centers for Health Statistics, 35.4% of United States’ children between 2-19-year-old are either overweight or obese (Fryar, Carroll, Afful, 2020). Obesity rates have consistently increased among preschoolers (3–5-year-olds) from 5.0% in 1976-1980, to 10.4% in 2007-2008, and 13.4% in 2017-2018 (Ogden & Caroll, 2010; Fryar, et. al., 2020). Data from the National Health and Nutrition Examination Survey (NHNES) 2017-2018 supported that 13.4% of preschool children (2–5-year-old), 20.3% of school-aged children (6–11-year-old), and 21.2% of adolescents (12–19-year-old) are considered obese (Fryar, et. al., 2020).

Generally, overweight is defined as “weight in excess of a weight standard”, and obesity is defined as “excess body fatness” (Ogden & Flegal, 2010, p. 1). World Health Organization (WHO) defines obesity as accumulating excessive amount of body fat that interferes with health of the individual (World Health Organization, 2021). WHO suggests using Body Mass Index (BMI), a simple index of weight-to-height, to identify obesity in adults (World Health Organization, 2014; Lob-Corzilius, 2007). Body Mass Index (BMI) is calculated as “Weight in kilograms ÷ Height in squared meters”, or “Weight (lbs) ÷ [Height (in)]² x 703”; a BMI greater
than 30 for adults is considered obesity (Mahan & Raymond, 2016; p. 113). Using BMI to classify obesity is also recommended in children; however, children’s BMI should be compared with CDC’s gender-specific BMI-for-age reference values (Ogden & Flegal, 2010). In the United States a BMI ≥ 95th percentile for children is considered obesity (Lob-Corzilius, 2007; Budd & Hayman, 2008; Ogden & Flegal, 2010).

**Significance of the Problem**

Obesity affects children “on many different levels” (Sullivan, 2010, p. 297). Obese children often present with physical, emotional, and social issues that impact their functioning in school and negatively impacts their quality of life, compared to normal weight children. (Khairy, et. al., 2016; Sullivan, 2010). Childhood obesity is also a risk factor for several chronic diseases, impacts premature mortality in adulthood (Budd & Hayman, 2008) and possess significant economic impact on the society (Cattelino, et. al., 2014). Young children who are overweight and obese are more likely to be obese later in childhood and during their adolescence years (Gauthier, &Gance-Cleveland, 2016) and present with high cholesterol, high blood sugar, asthma, and mental health problems (Cattelino, et. al., 2014).

Clearly, it is important to address this issue of preschool children being overweight and obese early, because the potential risk for long term weight issues begins as early as 3-year-old (Eckstein, et. al., 2006). Overweight and obese preschool children are five times more likely to become overweight or obese adults compared to normal weight preschool children, and suffer from lifelong physical limitations, medical complications, and mental health problems related to obesity (CDC Vitalsigns, 2013; Lob-Corzilius, 2007).
The health risks associated with being overweight and obese are well known. Childhood obesity contributes to numerous short and long-term medical, psychological, and economical problems for the child, family, and community (Lavizzo-Mourey, 2007; Budd & Hayman, 2008; Reilly, 2006). Complications caused by childhood obesity include diabetes, cardiovascular disease, hypertension, hyperlipidemia, sleep disorders, orthopedic problems, metabolic syndrome, breathing difficulties, asthma, cancer, reduced life expectancy, and premature death (CDC, 2021; Burgess & Broome, 2012; Sullivan, 2010; Rees, et. al., 2009; Tucker, 2009; Lavizzo-Mourey, 2007; Budd & Hayman, 2008; Lob-Corzilius, 2007; Mason et al., 2008). Obesity can also cause many psychological problems for children. Although most of the time people don’t think about the psychological effects of obesity in children, psychological and social implications of childhood obesity could be as serious as the physical health problems associated with being obese (Sullivan, 2010). Psycho-social implications associated with childhood obesity include, but are not limited to, low self-esteem, depression, eating disorders, anxiety, poor school performance, emotional and behavioral problems (Hussin, et. al., 2011; Sullivan, 2010; Mason et al., 2008). Ultimately, being obese can negatively affect children’s quality of life by impacting physical, emotional, and social aspects of their daily life (Khairy, et. al., 2016).

Childhood Obesity is a multi-dimensional and complex public health problem. Obesity results from long-term energy imbalance, caused by either high energy intake or low energy expenditure (Reilly, 2006). Poor dietary habits and lack of physical activity are the main causes associated with childhood obesity (Lob-Corzilius, 2007; Rees et al., 2009). However, there are many additional factors that contribute in various combinations to the worldwide rising prevalence and incidence of overweight and obesity among children such as environment, family
lifestyle, parental perception, ethnicity and cultural norms, genetics, and prenatal and postnatal nutrition. Among the different factors contributing to childhood obesity, the parents’ role in prevention, development, and management of children’s weight problems cannot be underestimated. Parents are responsible for managing their young children’s weight status (Rosser, 2005) and have an important role regarding quality and quantity of the foods consumed and the level of physical activity performed by their children (Guendelman, Fernald, Neufeld, & Fuentes-Afflick, 2010). Parents’ perception of childhood obesity is an important factor since it can directly affect the way parents feed their children (Garrett-Wright, 2011).

Parents often have an inaccurate perception of their child’s weight status. Many parents with overweight and obese children underestimate their children’s weight and do not recognize that their child is overweight or obese (Garrett-Wright, 2011; Polfuss & Frenn, 2012; Manios, et. al., 2010; Hussin, et. al., 2011; Eckstein, et. al., 2006). When examining if the age of the child affected parents’ perception of their child's weight status, there have been mixed findings. In an integrative review of the literature assessing parental perceptions of their child's weight, four of nine studies found that parents were less likely to label younger children as overweight versus older children (Towns & D'Auria, 2009). Eckstein et. al. (2006) also suggested that parents’ of younger children were even more likely to underestimate their child’s weight. Although in general parents usually agree that childhood obesity is a serious problem, most parents of overweight and obese children believe that their child will “grow out of it” (Jaballas, et. al., 2011, p. 297).

Presently, there is limited literature on how parents perceive their children’s diet quality based upon the age of the child. Yet, the limited number of published studies on mothers’ perceptions of their children’s diet report that in general a significant percentage of mothers
overestimate their children’s diet quality and perceive it as healthy (Broilo, et. al., 2017; Kourlaba, et. al., 2009). Kourlaba, et. al. (2009) work further supports that “although mothers believe that they provide their children with healthy food their children may not have a healthy diet” (p. 741).

Parents’ perceptions of their children’s weight and diet quality could affect children’s health-related behaviors such as their dietary habits and physical activity level and are thus important factors to consider when constructing effective interventions. Cattelino, et. al. (2014) stated that “children’s lifestyles depend largely on the adults’ choices” (p. 1104); therefore, if parents do not have accurate perceptions of their children’s weight status and diet quality, they will not initiate any changes toward establishing healthier dietary habits. Tucker (2009) stated “parents are largely responsible for establishing the social and environmental conditions and experiences that promote child health and well-being” (p. 189) and preschool children are even more dependent on their parents to feed them and to manage their physical activity. Thus, parents could be considered the key stakeholders when addressing childhood obesity, since they “have a unique role in promoting healthy behaviors to their children” (Economos, et. al., 2012, p. 170).

To successfully address childhood obesity, parents need to recognize that there is a problem. To prevent and reduce obesity rates among children, parents must admit the problem exists and seek to have “a clear understanding of its determinants” (Manios et al., 2010, p. 1527). Thus, Gauthier, & Gance-Cleveland (2016) suggested that the first step in designing any intervention to address childhood obesity is to have a comprehensive understanding of parents’ perception of their child’s weight status, considering ethnic circumstance and children’s age. Therefore, before healthcare professionals begin to plan weight management interventions for
children, it is essential that they assist parents “to recognize the problem that is the focus of the treatment” and embrace it (Eckstein, et. al., 2006, p. 688).

Conceptual Framework

The conceptual framework guiding this study was based on Perception Action Cycle. Historically, perception has been defined as a way we recognize and interpret the information we have gathered through our senses to respond to a certain satiation (Yolanda Williams, 2014). “Perception is the process of recognizing and interpreting sensory stimuli” that allows individuals to translate the sensory information and experiences from the individual’s surrounding environment into something meaningful to interact with the environment (Yolanda Williams, 2014). According to Sperry (1952), perception and action processes are essentially linked together. Perception-action cycle is the circular flow of information that takes place between an individual and its environment during a sensory-guided sequence of actions towards a goal (Cutsuridis, 2013). Many factors including environmental factors, previous experiences, expectations, and cultural norms could influence the individual’s perception (Jenkins, 2014). So, informed by the Perception Action Cycle, one could suggest that parents’ perceptions are influenced by numerous factors, some of which are modifiable and others which are non-modifiable. Regardless, parents’ perceptions can impact how they view their world and act upon it which in this case is their child’s weight and diet and thus via their actions either support or fail to support health interventions to address their child’s weight status and diet quality. The key issue here is to understand that for parents to act they need to realize there is a problem. Therefore, we must first seek to understand parents’ perceptions as they are the primary caregivers over their preschool children and if they do not perceive that a problem exists, they will not act upon it.
Based on what is known in the literature, the conceptual framework for this study suggested that parents’ perception of their child’s weight is correlated with how parents perceive their child’s diet quality, and both of these variables are correlated with child’s actual diet quality as measured by HEI-2015. This study also examined four key factors – parent’s socio-economic status, parent’s education level, parent’s ethnicity/race, and parent’s BMI – and explored how these factors were correlated with the accuracy of parents’ perceptions. Figure 1 provides a visual representation of the conceptual framework for this study.

Figure 1
Study’s Conceptual Framework
Purpose of the Study

The purpose of this study was: a) to assess and evaluate the accuracy of parental perception of their preschool children’s weight status, b) to assess and evaluate the accuracy of parental perception of their preschool children’s diet quality, c) to explore if there is a relationship between parents’ perception of their children’s weight, parents’ perception of their children’s diet quality, and their children’s diet quality as measured by Healthy Eating Index (HEI-2015) score.

Research Questions and Hypotheses

Seven research questions (with associated hypotheses) were explored in this study:

Research Question 1 – Do parents of preschool children have an accurate perception of their children’s weight status?

1 - Ha: Parents of preschool children have an accurate perception of their child’s weight status.

Research Question 2 – Are there factors that relate to the accuracy of parents’ perception of their children’s weight status?

2A - Ha: There is a positive relationship between parents’ level of education and the accuracy of parents’ perception of their children’s weight status.

2B - Ha: There is a positive relationship between parents’ socio-economic status and the accuracy of parents’ perception of their children’s weight status.
2C - Ha: There is a negative relationship between parents’ BMI and the accuracy of parents’ perception of their children’s weight status.

2D - Ha: The accuracy of parents’ perception of their children’s weight varies based on their ethnicity/race.

Research Question 3 - Is there a relationship between parents’ perception of their children’s weight and their children’s diet quality as measured by Healthy Eating Index (HEI)?

3 - Ha: There is a positive relationship between the accuracy of parents' perception of preschool children's weight status and children's HEI scores.

3A - Ha: Preschool children, whose parents under-estimated their child’s weight, have lower HEI scores.

3B - Ha: Preschool children, whose parents over-estimated their child’s weight, have higher HEI scores.

Research Question 4 - Do parents of preschool children have an accurate perception of their children’s diet quality?

4 - Ha: Parents of preschool children have an accurate perception of their child’s diet quality.

Research Question 5 – Are there factors that relate to the accuracy of parents’ perception of their children’s diet quality?

5A - Ha: There is a positive relationship between parents’ level of education and the accuracy of parents’ perception of their children’s diet quality.
5B - Ha: There is a positive relationship between parents’ socio-economic status and the accuracy of parents’ perception of their children’s diet quality.

5C - Ha: There is a negative relationship between parents’ BMI and the accuracy of parents’ perception of their children’s diet quality.

5D - Ha: The accuracy of parents’ perception of their children’s diet quality varies based on their ethnicity / race.

**Research Question 6** - Is there a relationship between parents’ perception of their children’s diet quality and their children’s diet quality as measured by Healthy Eating Index (HEI)?

6 - Ha: There is a negative relationship between parents' perception of preschool children's diet quality and children's HEI scores.

**Research Question 7** - Is there a relationship between parents’ perception of their children’s weight and parents’ perception of their children’s diet quality?

7 - Ha: There is a positive relationship between the accuracy of parents' perception of preschool children's weight status and the accuracy of parents’ perception of their children’s diet quality.

**Summary**

Childhood obesity is a major public health problem throughout the world (Budd & Hayman, 2008). However, to successfully address childhood obesity, parents must recognize that there is a problem. Research in this area suggest that most parents have a misperception about their children’s weight status and diet quality and thus fail to identify their child’s poor diet quality as well as their child’s overweight or obese weight status. Therefore, targeting parents of
overweight or obese children to participate in weight management programs without considering parental perceptions – in particular, parents’ tendency to underestimate their child’s weight status and overestimate their child’s diet quality – may not be the most effective strategy considering parents often perceive their children’s diet as healthy and do not view their children as being overweight or obese. Thus, securing a comprehensive understanding of parents’ perceptions is an important first step in reversing the childhood obesity trend. Understanding the accuracy of parents’ perceptions, will aide in the uptake of positive action plans by parents to manage preschool children’s weight status and diet quality.
Chapter 2

Review of Literature

Introduction

Childhood obesity “remains a public health challenge” (Howe, Alexander, & Stevenson, 2017, p. 57). The prevalence of obesity is evident among children of all ages, even young preschool children. Being overweight or obese during early childhood is linked with adolescent and adulthood obesity and significant health risk factors (Gauthier & Gance-Cleveland, 2016). Parents’ misperceptions and “lack of awareness of their child’s overweight or obesity status” is one of the factors contributing to the prevalence of childhood obesity (Howe, Alexander, & Stevenson, 2017, p. 57). Parents’ inaccurate perceptions of their children’s weight status and their inability to recognize their children’s weight problems “may be the first barrier” in successfully addressing childhood obesity (Hudson, McGloin, & McConnon, 2012, p. 1806; Howe, Alexander, & Stevenson, 2017). Parents’ involvement, participation, and commitment are essential factors in any effective early childhood weight management and obesity prevention program (Foster & Hale, 2015; Hong, Peltzer, & Jalayondeja, 2019; Howe, Alexander, & Stevenson, 2017; Hudson, McGloin, & McConnon, 2012). Therefore, an important step in prevention and treatment of childhood obesity is to help parents “recognize their child’s overweight status and achieve a willingness to make behavior changes” and initiate healthy changes for their young children (Eckstein, et. al., 2006, p. 682).

Parents’ Perception of Their Children’s Weight Status

Published literature suggests that parents do not have accurate perceptions of their children’s weight status and parents with overweight or obese children often fail to accurately
perceive their children’s weight status, which could have negative effects on childhood weight management interventions (Hudson, McGloin, & McConnon, 2012; Towns & D’Auria, 2009). Hong, Peltzer, & Jalayondeja (2019) reported about 42% of parents did not have an accurate perception of their 4th-6th grade children’s weight status. In the study done by Gauthier & Gance-Cleveland (2016) almost half of Hispanic parents (n=83) underestimated their child’s weight and did not identify their 2–5-year-old children’s weight problem. Merema, et. al (2016) reported many Western Australian parents did not have an accurate perception of their 5–15-year-old children’s weight status and therefore did not have any intention to initiate a healthy change for their children.

Parents of overweight and obese children are more likely to underestimate their child’s weight status compared to parents of normal weight children (Hong, Peltzer, & Jalayondeja, 2019; Gauthier & Gance-Cleveland, 2016). Mothers are more likely to underestimate their overweight and obese children’s weight status (Francescatto, et. al., 2014). A large transcontinental study (n=2,720) on mothers’ perception of their children’s weight status done by Gregori, et. al. (2018) reported that their data from 10 different countries around the world showed most mothers underestimated their overweight or obese 3–11-year-old children’s weight status. Chaparro, et. al. (2011) reported that 93.6% of mothers of overweight preschool children and 77.5% of mothers of obese preschool children underestimated their child’s weight status. Eckstein, et. al. (2006) found that most parents of overweight children in their study did not perceive their 2–17-year-old children as overweight and were not concerned about their child’s weight problem. Foster & Hale (2015) reported that 58% of the parents participating in their study (n=40) underestimated their overweight or obese 2–5-year-old children and, interestingly, 38% of parents of normal weight young children wanted their children “to ideally be heavier”
In the study done by Remmers, et. al. (2014) almost half of the parents underestimated their overweight or obese 5-year-old child’s weight status. Gomes, Barros, & Pereira (2017) reported that in their study primarily Portuguese parents of overweight children underestimated their 2–6-year-old children’s weight status.

Increasing parental awareness is “a needed first step” in addressing overweight and obesity among children (Eckstein, et. al., 2006). If parents have an accurate perception of their children’s weight problem and understand the risks associated with being overweight or obese, they will be more likely to make healthy changes (Towns & D’Auria, 2009). Parents who do not perceive their child’s weight as overweight “may not be receptive to strategies of addressing it” (Foster & Hale, 2015, p.5). Eckstein, et. al. (2006) found that parents who perceived their child as overweight were more likely to be concerned about their child’s weight problem. As Gauthier & Gance-Cleveland (2016) states “parents must recognize excess weight in their children as a precursor to developing concern about the consequences of obesity and motivate behavior change” (p. 84). Therefore, the first step in addressing the epidemic of childhood obesity is to have a comprehensive understanding of parents’ perceptions and to identify factors correlated with parental misperceptions and to help parents establish a realistic perception of their children’s weight status (Gauthier & Gance-Cleveland, 2016; Hudson, McGloin, & McConnon, 2012; Remmers, et. al., 2014).

Before planning any intervention or weight management programs for overweight or obese children, parents must “recognize the problem that is the focus of the treatment” (Eckstein, et. al., 2006, p. 688). Parents’ accurate perception of their child’s weight status is positively correlated with parents’ readiness for change (Rhee, et. al., 2005). If parents do not identify their child’s weight problem, they are less likely to be motivated to make healthy lifestyle changes
(Howe, Alexander, & Stevenson, 2017). To prevent and reverse childhood obesity, parents need to identify their children’s weight problem, and understand the health risks associated with being overweight in order to take action and make changes (Towns & D’Auria, 2009). As Towns & D’Auria (2009) stated in their integrative review of parental weight perception review, parents’ perception of their children’s weight status maybe “a key variable in determining the family’s readiness” to implement healthy changes regarding their eating habits and physical activity routine (p. 115). Gomes, Barros, & Pereira (2017) reported that parents’ perception of their children’s weigh status was “an important predictor of parental concerns”; parents who accurately perceived their overweight children’s weight status were significantly more likely to be concerned (p. 495). Correcting parental weight misperceptions and educating them about childhood weight management “is a public health priority” since it could affect children’s health both in short term and long term and prevent chronic diseases later in life (Merema, et. al., 2016, p. 70).

Factors Associated with Parents’ Perception of Their Child’s Weight Status

Although most of the existing literature supports that parents do not have an accurate perception of their children’s weight status, little is known about the reasons behind parents’ misperceptions and factors influencing parental perceptions (Pasch, et. al., 2016; Rietmeijer-Mentink, et. al., 2013). Children’s age may correlate with parents’ perceptions. Parents of younger children were more likely to have an inaccurate perception and to underestimate their younger children’s weight status compared to the older children (Pasch, et. al., 2016; Lundahl, et. al., 2014; Rietmeijer-Mentink, et. al., 2013;Hudson, McGloin, & McConnon, 2012). Parents were less likely to recognize their younger children as overweight and be concerned about their child’s weight status (Eckstein, et. al., 2006; Towns & D’Auria, 2009). In Eckstein, et. al. (2006)
study, only a small number of parents of 2–5-year-old identified their children as overweight. However, unlike other studies, Howe, Alexander, & Stevenson (2017) found that in their study parents of older children were more likely to underestimate their child’s weight status compared to parents of younger children.

Parents’ weight status is another factor that might influence parents’ perception of their children’s weight. Gregori, et. al. (2018) reported that their data from 10 different countries around the world showed mothers with higher BMI were more likely to underestimate their 3–11-year-old child’s weight status. Pasch, et. al. (2016) also reported that parents with higher BMI were more likely to underestimate their 8–10-year-old children’s weight status. In a systematic review of literature that was done by Francescatto, et. al. (2014) about mothers’ perceptions of their children’s nutritional status, they found that mothers’ overweight status was significantly correlated with mothers’ misperceptions of their children’s weight status. Overweight and obese parents were less likely to have accurate perception of their 5-year-old child’s weight status (Remmers, et. al., 2014). Chaparro, et. al. (2011) found that Hispanic mothers with higher BMI are less likely to have accurate perception of their preschool child’s weight status. Gauthier & Gance-Cleveland (2016) also reported that in their study parents’ BMI was significantly correlated with the accuracy of parents’ perception of their preschool children’s weight status; however, unlike other studies, they reported that overweight and obese Hispanic parents (n=83) perceived their child’s weight more accurately. Hudson, McGloin, & McConnon (2012) did not find a significant correlation between mother’s weight status and the accuracy of parents’ perception of their child’s weight status.

Literature suggested that parents’ education level might be associated with the accuracy of parents’ perception of their children’s weight. Parents with lower education level were less
likely to accurately perceive their 5-year-old child’s weight status compared to parents with higher education level (Remmers, et. al., 2014). Mothers with less education were more likely to underestimate their overweight children (Baughcum, at. al., 2000). In a systematic review of literature that was done by Francescatto, et. al. (2014) about mothers’ perceptions of their children’s nutritional status, they found that mothers’ lower education level was significantly correlated with mothers’ misperceptions of their children’s weight status. However, the study done by Eckstein, et. al. (2006) did not show any significant relationship between parents’ perception of their 2–5-year-old children’s weight status and parents’ education. In Gauthier & Gance-Cleveland (2016) study, parent education level was also not significantly correlated with the accuracy of Hispanic parents’ perception of their 2–5-year-old children’s weight status. Hudson, McGloin, & McConnon (2012) did not find a significant correlation between mother’s education level and the accuracy of parents’ perception of their child’s weight status as well. Like findings of Hudson, McGloin, & McConnon (2012) and Gauthier & Gance-Cleveland (2016), Howe, Alexander, & Stevenson (2017) also did not find any significant relationship between parents’ education and parents’ underestimation of their children’s weight status. In the study done by Pasch, et. al. (2016) parents’ education was not significantly related to parents’ underestimation of their children’s weight status.

Ethnicity and socio-economic status may also be correlated with the accuracy of parental perception of their children’s weight status. Parents in minority and lower income populations most often underestimate their overweight and obese preschool children’s weight status (Gauthier & Gance-Cleveland, 2016). A systematic review of literature about mothers’ perceptions of their children’s nutritional status that was done by Francescatto, et. al. (2014) found that ethnicity was significantly correlated with mothers’ misperceptions of their
children’s weight status. Some cultures equate overweight in young children with being healthy and well-fed (Gauthier & Gance-Cleveland, 2016). In their integrative review of the parental perception’s literature, Towns & D’Auria (2009) reported that parents’ ethnicity may influence the accuracy of their weight perception; Caucasians and Asian parents were more likely to accurately perceive their overweight children’s weight status, while Native American, African American, and Hispanic parents, who might prefer larger body size for their children, were more likely to perceive their overweight children’s weight status as normal (Towns & D’Auria, 2009).

The study done by Eckstein, et. al. (2006) did not show any significant relationship between parents’ perception of their 2–5-year-old children’s weight and parents’ ethnicity. Hudson, McGloin, & McConnon (2012) reported that parents with lower socio-economic status were less likely to accurately perceive their child’s weight status compared to parents with medium or high socio-economic status. Hong, Peltzer, & Jalayondeja (2019) also found that household income was significantly associated with parents’ underestimation of their 4th-6th grade children’s weight status; but unlike other studies, they found mothers with higher household income were more likely to underestimate their normal weight 4th-6th grade children’s weight status. Gregori, et. al. (2018) also reported in their transcontinental study on mothers’ weight perception (n=2720) mothers with higher family socio-economic status were more likely to underestimate their 3–11-year-old child’s weight status (Gregori, et. al., 2018). Howe, Alexander, & Stevenson (2017) did not find any significant relationship between parents’ ethnicity, or income, and parents’ underestimation of their children’s weight status.

Parents’ Perception of Their Children’s Diet Quality

Diet is an important factor in healthy growth and development of children. Poor diet quality in early childhood can cause overweight in preschool children and is linked with
increased rates of childhood obesity (Kourlaba, et. al., 2009). Unhealthy dietary habits in early childhood may continue later into adolescent and adulthood, increasing the risk for many chronic health problems (Kourlaba, et. al., 2009; Broilo, et. al., 2017; Robson, et. al., 2016). Parents could be considered the primary “gatekeepers of food” in the family (Robson, et. al., 2016, p. 984); parents are especially responsible to provide food and prepare meals for their young children (Adamo & Brett, 2014). Usually, parents of younger children have more control over their child’s food intake compared to parents of older children and teenagers (Robson, et. al., 2016).

Parents’ knowledge about a healthy diet and their ability to accurately identify their children’s diet quality is essential for the success of weight management programs to treat and prevent childhood obesity (Broilo, et. al., 2017). Research suggests a significant percentage of mothers overestimate their children’s diet quality (Kourlaba, et. al., 2009). Parents’ who inaccurately overestimate their children’s diet as healthy, will not be concerned and are less likely to initiate any changes to improve their child’s diet quality (Kourlaba, et. al., 2009). Parents must be able to accurately identify their young children’s diet quality; if they don’t identify their children’s poor diet quality, they will not initiate any changes to their child’s dietary habits (Kourlaba, et. al., 2009). Understanding parents’ perception of their children’s diet quality and incorporating it into nutritional interventions could help make the children’s weight management programs more effective (Broilo, et. al., 2017).

In the current literature, limited information exists about how parents perceive their children’s diet quality. Limited number of researches that studied mothers’ perception of their children’s diet quality reported that in general mothers tend to overestimate their children’s diet quality and perceive it as healthy (Kourlaba, et. al., 2009; Broilo, et. al., 2017). Interestingly,
parents who underestimated their overweight or obese children’s weight status were more likely to perceive their children’s diet as healthy (Hong, Peltzer, & Jalayondeja, 2019). In the study done by Gomes, Barros, & Pereira (2017) most Portuguese parents perceived their children’s diet quality as healthy regardless of their child’s weight status.

To the best of my knowledge, there was only one study found in the literature that directly compared mothers’ perception of their preschool child’s diet quality with the actual quality of child’s diet using Healthy Eating Index (Kourlaba, et. al., 2009). Kourlaba, et. al. (2009) studied mothers’ perception of their children’s diet quality and compared it with children’s actual diet quality measured by Healthy Eating Index (HEI), using a sample of 2287 Greek 2–5-year-old children from the GENESIS study, and examined the factors that might be associated with mothers’ inaccurate diet perception. While only 0.2% of children in this study had a “good diet” based on children’s HEI scores, 80% of the mothers perceived their preschooler’s diet as “good/very good/healthy” (Kourlaba, et. al., 2009, p. 740). Kourlaba, et. al. (2009) reported that “although mothers believe that they provide their children with healthy food their children may not have a healthy diet” (p. 741). Broilo, et. al. (2017) conducted a cross-sectional research (n= 464 Brazilian women) to study mothers’ perception of their 2–3-year-old child’s diet quality; 72% of participating mothers perceived their child’s diet as a healthy diet; although, Broilo, et. al. (2017) did not analyze children’s actual food intake to compare with mothers’ perception, based on other research studies using data from the same sample population, the researchers suggested that mothers’ perception of their child’s diet was not accurate.

Many factors including cultural, socio-economical, psychological, and biological factors could affect how parents perceive their children’s diet quality (Adamo & Brett, 2014). Kourlaba,
et. al. (2009) did not find any significant correlation between socio-demographic factors and mothers’ overestimation of their child’s diet quality. Adamo & Brett (2014) also did not find any significant correlation between mothers’ overestimation of their children’s diet quality and mothers’ education level or mothers’ BMI. More research is needed to explore parental diet perception and to identify and examine factors that are associated with the accuracy of parents’ perception of their children’s diet quality.

**Gaps in the Literature**

Accuracy of parents’ perceptions and factors related to parents’ misperceptions have not been studied comprehensively in different age groups. The existing literature mostly focused on parents’ perception of their older children’s weight. Most published research studies examined parents’ perception of their adolescents and teenagers’ weight status (Welch, et. al., 2004; Park, et. al., 2019). Most studies about parents’ weight perception are limited to examining mothers’ perceptions (Francescatto, et. al., 2014). In an integrative review of parental weight perception literature by Towns & D’Auria (2009), 10 of the 17 research studies assessed mothers’ perception of their children’s weigh status. Also, there are very limited published research studies about how parents perceive their children’s diet quality, regardless of children’s age group. Only one study compared parents’ perception of their child’s diet with child’s actual diet quality (Kourlab, et. al., 2009). Researchers have very limited knowledge of how young children’s parents perceive their children’s diet quality. Therefore, findings of the current study are important as they will add to the limited literature and provide insight about parents’ perception of their preschool children’s weight status and diet quality, specifically exploring the relationship between parents’ perception of their preschool children’s weight and the children’s diet quality as measured by Healthy Eating Index (HEI-2015).
Instruments

Rating scales containing graphic shapes is a commonly used method for assessing weight perception in the literature. Body figure rating scales have historically been used among adults and adolescents to measure body image perception and dissatisfaction and have been shown to provide valid and reliable information (Truby, & Paxton, 2002). Eckstein, et. al. (2006) developed and tested “gender– and age-range –specific child sketches” to assess parental perceptions of their 2–17-year-old children’s weight status (p. 682). Parents were asked to choose the sketch that most closely represents their child’s weight status. The tool was developed for boys and girls separately; for each gender, 4 age groups are defined (ages 2-5, ages 6-9, ages 10-13, and ages 14-17) and for each age group there are 7 sketches in a linear descending format. The middle sketch for each gender and age group represents a child at the CDC’s 50th BMI percentile (Eckstein, et. al., 2006). Eckstein, et. al. (2006) reported that their visual tool was more sensitive in assessing children’s weight status compared to parents’ reports by words.

Gauthier, & Gance-Cleveland (2016) adopted and used the seven gender-specific sketches in its original linear descending order for ages 2-5 that was developed by Eckstein, et. al. (2006). They also revised the presentation of the same seven gender-specific sketches for 2–5-year-old children into a random circular format and used it in their research to examine the effect of the tool’s visual presentation on the accuracy of parents’ perception. Gauthier & Gance-Cleveland (2016) used three measures to assess Hispanic parents’ perceptions of their 2–5-year-old children’s weight status in their study (n=83): “a word descriptor of weight and two separate visual descriptors,” and concluded that the accuracy of Hispanic parents’ weight perceptions was not significantly different when sketches were presented in linear or circular format (p.85). The
current study also used both linear and circular formats to compare the accuracy of parents’ weight perception using different visual presentations.

**Conceptual Framework**

Research regarding the concept of parents’ perception of their children’s weight status emerged in the literature in the early 2000s, almost concurrently researchers exploring factors contributing to the significant increase in childhood overweight and obesity rates emerged as well (Mareno, 2014). One problem with assessing parental perceptions is that perception cannot be measured directly; so, researchers who study parents’ weight perception provide operational definitions and often rely on different techniques including verbal reports and visual matching tasks to measure perception (Mareno, 2014). Although, parental weight perception has been studied for over twenty years, most research studies about parents’ perceptions “lack a strong conceptual definition” (Mareno, 2014, p.35). From the 17 studies that were included in Towns & D’Auria (2009) integrative review of parental weight perception literature, only one study noted that it was guided by a theoretical framework. Few researchers in this area report a conceptual framework guiding their study. Mareno (2014) suggested parents’ perception of their child’s weight status can be conceptually defined as “a parent’s judgment of their child’s body weight formulated by a parent’s recognition of body size, physical appearance, functional abilities, psychosocial effects and health effects related to current body weight” (p. 37).

Parents’ perception of their children’s weight could be influenced by many factors including race, ethnicity, geographic region, family, environment, societal normalization of overweight, parents’ values and beliefs, parents’ weight status, parents’ mental health, child’s gender and age, and other individual, social, and environmental factors (Mareno, 2014). Thus,
offering a conceptual framework associated with one’s research can aid the reader to more fully understand the researchers’ ideas and notions regarding the subject of exploration and should be considered. In attempt to offer the reader a clear understanding of the lens from which I viewed this issue I have the study’s conceptual framework. Guided by Perception Action Cycle and based on what is known in the literature, the study’s conceptual framework suggested that parents’ perception of their child’s weigh is correlated with how parents perceive their child’s diet quality, and both variables are correlated with child’s actual diet quality as measured by HEI-2015. This study also examined four key factors – parent’s socio-economic status, parent’s education level, parent’s ethnicity/race, and parent’s BMI – and explored how these factors were correlated with the accuracy of parents’ perceptions. Figure 1 provides a visual representation of the study’s conceptual framework for this study.

**Summary**

According to the literature, most parents tend to underestimate their children’s weight status regardless of race, ethnicity, cultural background, education level, or income (Pasch, et al., 2016; Howe, Alexander, & Stevenson, 2017). The accuracy of parents’ perception of their children’s weight status is “a crucial factor in parental ability for action” regarding children’s weight problems (Hong, Peltzer, & Jalayondeja, 2019, p. 557). Literature suggested recognizing overweight and obesity among young children and early weight management interventions “may present a key opportunity for both obesity treatment and prevention” (Hudson, McGloin, & McConnon, 2012, p. 1807). Therefore, early interventions “must focus on finding ways to help parents recognize overweight in very young children” (Towns & D’Auria, 2009, p. 128). To help parents of young children develop more accurate perceptions of their child’s weight status and diet quality, the accuracy of parents’ perceptions and factors associated with parental
misperceptions should be explored and examined comprehensively. This study contributes to a better understanding of parents’ perceptions of their 3–5-year-old preschool children. The findings of this study add to previous literature by describing the relationship between parental weight perception, parental diet perception, and children’s diet quality as measured by HEI-2015. Understanding the accuracy of parents’ perceptions and factors related to parental misperceptions has implications for designing and implementing childhood obesity interventions and action plans to manage and improve preschool children’s weight status and diet quality and ultimately prevent childhood obesity.
Chapter 3

Methods

Introduction

The purpose of this study was: a) to assess and evaluate the accuracy of parental perception of their preschool children’s weight status, b) to assess and evaluate the accuracy of parental perception of their preschool children’s diet quality, c) to explore if there is a relationship between parents’ perception of their children’s weight, parents’ perception of their children’s diet quality, and their children’s diet quality as measured by Healthy Eating Index (HEI-2015) score.

Research Questions

Seven research questions (with associated hypotheses) were explored in this study:

Research Question 1 – Do parents of preschool children have an accurate perception of their children’s weight status?

1 - Ha: Parents of preschool children have an accurate perception of their child’s weight status.

Research Question 2 – Are there factors that relate to the accuracy of parents’ perception of their children’s weight status?

2A - Ha: There is a positive relationship between parents’ level of education and the accuracy of parents’ perception of their children’s weight status.
2B - Ha: There is a positive relationship between parents’ socio-economic status and the accuracy of parents’ perception of their children’s weight status.

2C - Ha: There is a negative relationship between parents’ BMI and the accuracy of parents’ perception of their children’s weight status.

2D - Ha: The accuracy of parents’ perception of their children’s weight varies based on their ethnicity / race.

Research Question 3 - Is there a relationship between parents’ perception of their children’s weight and their children’s diet quality as measured by Healthy Eating Index (HEI-2-15)?

3 - Ha: There is a positive relationship between the accuracy of parents' perception of preschool children's weight status and children's HEI-2015 scores.

3A - Ha: Preschool children, whose parents under-estimated their child’s weight, have lower HEI-2015 scores.

3B - Ha: Preschool children, whose parents over-estimated their child’s weight, have higher HEI-2015 scores.

Research Question 4- Do parents of preschool children have an accurate perception of their children’s diet quality?

4 - Ha: Parents of preschool children have an accurate perception of their child’s diet quality.

Research Question 5 – Are there factors that relate to the accuracy of parents’ perception of their children’s diet quality?
5A - Ha: There is a positive relationship between parents’ level of education and the accuracy of parents’ perception of their children’s diet quality.

5B - Ha: There is a positive relationship between parents’ socio-economic status and the accuracy of parents’ perception of their children’s diet quality.

5C - Ha: There is a negative relationship between parents’ BMI and the accuracy of parents’ perception of their children’s diet quality.

5D - Ha: the accuracy of parents’ perception of their children’s diet quality varies based on their ethnicity / race.

Research Question 6 - Is there a relationship between parents’ perception of their children’s diet quality and their children’s diet quality as measured by Healthy Eating Index (HEI-2015)?

6 - Ha: There is a negative relationship between parents' perception of preschool children's diet quality and children's HEI-2015 scores.

Research Question 7 - Is there a relationship between parents’ perception of their children’s weight and parents’ perception of their children’s diet quality?

7 - Ha: There is a positive relationship between the accuracy of parents' perception of preschool children's weight status and the accuracy of parents’ perception of their children’s diet quality.
Study Design

This study used a quantitative research approach to investigate parents’ perception of their pre-school (3-5 years old) children’s weight status and diet quality. This study employed a cross-sectional, correlational, descriptive, and exploratory study design to specifically explore a relationship between parental weight perception, parental diet perception, and children’s Healthy Eating Index (HEI-2015) Score, using a survey design. Data was collected at one point of the time thus cross-sectional, a survey-based approach thus categorized as non-experimental in nature. This study was correlational because it is examining the relationship between variables. Main variables in this study were accuracy of parents’ perception of their preschool children’s weight status, accuracy of parents’ perception of their preschool children’s diet quality, and children’s Healthy Eating Index (HEI) scores. This study did not look for cause-and-effect relationship; therefore, there was no dependent or independent variables.

Sampling

The target population for this study was parents, guardians, and caregivers of preschool (3-5 years old) children.

Study inclusion criteria consist of all parents, guardians, and caregivers of healthy preschool children (between ages 3-5 years old) who live in the United States were eligible to participate in this study.

Study exclusion criteria consist of parents of children younger than 3 years and older than 5 years, parents of preschool children with chronic health problems, acute medical conditions, and/or physical or mental disabilities. Parents of children living outside of the United States were also excluded.
Sample Size

A total sample size of 193 was calculated for this study using A priori G-Power analysis based on a small effect size (0.2), Alpha = 0.05, and power = 0.80, for two tails study (Erdfelder, Faul, & Buchner, 1996). Figure 2 displays A priori G-Power analysis to determine required sample size (Figure 2).

Figure 2

A priori G-Power Analysis to Determine Sample Size
**Sample Type**

Data was collected using a sample of convenience through Social Media postings (i.e. Facebook) and SurveyMonkey Audience®. Both purposive sampling and non-purposive methods was utilized to reach out to potential participants.

**Study Procedures**

Following SHU’s IRB approval, a letter of solicitation was distributed through Email and Social Media to the potential participants. Parents’ and moms’ groups on social media (i.e. Facebook) were used as a platform for snowball sampling to reach out to parents who have preschool (3-5 years old) children. SurveyMonkey Audience®, a service provided by SurveyMonkey website, was also used to reach out to potential participants. SurveyMonkey Audience Panels are representative of a diverse online population that voluntarily joins a program to take surveys. SurveyMonkey emails the survey link to the people from their global panel based on the inclusion/exclusion criteria defined by the Primary Investigator. Anonymity, confidentiality, and volunteerism of the study are assured via SurveyMonkey Audience® Panels design.

Parents were explicitly notified in the letter of solicitation that their consent to participate in the study was given by parents based upon their accessing of the survey questionnaire link and its submission. The survey was available through SurveyMonkey website from November 2019 to August 2020. Participants were asked to complete the questionnaire if they have a healthy preschool child between ages 3-5 years old and live in the United States.
Data Collection

A 29-question survey questionnaire (Appendix E) designed by the Primary Investigator was used to collect parents’ and children’s demographics (age, gender, race, parents’ socio-economic status, parent’s education level), parents’ perception of their child’s weight status, parents’ perception of their child’s diet quality, children’s, and parents’ anthropometric measurements (height and weight), and children’s dietary intake. A short paragraph was included in the questionnaire to explicitly instruct parents on how to measure their child’s height and weight accurately at home.

Instruments

Parents’ Perception of their Children’s Weight Status. Parents’ perception of their children’s weight was measured using three methods: 1) a five-point Likert-type scale question addressing parental perception developed by the primary investigator – response options included very underweight, underweight, normal weight, overweight, and obese, 2) seven gender-specific sketches for 2-5 years old children presented in a linear form [adopted with permission from Eckstein, et. al. (2006)] (see Appendix E- Questionnaire: Q15 and Q17), 3) same seven gender-specific sketches for 2-5 years old children presented in a random circular format [adopted with permission from Gauthier, & Gance-Cleveland (2016)] (see Appendix E- Questionnaire: Q16 and Q18).

Using rating scales containing graphic shapes is a commonly used method for assessing weight perception and has been shown to provide valid and reliable information (Truby, & Paxton, 2002). Body figure rating scales are simple and quick to use and easy to understand and provide reliable information. Thus, an age-range and gender-specific set of 7 child sketches in
linear format was used to measure parents’ perception of their child’s weight (Eckstein, et. al., 2006). The drawings in each series of sketches represent children’s BMI percentiles as it is defined by The Centers for Disease Control and Prevention 2000 reference. The middle sketch in each group represents a child at the 50th BMI percentile. To measure parents’ perception of their child’s weight, parents were asked to select the figure from the appropriate gender series that most closely represents their child’s actual body size.

According to Eckstein, et. al. (2006), the test-retest reliability for sketch selection in their study was 91.7%, which indicates excellent reliability. Gauthier, & Gance-Cleveland (2016) also reported this visual tool has high degree of reliability (95%) for measuring parents’ perception of their children’s weight. Although findings from studies that used this tool are consistent, this tool has not been formally validated (Gauthier, & Gance-Cleveland, 2016). However, it seems that Eckstein and colleagues (2006) had used measures to ensure construct validity and face validity for this tool; digital images of children in different age groups and with different body weights were examined and modified by a graphic artist and two authors experienced in children nutritional assessment to create a gender-specific series of 7 child sketches in each age group for boys and girls (Eckstein, et. al., 2006).

Some research studies suggest that body size perception and silhouette selection vary with silhouette presentations and when body figure rating scales presented in linear format, participants tend to frequently select the middle sketches and often avoid the extremes (Gauthier, & Gance-Cleveland, 2016). Gauthier, & Gance-Cleveland (2016) modified the gender and age-group-specific sketches developed by Eckstein, et. al. (2006) into circular randomly arranged silhouette and used it in their research to examine the effect of the tool’s visual presentation on the accuracy of parents’ perception. In Gauthier & Gance-Cleveland (2016) study, parents’
accuracy of weight status was not affected by the two different silhouette presentations. However, same seven gender-specific sketches for 2-5 years old children presented in a random circular format [adopted with permission from Gauthier, & Gance-Cleveland (2016)] was also used in this study to compare the accuracy of parents’ weight perception using both linear and circular visual presentation.

**Parents’ Perception of their Children’s Diet Quality.** Parents’ perception of their children’s diet quality was measured using two questions: 1) a three-point Likert-type scale question addressing parental perception developed by the primary investigator – response options included poor, moderate, and healthy diet, 2) a score calculated based on parents’ report of their child consumption of five different food groups - Diet score.

To measure parental diet perception a short tool was developed by the Primary Investigator based on Key Recommendations from Dietary Recommendations for Americans 2015-2020. For each parent, a parent’s perception Diet Score between 0-100 was calculated based on their responses to the five statements. Parents were asked to indicate their level of agreement with five statements about their child’s dietary intake (Figure 3). Each category was given a score, the scores for each response were then added together and the total score was multiplied by 4 to get a parent’s perception Diet Score between 0-100 for each parent.
The PI developed measuring parents’ diet perception tool included five statements from the Key Recommendations of Dietary Recommendations for Americans 2015-2020. To assure that the five statements were accurately adopted for the purpose of this study, an expert in Nutrition discipline audited this information. Also, the clarity of this tool was assessed by administering the tool to a small group of ten parents with same characteristics as those who would eventually participate in the study using a modified Delphi Process. Additionally, Internal consistency of this tool was assessed after collecting and analyzing data, showing Cronbach’s $\alpha = 0.797$, which is generally taken to indicate high internal consistency (Table 1).
Table 1

*Internal Consistency of Parental Diet Perception Tool*

<table>
<thead>
<tr>
<th>Reliability Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cronbach's Alpha</td>
</tr>
<tr>
<td>.797</td>
</tr>
</tbody>
</table>

*Children’s Diet Quality.* 24-hour Food Recall was used to collect children’s dietary intake data. 24-hour Food Recall is one of the commonly accepted methods to collect dietary intake information in the Nutrition scholarly discipline (Mahan & Raymond, 2016). Participants were asked to recall their child’s food / beverage intake for the past 24-hour and report it as accurately and with as much detailed information as possible. Data collected through the 24-hour Feed Recall was used to conduct a nutrient intake analysis for each child (Figure 4).

**Figure 4**

*24-hour Food Recall Question*

*10. Please write down all foods and beverages consumed by your CHILD during the past day. Please list all foods including snacks and all drinks like water, milk, tea, juice ... and record the amount of each food and beverage your CHILD consumed yesterday as detailed as possible.*

For Example:
1 (8-oz) cup milk
1 Tablespoon peanut butter / 1 slice toast
1 small plate pasta with meatball sauce

<table>
<thead>
<tr>
<th>BREAKFAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snack</td>
</tr>
<tr>
<td>LUNCH</td>
</tr>
<tr>
<td>Snack</td>
</tr>
<tr>
<td>DINNER</td>
</tr>
<tr>
<td>Snack</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>
To analyze each child’s dietary intake, Automated Self-Administered 24-Hour (ASA24®) Dietary Assessment Tool was used in this study ([https://epi.grants.cancer.gov/asa24/](https://epi.grants.cancer.gov/asa24/)). ASA24® was created by The National Cancer Institute (NCI) and was first released in 2009. The ASA24 system is based upon the United States Department of Agriculture’s (USDA) Automated Multiple-Pass Method (AMPM) and has been validated by the ASA24 development team. The results from numerous validation and evaluation studies show close agreement between the ASA24® system and standardized interviewer-administered 24-hour recalls ([https://epi.grants.cancer.gov/asa24/respondent/validation.html](https://epi.grants.cancer.gov/asa24/respondent/validation.html)). ASA24®-2018, released November 2018, was used in this study. Dietary data from 24-hour Food Recall was entered in ASA24® by the Primary Investigator to analyze dietary intake data for each child.

Analyzed dietary data from ASA-24® was then used to calculate Healthy Eating Index-2015 score for each child. The HEI-2015 is a diet quality index released by the Center for Nutrition Policy and Promotion of the United States Department of Agriculture. HEI-2015 measures how well a person’s diet conforms to recommended healthy eating patterns and includes thirteen components that reflect the Key Recommendations in the 2015-2020 Dietary Guidelines for Americans ([https://www.cnpp.usda.gov/how-hei-scored](https://www.cnpp.usda.gov/how-hei-scored)). HEI-2015 demonstrated construct validity, displayed reliability with low to moderate correlations among distinct components and internal consistency, and demonstrated criterion validity because the HEI-2015 was associated with a statistically significant reduced risk of mortality in the National Institute of Health-AARP Diet and Health Study (Reedy, et. al., 2018). Overall, a higher total HEI score indicates a diet that aligns better with dietary recommendations. An HEI score over 80 implies a ‘good’ diet, a score between 50 and 80 indicates that a diet ‘needs improvement’ and a score below 50 indicates a ‘poor’ diet (Kourlaba, et. al., 2009).
Data Analysis

Data was collected between November 2019 and August 2020. Microsoft Excel, SAS University edition, and IBM SPSS Statistics Base Integrated Student Edition v24 were used for data analysis.

Calculating Body Mass Index (BMI)

Calculating Parents’ BMI. Parents’ self-reported height and weight were used to calculate parents’ Body Mass Index (BMI) using the following formula: 703 x weight (lbs) ÷ [height (in)]^2

Calculating Children’s BMI. Children’s reported height and weight along with their age and gender was used by the Primary Investigator to calculate Body Mass Index (BMI) as well as BMI Percentile for each child. Every child’s BMI were compared with CDC’s BMI-for-Age and Gender growth charts and derived BMI percentiles were classified into one of the four CDC defined categories: BMI < 5TH percentile underweight, 5TH ≥ BMI < 85TH percentile normal weight, 85TH ≥ BMI < 95TH percentile overweight, and BMI ≥ 95TH percentile obese (Centers for Disease Control and Prevention, 2021).

Calculating Children’s Healthy Eating Index (HEI-2015) Score

ASA24® generated output files for 24-hour Food Recall for each child, provided total nutrient and food group values for foods, beverages, and supplements combined. The Primary Investigator obtained food and nutrient analysis output files from ASA24® researcher website. NIH (National Cancer Institute) provides a SAS code, macros for scoring, for calculating the Healthy Eating Index-2015 using nutrient analysis files from different dietary assessment tools
including 24-hour Food Recall(s) from Automated Self-Administered 24-Hour Dietary Assessment Tool (ASA24®) (https://epi.grants.cancer.gov/hei/sas-code.html). Data files from ASA24® were imported into statistical software SAS University Edition and these macros were used to calculate Healthy Eating Index–2015 Score (an index of diet quality) for each child.

**Calculating the Accuracy of Parents’ Weight Perception**

As described previously, parents’ perception of their children’s weight was measured using three methods: 1) Likert Scale question, 2) Linear Visual, 3) Circular Visual. The accuracy of parents’ perception was calculated by comparing children’s BMI percentiles to parents’ responses to the three questions measuring their perception of weight. Each weight category was given a code. A positive score (+1) means that parents over-estimated their child’s actual body size, a negative score (-1) means that parents under-estimated their child’s actual body size, and zero means parents have an accurate perception of their child’s actual body size (Tremblay, et. al., 2011).

When analyzing the Five-point Likert-scale question, the parents’ weight perception was considered accurate if: Child’s BMI was <5th percentile and parent chose “very underweight” or “underweight”, Child’s BMI was 5th ≥ BMI < 85th percentile and parent chose “normal weight”, Child’s BMI was ≥85th percentile and parent chose “overweight” or “obese” (https://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html).

When analyzing Gender-specific sketches for ages 2-5 (for both Linear Visual and Circular Visual), the parents’ weight perception was considered accurate if: Child’s BMI was <5th percentile and parent chose sketch number 7, Child’s BMI was 5th ≥ BMI < 85th percentile
and parent chose sketch number 3, 4, 5, or 6, Child’s BMI was ≥85th percentile and parent chose sketch number 1 or 2 (Eckstein, et. al., 2006; Gauthier, & Gance-Cleveland, 2016).

**Calculating the Accuracy of Parents’ Diet Perception**

Parents’ perception of their children’s diet quality was measured using two measures: 1) Likert Scale, 2) parents’ Diet Score. To evaluate the accuracy of parents’ perception of their child’s diet quality, children’s HEI-2015 Scores was compared to parents’ responses to the two questions measuring their perception of diet quality. Like the accuracy of parents’ weight perception, each category was given a code. A positive score (+1) means that parents over-estimated their child’s actual diet quality, a negative score (-1) means that parents under-estimated their child’s actual diet quality, and zero means parents have an accurate perception of their child’s diet quality.

When analyzing the three-point Likert-scale question, the parents’ perception was considered accurate if: Child’s HEI-2015 score was < 50 and parent chose “poor diet”, Child’s HEI-2015 score was between 50 to 80 (50 ≥ HEI-2015 ≤ 80) and parent chose “moderate diet”, Child’s HEI-2015 was > 80 and parent chose “healthy diet”.

When analyzing the parents’ perception using Diet Score, the parents’ perception was considered accurate if child’s HEI-2015 score and parents’ perception of child’s diet quality are both at the same category: Child’s HEI-2015 score and parents’ Diet Score were both < 50, Child’s HEI-2015 score & parents’ Diet Score were both between 50 to 80 (50 ≥ HEI-2015 & Diet Score ≤ 80), Child’s HEI-2015 score and parents’ Diet Score were both > 80.
**Statistical Analysis**

To explore the accuracy of parents’ weight and diet perception, the distribution of parents’ weight perception and the distribution of parents’ diet perception were compared to the distribution of children’s BMI and the distribution of children’s HEI-2015 score, respectively. The Non-parametric Test of Spearman’s correlation coefficient (\(r_s\)) was used to examine the relationship between parents’ level of education, parents’ socio-economic status, parents’ BMI, parents’ ethnicity/race and the accuracy of parental weight perception and diet perception. Spearman’s correlation coefficient (\(r_s\)) test was also used to determine if there was any relationship between the study’s three main variables: parents’ perception of their preschool children’s weight status, parents’ perception of their preschool children’s diet quality, and children’s diet quality as measured by HEI-2015 score. Figure 5 provides a visual representation of the data analysis processes associated with the study.
Figure 5

Data Collection and Data Analysis

Data Collection
Questionnaire

Demographic
Height and Weight
Parents’ Perception
Child’s 24-hour Food Recall

Data Analysis

Parent’s BMI
Child’s BMI

Child’s HEI-2015 Score

Accuracy of Parent’s
Weight Perception

Accuracy of Parent’s Diet Perception

Accuracy of Parent’s Weight Perception
Chapter 4

Results

This chapter presents the findings of the research study. The study results are organized and reported by research questions. Before reporting the results for each research question, an overview of the study’s total sample size and descriptive statistics of participants’ demographic information is provided.

Total of 339 surveys were collected for this study. However, 6 participants were excluded because they did not meet the study’s inclusion criteria. Therefore, a total sample of 333 was used to evaluate parents’ perception of their preschool (3-5 years old) children’s weight status. Forty-four participants did not complete the 24-hour food recall questions and did not report their child’s dietary intake. Consequently, a total sample of 289 was used to measure parents’ perception of their preschool children diet quality. G-Power was used to calculate post hoc achieved power (Erdfelder, Faul, & Buchner, 1996). For analysis conducted on the 333 participants and 289 participants the post hoc achieved power was above 0.9 with effect size of 0.2 (Figure 6).
Figure 6

Post Hoc G-Power Analysis

Total Sample = 333
*Post hoc Achieved Power 0.9580*
Small effect size (0.2)
Alpha 0.05
Two tails study

Total sample = 289
*Post hoc Achieved Power 0.9298*
Small effect size (0.2)
Alpha 0.05
Two tails study
Parents’ Demographics

Participants in this study were from 44 different states (Figure 7). 183 of participating parents were female and 149 were male. 52.7% of participating parents were mothers and 41.4% fathers. About half of participating parents (49.1%) reported their age between 31-40 years old, followed by 29.8% who were 18-30 years old. Most participating parents reported their ethnicity/race as White/Caucasian (64.9%), followed by 12.8% Hispanic, and 8.9% Black/African American (Table 2). 69.7% of participating parents were married, followed by 15.6% single parent, and 9.3% in a domestic relationship. Participating parents’ education level ranged from less than high school diploma to Doctorate degree with 29.2% reported their highest degree Bachelor’s, followed by 16.7% high school diploma, and 16.4% Master’s degree (Table 3). The reported household income ranged from under $50,000 to more than $250,000, with 33.6% reporting their household income between $50,000 to $100,000, 27.7% under $50,000 and 18.2% between $100,000 and $150,000 for participating parents (Table 4).
**Figure 7**

*Participating Parents from Different States*
Table 2

Parents’ Demographic Data

<table>
<thead>
<tr>
<th>Parents’ Descriptive Data</th>
<th>Groups</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>183</td>
<td>54.5%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>149</td>
<td>44.3%</td>
</tr>
<tr>
<td>Relationship to Child</td>
<td>Mother</td>
<td>177</td>
<td>52.7%</td>
</tr>
<tr>
<td></td>
<td>Father</td>
<td>139</td>
<td>41.4%</td>
</tr>
<tr>
<td></td>
<td>Guardian</td>
<td>8</td>
<td>2.4%</td>
</tr>
<tr>
<td></td>
<td>Stepmother</td>
<td>1</td>
<td>0.3%</td>
</tr>
<tr>
<td></td>
<td>Stepmother</td>
<td>2</td>
<td>0.6%</td>
</tr>
<tr>
<td></td>
<td>Caregiver</td>
<td>2</td>
<td>0.6%</td>
</tr>
<tr>
<td></td>
<td>Grandmother</td>
<td>1</td>
<td>0.3%</td>
</tr>
<tr>
<td></td>
<td>Grandfather</td>
<td>2</td>
<td>0.6%</td>
</tr>
<tr>
<td>Age</td>
<td>18–30-year-old</td>
<td>100</td>
<td>29.8%</td>
</tr>
<tr>
<td></td>
<td>31–40-year-old</td>
<td>165</td>
<td>49.1%</td>
</tr>
<tr>
<td></td>
<td>41–50-year-old</td>
<td>57</td>
<td>17.0%</td>
</tr>
<tr>
<td></td>
<td>51–60-year-old</td>
<td>7</td>
<td>2.1%</td>
</tr>
<tr>
<td></td>
<td>61–70-year-old</td>
<td>4</td>
<td>1.2%</td>
</tr>
<tr>
<td>Ethnicity / Race</td>
<td>Asian / Pacific Islander</td>
<td>27</td>
<td>8.0%</td>
</tr>
<tr>
<td></td>
<td>Black / African American</td>
<td>30</td>
<td>8.9%</td>
</tr>
<tr>
<td></td>
<td>Hispanic</td>
<td>43</td>
<td>12.8%</td>
</tr>
<tr>
<td></td>
<td>Native American / American Indian</td>
<td>4</td>
<td>1.2%</td>
</tr>
<tr>
<td></td>
<td>White / Caucasian</td>
<td>218</td>
<td>64.9%</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>11</td>
<td>3.3%</td>
</tr>
</tbody>
</table>
### Table 3

Parents’ Education Level

<table>
<thead>
<tr>
<th>Parent Highest Degree</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than a high school diploma</td>
<td>8</td>
<td>2.4%</td>
</tr>
<tr>
<td>High school degree / diploma / or equivalent</td>
<td>56</td>
<td>16.7%</td>
</tr>
<tr>
<td>Some college credits, no degree</td>
<td>51</td>
<td>15.2%</td>
</tr>
<tr>
<td>Technical / trade training</td>
<td>9</td>
<td>2.7%</td>
</tr>
<tr>
<td>Associate degree</td>
<td>37</td>
<td>11%</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>98</td>
<td>29.2%</td>
</tr>
<tr>
<td>Master’s degree</td>
<td>55</td>
<td>16.4%</td>
</tr>
<tr>
<td>Professional degree</td>
<td>6</td>
<td>1.8%</td>
</tr>
<tr>
<td>Doctorate degree</td>
<td>13</td>
<td>3.9%</td>
</tr>
<tr>
<td>Total</td>
<td>333</td>
<td>99.1%</td>
</tr>
<tr>
<td>Missing</td>
<td>3</td>
<td>0.9%</td>
</tr>
<tr>
<td>Total</td>
<td>336</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Table 4

Participants’ Household Income

<table>
<thead>
<tr>
<th>Household Income</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
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<td></td>
</tr>
<tr>
<td>Household income &lt; $ 50K</td>
<td>93</td>
<td>27.7%</td>
</tr>
<tr>
<td>$ 50K ≤ Household income &lt; $ 100K</td>
<td>113</td>
<td>33.6%</td>
</tr>
<tr>
<td>$ 100K ≤ Household income &lt; $ 150K</td>
<td>61</td>
<td>18.2%</td>
</tr>
<tr>
<td>$ 150K ≤ Household income &lt; $ 200K</td>
<td>29</td>
<td>8.6%</td>
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<tr>
<td>$ 200K ≤ Household income &lt; $ 250K</td>
<td>7</td>
<td>2.1%</td>
</tr>
<tr>
<td>$ 250K ≤ Household income</td>
<td>20</td>
<td>6%</td>
</tr>
<tr>
<td>Do not like to report</td>
<td>10</td>
<td>3%</td>
</tr>
<tr>
<td>Total</td>
<td>333</td>
<td>99.1%</td>
</tr>
<tr>
<td>Missing</td>
<td>3</td>
<td>0.9%</td>
</tr>
<tr>
<td>Total</td>
<td>336</td>
<td>100%</td>
</tr>
</tbody>
</table>
Children’s Demographics

The children’s age in this study ranged from 36 months to 72 months with the mean of 55.52 months; 26% of the children were 3 years old, 37% of children were 4 years old, and 37% were 5 years old (Figure 8). The distribution was equal between boys and girls with 47% girls and 53% boys (Figure 9). More than half of participating parents (62%) reported their child’s ethnicity/race as White/Caucasian, followed by 12% Hispanic, and 11% Black/African American; 11% of participants reported their child’s ethnicity/race as mixed (Figure 10).

Figure 8

*Children’s Age*
Figure 9

Children’s Gender

Figure 10

Children’s Ethnicity/Race
Research Questions

Research Question 1

Do parents of preschool children have an accurate perception of their children’s weight status?

1 – Ha. Parents of preschool children have an accurate perception of their child’s weight status.

1 – Ho. Parents of preschool children do NOT have an accurate perception of their child’s weight status.

To answer this research question and test Hypothesis 1, children’s BMI percentiles were compared to parents’ weight perception of their children as measured by three methods, a five-point Likert-type scale question, seven gender-specific sketches for 2-5 years old children presented in a Linear form [adopted with permission from Eckstein, et. al. (2006)], and same seven gender-specific sketches for 2-5 years old children presented in a random Circular format [adopted with permission from Gauthier, & Gance-Cleveland (2016)].

Likert Scale. Although 279 parents reported their child’s weight as “healthy weight”, only 118 children had “healthy weight” based on their calculated BMI categories. Only 16 parents reported their child’s weight as “overweight” or “obese”, but 164 children had BMI that categorized as “overweight” or “obesity” (Figure 11). Non-parametric test, Related-Samples Kendall’s Coefficient of Concordance, was used to compare the distribution of children’s BMI and parents’ weight perception of their child as measured by Likert Scale and the result confirmed that the distribution of these two variables is not the same (Figure 12). When parents’ weight perception of their child was measured by Likert Scale, 49% of participants
underestimated their child’s weight, 14% overestimated, and only 37% reported their child’s weight accurately (Figure 13).

Figure 11

*Parents’ Perception of Their Child’s Weight Status as Measured by Likert Scale*
Figure 12

*Parents’ Perception of Their Child’s Weight Status as Measured by Likert Scale Compared to Children’s BMI*

![Bar chart showing the comparison between child BMI code and parental perception (PP Child Wt) measured by Likert scale. The chart includes the distribution of ranks and a table showing Total N, Kendall's W, Test Statistic, Degrees of Freedom, and Asymptotic Sig. (2-tailed test).]

Figure 13

*Accuracy of Parental Perception of Their Child’s Weight Status as Measured by Likert Scale*

![Pie chart showing the accuracy of parental perception of child's weight status. The chart indicates that 37% of parents accurately assessed their child's weight status, 14% under-estimated, and 49% over-estimated.]
**Linear Visual.** When measured by Linear Visual, 288 parents reported their child’s weight as “healthy weight”, while only 118 children had “healthy weight” based on their calculated BMI categories. Although only 23 parents reported their child’s weight as “overweight” or “obese”, 164 children had BMI’s that categorized them as “overweight” or “obese” (Figure 14). Non-parametric test, Related-Samples Kendall’s Coefficient of Concordance, was used to compare the distribution of children’s BMI and parents’ weight perception as measured by Linear Visual. Results confirmed that the distributions of these two variables are not the same (Figure 15). Parents’ weight perception measured by Linear Visual showed that 47% of participants underestimated their child’s weight, while 15% overestimated, and only 38% reported their child’s weight accurately (Figure 16).

**Figure 14**

*Parents’ Perception of Their Child’s Weight Status as Measured by Linear Visual*
Figure 15

Parents’ Perception of Their Child’s Weight Status as Measured by Linear Visual Compared to Children’s BMI

Figure 16

Accuracy of Parental Perception of Their Child’s Weight Status as Measured by Linear Visual

Accuracy PP Weight - using Linear visual
**Circular Visual.** When using the Circular Visual measurement, 273 parents reported their child’s weight as “healthy weight”, with only 118 children being identified as “healthy weight” based on their calculated BMI categories. Using the Circular Visual measurement, 30 parents reported their child’s weight as “overweight” or “obese”, while 164 children had BMI that categorized as “overweight” or “obesity” (Figure 17). Non-parametric test, Related-Samples Kendall’s Coefficient of Concordance, was used to compare the distribution of children’s BMI and parents’ weight perception as measured by Circular Visual and the result confirmed that the distribution of these two variables is not the same (Figure 18). The results of Circular Visual measurement indicated that 47% of participants underestimated their child’s weight, 16% overestimated, and only 37% reported their child’s weight accurately (Figure 19).

**Figure 17**

*Parents’ Perception of Their Child’s Weight Status as Measured by Circular Visual*
Figure 18

Parents’ Perception of Their Child’s Weight Status as Measured by Circular Visual Compared to Children’s BMI

Figure 19

Accuracy of Parental Perception of Their Child’s Weight Status as Measured by Circular Visual
Regardless of which method was used to measure parental weight perception of their child – Likert Scale, Linear Visual, or Circular Visual – the results of this study indicated that the distributions of parental weight perception and children’s BMI were not the same and thus lead me to fail to reject the Null Hypothesis. Therefore, parents’ perception of their pre-school children’s weight status was NOT accurate.

**Comparing Linear Visual and Circular Visual.** As mentioned on the Methods, two different visual tools, Linear and Circular, was used to examine the effect of tools presentation on the accuracy of parents’ perception of their preschool children’s weight status. After collecting and analyzing data, the non-parametric test of Kendall’s Coefficient of Concordance was done to compare the distribution of parents’ weight perceptions based on Linear and Circular visuals according to three categories of children’s weight: underweight, normal, overweight/obese. The results showed that the distribution of parents’ weight perception of their child as measured by Linear, and Circular are the same and there is not a statistically significant difference (Figure 20).
Figure 20

Parents’ Perception of Their Child’s Weight Status: Circular Visual Compared to Linear Visual Compared

![Bar chart showing Related-Samples Kendall's Coefficient of Concordance for Linear and Circular visualizations. The chart includes frequency distributions and statistical comparisons.]

### Related-Samples Kendall's Coefficient of Concordance

<table>
<thead>
<tr>
<th></th>
<th>Linear</th>
<th>Circular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Rank</td>
<td>1.50</td>
<td>1.50</td>
</tr>
<tr>
<td>Rank Frequency</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Statistical Results

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total N</td>
<td>333</td>
</tr>
<tr>
<td>Kendall's W</td>
<td>.000</td>
</tr>
<tr>
<td>Test Statistic</td>
<td>.006</td>
</tr>
<tr>
<td>Degrees of Freedom</td>
<td>1</td>
</tr>
<tr>
<td>Asymptotic Sig. (2-sided test)</td>
<td>.938</td>
</tr>
</tbody>
</table>

1. Multiple comparisons are not performed because the overall test retained the null hypothesis of no differences.
Research Question2

Are there factors that relate to the accuracy of parents’ perception of their children’s weight?

2 A – Ha. There is a positive relationship between parents’ level of education and the accuracy of parents’ perception of their children’s weight status.

2 A – Ho. There is NOT a positive relationship between parents’ level of education and the accuracy of parents’ perception of their children’s weight status.

Since both variables were measured using ordinal data, the Non-Parametric Test of Spearman’s Correlation Coefficient (rs) was used to test if there is any relationship between parents’ level of education and the accuracy of parents’ weight perception as measured by Likert Scale, Linear Visual, and Circular Visual (Table 5).
Table 5

Correlation between Parents’ Level of Education and Accuracy of Parental Perception of Their Child’s Weight Status

The results did not show any significant relationship between parents’ level of education and the accuracy of parents’ weight perception of their child and thus lead me to fail to reject the Null Hypothesis. Therefore, there was NOT a significant relationship between parents’ level of education and the accuracy of parents’ perception of their children’s weight status.

Likert: $r_s = 0.048$, $p = 0.384$
Linear: $r_s = 0.049$, $p = 0.377$
Circular: $r_s = 0.084$, $p = 0.128$
2B – Ha. There is a positive relationship between parents’ socio-economic status and the accuracy of parents’ perception of their children’s weight status.

2B – Ho. There is NOT a positive relationship between parents’ socio-economic status and the accuracy of parents’ perception of their children’s weight status.

Both variables were measured using ordinal data, so, the Non-Parametric Test of Spearman’s Correlation Coefficient ($r_s$) was used to test if there is any relationship between parents’ socio-economic status and the accuracy of parents’ weight perception as measured by Likert Scale, Linear Visual, and Circular Visual (Table 6).

Table 6

*Correlation between Parents’ Socio-economic Status and Accuracy of Parental Perception of Their Child’s Weight Status*

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Household Income</th>
<th>PP Child Wt - Words Accuracy</th>
<th>PP Linear Accuracy</th>
<th>PP Circular Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman’s rho</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>1.000</td>
<td>.040</td>
<td>.060</td>
<td>.056</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.465</td>
<td>.277</td>
<td>.310</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>333</td>
<td>333</td>
<td>333</td>
<td>333</td>
</tr>
<tr>
<td>PP Child Wt - Words Accuracy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>.040</td>
<td>1.000</td>
<td>.821**</td>
<td>.779**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.465</td>
<td>.000</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>333</td>
<td>333</td>
<td>333</td>
<td>333</td>
</tr>
<tr>
<td>PP Linear Accuracy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>.060</td>
<td>.821**</td>
<td>1.000</td>
<td>.882**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.277</td>
<td>.000</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>333</td>
<td>333</td>
<td>333</td>
<td>333</td>
</tr>
<tr>
<td>PP Circular Accuracy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>.056</td>
<td>.779**</td>
<td>.882**</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.310</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>333</td>
<td>333</td>
<td>333</td>
<td>333</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).
The results did not show any significant relationship between parents’ socio-economic status and the accuracy of parents’ weight perception of their child and thus lead me to fail to reject the Null Hypothesis. Therefore, there was NOT a significant relationship between parents’ socio-economic status and the accuracy of parents’ perception of their children’s weight status.

Likert: $r_s = 0.040$, $p = 0.465$
Linear: $r_s = 0.060$, $p = 0.277$
Circular: $r_s = 0.056$, $p = 0.310$

2C – Ha. There is a negative relationship between parents’ BMI and the accuracy of parents’ perception of their children’s weight status.

2C – Ho. There is NOT a negative relationship between parents’ BMI and the accuracy of parents’ perception of their children’s weight status.

Since the accuracy of parental weight perception was calculated using ordinal data, the Non-Parametric Test of Spearman’s Correlation Coefficient ($r_s$) was used to test if there is any relationship between parents’ BMI and the accuracy of parents’ weight perception of their child as measured by Likert Scale, Linear Visual, and Circular Visual (Table 7).
Table 7

Correlation between Parents’ BMI and Accuracy of Parental Perception of Their Child’s Weight Status

<table>
<thead>
<tr>
<th></th>
<th>Parent BMI Correlation Coefficient</th>
<th>Parent BMI code</th>
<th>PP Child Wt - Words Accuracy Correlation Coefficient</th>
<th>PP Linear Accuracy Correlation Coefficient</th>
<th>PP Circular Accuracy Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman's rho</td>
<td>1.000</td>
<td>.943**</td>
<td>-.068</td>
<td>-.103</td>
<td>-.110'</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.218</td>
<td>.062</td>
<td>.044</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>333</td>
<td>333</td>
<td>333</td>
<td>333</td>
</tr>
<tr>
<td>Parent BMI code</td>
<td>.943**</td>
<td>1.000</td>
<td>-.044</td>
<td>-.059</td>
<td>-.072</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.423</td>
<td>.280</td>
<td>.193</td>
<td>.193</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>333</td>
<td>333</td>
<td>333</td>
<td>333</td>
</tr>
<tr>
<td>PP Child Wt - Words Accuracy</td>
<td>-.068</td>
<td>-.044</td>
<td>1.000</td>
<td>.821**</td>
<td>.779**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.218</td>
<td>.423</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>333</td>
<td>333</td>
<td>333</td>
<td>333</td>
</tr>
<tr>
<td>PP Linear Accuracy</td>
<td>-.103</td>
<td>-.059</td>
<td>.821**</td>
<td>1.000</td>
<td>.882**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.062</td>
<td>.280</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>333</td>
<td>333</td>
<td>333</td>
<td>333</td>
</tr>
<tr>
<td>PP Circular Accuracy</td>
<td>-.110'</td>
<td>-.072</td>
<td>.779**</td>
<td>.882**</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.044</td>
<td>.193</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>333</td>
<td>333</td>
<td>333</td>
<td>333</td>
</tr>
</tbody>
</table>

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

The results showed a significant relationship between parents’ BMI and the accuracy of parents’ weight perception of their child as measured by Circular Visual and thus lead me to reject the Null Hypothesis. Therefore, there was a significant weak negative relationship between
parents’ BMI and the accuracy of parents’ perception of their children’s weight status (Circular: \( r_s = -0.110, p = 0.044 \)).

**2D – Ha.** The accuracy of parents’ perception of their children’s weight varies based on their **ethnicity / race**.

**2D – Ho.** The accuracy of parents’ perception of their children’s weight does **NOT** vary based on their ethnicity / race.

Parents’ ethnicity/race was measured using nominal data; therefore, the Non-Parametric Kruskal-Wallis Test was used to test if the accuracy of parents’ weight perception, as measured by Likert Scale, Linear Visual, and Circular Visual, is different based on parents’ ethnicity/race (Table 8).

**Table 8**

*Accuracy of Parental Perception of Their Child’s Weight Status based on Parents’ Ethnicity/Race*

<table>
<thead>
<tr>
<th>Hypothesis Test Summary</th>
<th>Null Hypothesis</th>
<th>Test</th>
<th>Sig.</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>The distribution of PP Child Wt - Words Accuracy is the same across categories of Parent Race/Ethnicity.</td>
<td>Independent-Samples Kruskal-Wallis Test</td>
<td>.759</td>
<td>Retain the null hypothesis.</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>The distribution of PP Linear Accuracy is the same across categories of Parent Race/Ethnicity.</td>
<td>Independent-Samples Kruskal-Wallis Test</td>
<td>.303</td>
<td>Retain the null hypothesis.</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>The distribution of PP Circular Accuracy is the same across categories of Parent Race/Ethnicity.</td>
<td>Independent-Samples Kruskal-Wallis Test</td>
<td>.635</td>
<td>Retain the null hypothesis.</td>
</tr>
</tbody>
</table>

Asymptotic significances are displayed. The significance level is .05.
The results showed that the accuracy of parental weight perception of their child was the same across all categories of parents’ ethnicity/race, and thus lead me to fail to reject the Null Hypothesis. Therefore, the accuracy of parents’ perception of their children’s weight did NOT vary based on their ethnicity / race.

**Research Question 3**

Is there a relationship between parents’ perception of their children’s weight and their children’s diet quality as measured by Healthy Eating Index (HEI-2015)?

3 – **Ha.** There is a positive relationship between the accuracy of parents’ perception of preschool children's weight status and children's HEI-2015 scores.

3 – **Ho.** There is **NOT** a positive relationship between the accuracy of parents’ perception of preschool children's weight status and children's HEI-2015 scores.

Accuracy of parental weight perception was calculated using ordinal level data, therefore, the Non-Parametric Test of Spearman’s Correlation Coefficient (rs) was used to test if there is any relationship between accuracy of parents’ perception of their children’s weight status, as measured by Likert Scale, Linear Visual, and Circular Visual, and children’s HEI-2015 scores (Table 9).
Table 9

*Correlation between Accuracy of Parental Perception of Their Child’s Weight Status and Children’s HEI-2015 Scores*

<table>
<thead>
<tr>
<th></th>
<th>HEI-2015 Score</th>
<th>PP Child Wt - Words Accuracy</th>
<th>PP Linear Accuracy</th>
<th>PP Circular Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spearman’s rho</strong></td>
<td>1.000</td>
<td>.059</td>
<td>.054</td>
<td>.039</td>
</tr>
<tr>
<td><strong>HEI-2015 Score</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Correlation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sig. (2-tailed)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>289</td>
<td>289</td>
<td>289</td>
<td>289</td>
</tr>
</tbody>
</table>

|                  | PP Child Wt - Words Accuracy |                  |                   |                     |
| **Correlation**   | 0.059                      | 1.000            | .821”             | .779”               |
| **Coefficient**   |                            |                  |                   |                     |
|                  |                            |                  |                   |                     |
| **Sig. (2-tailed)** |                            | .318             | .000              | .000                |
| **N**             | 289                        | 333              | 333               | 333                 |

|                  | PP Linear Accuracy |                  |                   |                     |
| **Correlation**   | 0.054              | .821”            | 1.000             | .882”               |
| **Coefficient**   |                    |                  |                   |                     |
|                  |                    |                  |                   |                     |
| **Sig. (2-tailed)** |                    | .363             | .000              | .000                |
| **N**             | 289                | 333              | 333               | 333                 |

|                  | PP Circular Accuracy |                  |                   |                     |
| **Correlation**   | 0.039              | .779”            | .882”             | 1.000               |
| **Coefficient**   |                    |                  |                   |                     |
|                  |                    |                  |                   |                     |
| **Sig. (2-tailed)** |                    | .504             | .000              | .000                |
| **N**             | 289                | 333              | 333               | 333                 |

**“. Correlation is significant at the 0.01 level (2-tailed).**

The results did not show any significant relationship between the accuracy of parents’ weight perception of their child and children’s HEI-2015 scores and thus lead me to fail to reject the Null Hypothesis. Therefore, there was **NOT** a significant relationship between accuracy of parents’ perception of their children’s weight status and children’s HEI-2015 scores.

**Likert:** $r_s=0.059$, $p=0.318$
**Linear:** $r_s =0.054$, $p=0.363$
**Circular:** $r_s =0.039$, $p=0.504$
3A – Ha. Preschool children, whose parents under-estimated their child’s weight, have lower HEI-2015 scores.

3A – Ho. Preschool children, whose parents under-estimated their child’s weight, do **NOT** have lower HEI-2015 scores.

3B – Ha. Preschool children, whose parents over-estimated their child’s weight, have higher HEI-2015 scores.

3B – Ho. Preschool children, whose parents over-estimated their child’s weight, do **NOT** have higher HEI-2015 scores.

Since children’s HEI-2015 scores were ratio level data, Normality Test was performed to test if the distribution of children’s HEI-2015 scores was normal or not. The results showed that distribution of children’s HEI-2015 scores was Normal with mean 53 and standard deviation 11.93 (Table 10).

**Table 10**

*Normality Test for Children’s HEI-2015 Scores*

<table>
<thead>
<tr>
<th>Tests of Normality</th>
<th>Kolmogorov-Smirnov&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic</td>
<td>df</td>
</tr>
<tr>
<td>HEI2015_Score</td>
<td>.052</td>
<td>289</td>
</tr>
</tbody>
</table>

<sup>a</sup> Lilliefors Significance Correction

In order to test hypotheses 3A and 3B, T-Test was performed to compare children’s HEI-2015 Scores between two groups: children whose parents “under-estimated” their child’s weight, and children whose parents “over-estimated” their child’s weight. A separate T-Test was done...
for each of the three measurements of parental weight perception, Likert Scale (Table 11), Linear Visual (Table 12), and Circular Visual (Table 13).

**Table 11**

*T-Test / Likert Scale*

<table>
<thead>
<tr>
<th>HEI-2015 Score</th>
<th>PP Child Wt - Words Accuracy</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>41</td>
<td>55.19</td>
<td>12.716</td>
<td>1.986</td>
<td></td>
</tr>
<tr>
<td>-1</td>
<td>142</td>
<td>52.89</td>
<td>12.604</td>
<td>1.058</td>
<td></td>
</tr>
</tbody>
</table>

**Independent Samples Test**

<table>
<thead>
<tr>
<th>HEI-2015 Score</th>
<th>Levene’s Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equal variances assumed</td>
<td>.031</td>
<td>.861</td>
<td>1.027</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>1.022</td>
<td>.311</td>
<td>64.440</td>
</tr>
</tbody>
</table>
Table 12

*T-Test / Linear Visual*

<table>
<thead>
<tr>
<th></th>
<th>PP Linear Accuracy</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEI-2015 Score</td>
<td></td>
<td>43</td>
<td>55.24</td>
<td>12.562</td>
<td>1.916</td>
</tr>
<tr>
<td>-1</td>
<td></td>
<td>142</td>
<td>52.91</td>
<td>12.293</td>
<td>1.032</td>
</tr>
</tbody>
</table>

**Independent Samples Test**

<table>
<thead>
<tr>
<th></th>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>t</td>
</tr>
<tr>
<td>HEI-2015 Score</td>
<td>.115</td>
<td>.735</td>
<td>1.084</td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>1.071</td>
<td>68.185</td>
<td>.288</td>
</tr>
</tbody>
</table>

Table 13

*T-Test / Circular Visual*

<table>
<thead>
<tr>
<th>Group Statistics</th>
<th>PP Circular Accuracy</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEI-2015 Score</td>
<td>1</td>
<td>43</td>
<td>54.61</td>
<td>13.028</td>
<td>1.987</td>
</tr>
<tr>
<td></td>
<td>-1</td>
<td>137</td>
<td>52.92</td>
<td>12.590</td>
<td>1.076</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Independent Samples Test</th>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>t</td>
</tr>
<tr>
<td>HEI-2015 Score</td>
<td>.183</td>
<td>.669</td>
<td>.761</td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>.748</td>
<td>68.413</td>
<td>.457</td>
</tr>
</tbody>
</table>

The results of T-Tests did not show any significant difference and thus lead me to fail to reject both Null hypotheses, therefore, there was NOT a significant difference between HEI-2015 Scores of children whose parents under-estimated their child’s weight and HEI-2015 Scores of children whose parents over-estimated their child’s weight.
**Research Question 4**

Do parents of preschool children have an accurate perception of their children’s diet quality?

4– Ha. Parents of preschool children have an accurate perception of their child’s diet quality.

4– Ho. Parents of preschool children do NOT have an accurate perception of their child’s diet quality.

To answer this research question and test Hypothesis 4, children’s diet quality based as measured by HEI-2015 score were compared to parents’ diet perception as measured by two methods, a three-point Likert-type scale question, and parents’ perception of diet quality Score from parents’ report of their child consumption of five different food groups based on Key Recommendations from Dietary Recommendations for Americans 2015-2020.

**Likert Scale.** When parental diet perception was measured by Likert Scale, only 15 parents reported their child’s diet quality as “poor”, however, 119 children had “poor diet” based on their calculated HEI-2015 Score. While 110 parents reported their child’s weight as “healthy”, only 4 children had HEI-2015 Score that categorized as “healthy” (Figure 21). Non-parametric test, Related-Samples Kendall’s Coefficient of Concordance, was used to compare the distribution of children’s HEI-2015 Scores and parents’ diet perception as measured by Likert Scale and the result confirmed that the distribution of these two variables are not the same (Figure 22). When parents’ diet perception was measured by Likert Scale, 62% of participants overestimated their child’s diet quality, 3% underestimated, and only 35% had accurate perception of their child’s diet quality (Figure 23).
Figure 21

Parents’ Perception of Their Child’s Diet Quality as Measured by Likert Scale

![Bar chart showing Child HEI-2015 Score / PP Diet - Likert](chart1.png)

Figure 22

Parents’ Perception of Their Child’s Diet Quality as Measured by Likert Scale Compared to Children’s HEI-2015 Score

![Kendall's Coefficient of Concordance](chart2.png)

<table>
<thead>
<tr>
<th>Total N</th>
<th>.289</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kendall’s W</td>
<td>.554</td>
</tr>
<tr>
<td>Test Statistic</td>
<td>160.048</td>
</tr>
<tr>
<td>Degrees of Freedom</td>
<td>1</td>
</tr>
<tr>
<td>Asymptotic Sig. (2-tailed test)</td>
<td>.000</td>
</tr>
</tbody>
</table>

1. Multiple comparisons are not performed because there are less than three test fields.
**Figure 23**

*Accuracy of Parents’ Perception of Their Child’s Diet Quality as Measured by Likert Scale*

![Accuracy PP Diet - Likert](image)

**Diet Score.** The results of parental perception of their child’s diet quality as measured by Diet Score identified that 32 parents reported their child’s diet quality as “poor”, but 119 children had “poor diet” based on their calculated HEI-2015 Score. Although, 91 parents reported their child’s weight as “healthy”, only 4 children had HEI-2015 Score that categorized them as “healthy” (Figure 24). Non-parametric test, Related-Samples Kendall’s Coefficient of Concordance, was used to compare the distribution of children’s HEI-2015 Scores and parents’ diet perception as measured by Diet Score and the result confirmed that the distribution of these two variables is not the same (Figure 25). When parents’ diet perception was measured by Diet Score, 57% of participants overestimated their child’s diet quality, 5% underestimated, and 38% had accurate perception of their child’s diet quality (Figure 26).
Figure 24

*Parents’ Perception of Their Child’s Diet Quality as Measured by Diet Score*

Figure 25

*Parents’ Perception of Their Child’s Diet Quality as Measured by Diet Score Compared to Children’s HEI-2015 Score*
Regardless of which method was used to measure parental perception of their child’s diet quality – Liker Scale, or Diet Score – the results of this study showed that the distributions of parental perception of their child’s diet quality and children’s HEI-2015 scores were not the same and failed to reject the Null Hypothesis. Therefore, parents’ perception of their pre-school children’s diet quality was NOT accurate.
Research Question 5

Are there factors that relate to the accuracy of parents’ perception of their children’s diet quality?

5 A- Ha. There is a positive relationship between parents’ level of education and the accuracy of parents’ perception of their children’s diet quality.

5A – Ho. There is NOT a positive relationship between parents’ level of education and the accuracy of parents’ perception of their children’s diet quality.

Since both variables were measured using ordinal data, the Non-Parametric Test of Spearman’s Correlation Coefficient ($rs$) was used to test if there is any relationship between parents’ level of education and the accuracy of parents’ diet perception as measured by Likert Scale, and Diet Score (Table 14).
Table 14

*Correlation between Parents’ Level of Education and Accuracy of Parental Perception of Their Child’s Diet Quality*

<table>
<thead>
<tr>
<th>Spearman's rho</th>
<th>Parent Highest Degree</th>
<th>PP Child-Diet-1 Accuracy</th>
<th>PP Quality-Child-Diet-2 Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent Highest Degree</td>
<td>Correlation Coefficient</td>
<td>1.000</td>
<td>.131*</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.</td>
<td>.026</td>
<td>.079</td>
</tr>
<tr>
<td>N</td>
<td>333</td>
<td>289</td>
<td>289</td>
</tr>
<tr>
<td>PP Child-Diet-Score Accuracy</td>
<td>Correlation Coefficient</td>
<td>.131*</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.026</td>
<td>.</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>289</td>
<td>289</td>
<td>289</td>
</tr>
<tr>
<td>PP Child-Diet-Words Accuracy</td>
<td>Correlation Coefficient</td>
<td>.103</td>
<td>.573*</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.079</td>
<td>.000</td>
<td>.</td>
</tr>
<tr>
<td>N</td>
<td>289</td>
<td>289</td>
<td>289</td>
</tr>
</tbody>
</table>

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

The results indicated a significant relationship between parents’ level of education and the accuracy of parents’ perception of their child’s diet quality as measured by diet score and rejected the Null Hypothesis. Therefore, there was a significant weak positive relationship between parents' level of education and the accuracy of parents’ perception of their children’s diet quality (Diet Score: $rs = 0.131$, $p = 0.026$).

5B – Ha. There is a positive relationship between parents’ socio-economic status and the accuracy of parents’ perception of their children’s diet quality.

5B – Ho. There is NOT a positive relationship between parents’ socio-economic status and the accuracy of parents’ perception of their children’s diet quality.
Both variables were measured using ordinal data, therefore, the Non-Parametric Test of Spearman’s Correlation Coefficient ($r_s$) was used to test if there is any relationship between parents’ socio-economic status and the accuracy of parents’ perception of their child’s diet quality as measured by Likert Scale, and Diet Score (Table 15).

**Table 15**

*Correlation between Parents’ Socio-economic Status and Accuracy of Parental Perception of Their Child’s Diet Quality*

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Household Income</th>
<th>PP Child-Diet-1 Accuracy</th>
<th>PP Quality-Child-Diet-2 Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman’s rho</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household Income</td>
<td>Correlation Coefficient</td>
<td>1.000</td>
<td>.118*</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td></td>
<td>.054</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td></td>
<td>333</td>
</tr>
<tr>
<td>PP Child-Diet-Score Accuracy</td>
<td>Correlation Coefficient</td>
<td>.118*</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td></td>
<td>.045</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td></td>
<td>289</td>
</tr>
<tr>
<td>PP Child-Diet-Words Accuracy</td>
<td>Correlation Coefficient</td>
<td>.054</td>
<td>.573**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td></td>
<td>.359</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td></td>
<td>289</td>
</tr>
</tbody>
</table>

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

The results showed a significant relationship between parents’ socio-economic status and the accuracy of parents’ perception of their child’s diet quality as measured by Diet Score and lead me to reject the Null Hypothesis. Therefore, there was a significant weak positive relationship between parents’ socio-economic status and the accuracy of parents’ perception of their children’s diet quality (Diet Score: $r_s =0.118$, $p=0.045$).
5C – **Ha.** There is a negative relationship between parents’ BMI and the accuracy of parents’ perception of their children’s diet quality.

5C – **Ho.** There is **NOT** a negative relationship between parents’ BMI and the accuracy of parents’ perception of their children’s diet quality.

Since the accuracy of parental diet perception was calculated using ordinal data, the Non-Parametric Test of Spearman’s Correlation Coefficient ($r_s$) was used to test if there is any relationship between parents’ BMI and the accuracy of parents’ perception of their child’s diet quality as measured by Likert Scale, and Diet Score (Table 16).

**Table 16**

*Correlation between Parents’ BMI and Accuracy of Parental Perception of Their Child’s Diet Quality*

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Parent BMI code</th>
<th>PP Child-Diet-1 Accuracy</th>
<th>PP Quality-Child-Diet-2 Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman’s rho Parent BMI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>1.000</td>
<td>.943**</td>
<td>-.022</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.000</td>
<td>.703</td>
</tr>
<tr>
<td>N</td>
<td>333</td>
<td>1.000</td>
<td>.573**</td>
</tr>
<tr>
<td>Parent BMI code</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>.943**</td>
<td>1.000</td>
<td>-.027</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.856</td>
<td>.644</td>
</tr>
<tr>
<td>N</td>
<td>333</td>
<td>289</td>
<td>289</td>
</tr>
<tr>
<td>PP Child-Diet-Score Accuracy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>-.022</td>
<td>-.011</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.703</td>
<td>.856</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>289</td>
<td>289</td>
<td>289</td>
</tr>
<tr>
<td>PP Quality-Child-Diet-Likert Accuracy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>-.018</td>
<td>-.027</td>
<td>.573**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.755</td>
<td>.644</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>289</td>
<td>289</td>
<td>289</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).**
The results did not show any significant relationship between parents’ BMI and the accuracy of parents’ perception of their child’s diet quality lead me to fail to reject the Null Hypothesis. Therefore, there was NOT a significant relationship between parents’ BMI and the accuracy of parents’ perception of their children’s diet quality.

Diet Score: \( rs = -0.022, p=0.703 \)
Diet Likert: \( rs = -0.018, p=0.755 \)

5D – **Ha.** The accuracy of parents’ perception of their children’s diet quality varies based on their **ethnicity / race**.

5D – **Ho.** The accuracy of parents’ perception of their children’s diet quality does **NOT** vary based on their ethnicity / race.

Since the accuracy of parents’ diet perception was calculated using ordinal data and parents’ ethnicity/race was measured using nominal data, the Non-Parametric Kruskal-Wallis Test was used to test if the accuracy of parents’ perception of their child’s diet quality, as measured by Likert Scale, and Diet Score, is different based on parents’ ethnicity/race (Table 17).
The results showed that the accuracy of parental perception of their child’s diet quality was the same across all categories of parents’ ethnicity/race, and thus lead me to fail to reject the Null Hypothesis. Therefore, the accuracy of parents’ perception of their children’s diet quality did NOT vary based on their ethnicity / race.

**Research Question 6**

Is there a relationship between parents’ perception of their children’s diet quality and their children’s diet quality as measured by Healthy Eating Index (HEI-2015)?

**6– Ha.** There is a negative relationship between the accuracy of parents' perception of preschool children's diet quality and children's HEI-2015 scores.

**6– Ho.** There is NOT a negative relationship between the accuracy of parents' perception of preschool children's diet quality and children's HEI-2015 scores.

Accuracy of parental perception of their child’s diet quality was calculated using ordinal level data, therefore, the Non-Parametric Test of Spearman’s Correlation Coefficient ($r_s$) was
used to test if there is any relationship between accuracy of parents’ perception of their children’s diet quality, as measured by Likert Scale and Diet Score, and children’s HEI-2015 scores (Table 18).

Table 18

*Correlation between Accuracy of Parental Perception of Their Child’s Diet Quality and Children’s HEI-2015 Scores*

<table>
<thead>
<tr>
<th></th>
<th>HEI-2015 Score</th>
<th>PP Child-Diet-1 Accuracy</th>
<th>PP Quality-Child-Diet-2 Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman’s rho</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HEI-2015 Score</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>1.000</td>
<td>-.394**</td>
<td>-.406**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>289</td>
<td>289</td>
<td>289</td>
</tr>
<tr>
<td>PP Child-Diet-1 Accuracy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>-.394**</td>
<td>1.000</td>
<td>.573**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>289</td>
<td>289</td>
<td>289</td>
</tr>
<tr>
<td>PP Quality-Child-Diet-2 Accuracy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>-.406**</td>
<td>.573**</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>289</td>
<td>289</td>
<td>289</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

The results indicated a significant relationship between the accuracy of parents’ perception of their child’s diet quality, as measured by both Likert Scale and Diet Score, and children’s HEI-2015 scores, and lead me to reject the Null Hypothesis. Therefore, there was a significant medium negative relationship between parents’ perception of preschool children's diet quality and children's HEI-2015 scores.

Diet Score: $rs = -0.394, p=0.000$
Diet Likert: $rs = -0.406, p=0.000$
Research Question 7

Is there a relationship between parents’ perception of their children’s weight and parents’ perception of their children’s diet quality?

7 – Ha. There is a positive relationship between the accuracy of parents' perception of preschool children's weight status and the accuracy of parents’ perception of their children’s diet quality.

7 – Ho. There is NOT a positive relationship between the accuracy of parents' perception of preschool children's weight status and the accuracy of parents’ perception of their children’s diet quality.

Since both accuracy of parental weight perception and accuracy of parental diet perception were calculated using ordinal level data, the Non-Parametric Test of Spearman’s Correlation Coefficient ($r_s$) was used to test if there is any relationship between accuracy of parents’ perception of their children’s weight status, as measured by Likert Scale, Linear Visual, and Circular Visual, and the accuracy of parents’ perception of their children’s diet quality, as measured by Likert Scale (Table 19) and Diet Score (Table 20).
Table 19

Correlation between Accuracy of Parental Perception of Their Child’s Weight Status and Accuracy of Parental Perception of Their Child’s Diet Quality as Measured by Likert Scale

<table>
<thead>
<tr>
<th>Spearman’s rho</th>
<th>PP Diet- Likert Accuracy</th>
<th>PP Child Wt –Likert Accuracy</th>
<th>PP Linear Accuracy</th>
<th>PP Circular Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correlation Coefficient</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.000</td>
<td>-.029</td>
<td>.011</td>
<td>.028</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.620</td>
<td>.846</td>
<td>.635</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>289</td>
<td>289</td>
<td>289</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Correlation Coefficient</td>
<td>-.029</td>
<td>1.000</td>
<td>.821”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.620</td>
<td>.600</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>289</td>
<td>333</td>
<td>333</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Correlation Coefficient</td>
<td>.011</td>
<td>.821”</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.846</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>289</td>
<td>333</td>
<td>333</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Correlation Coefficient</td>
<td>.028</td>
<td>.779”</td>
<td>.882”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.635</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>289</td>
<td>333</td>
<td>333</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).
Table 20

Correlation between Accuracy of Parental Perception of Their Child’s Weight Status and Accuracy of Parental Perception of Their Child’s Diet Quality as Measured by Diet Score

<table>
<thead>
<tr>
<th></th>
<th>PP Child-Diet-Score Accuracy</th>
<th>PP Child Wt – Likert Accuracy</th>
<th>PP Linear Accuracy</th>
<th>PP Circular Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman’s rho PP Child-Diet-Score Accuracy</td>
<td>Correlation Coefficient</td>
<td>1.000</td>
<td>.072</td>
<td>.110</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.</td>
<td>.224</td>
<td>.062</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>289</td>
<td>289</td>
<td>289</td>
</tr>
<tr>
<td>PP Child Wt - Likert Accuracy</td>
<td>Correlation Coefficient</td>
<td>.072</td>
<td>1.000</td>
<td>.821**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.224</td>
<td>.</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>289</td>
<td>333</td>
<td>333</td>
</tr>
<tr>
<td>PP Linear Accuracy</td>
<td>Correlation Coefficient</td>
<td>.110</td>
<td>.821**</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.062</td>
<td>.000</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>289</td>
<td>333</td>
<td>333</td>
</tr>
<tr>
<td>PP Circular Accuracy</td>
<td>Correlation Coefficient</td>
<td>.102</td>
<td>.779**</td>
<td>.882**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.083</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>289</td>
<td>333</td>
<td>333</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

The results did not show any significant relationship between the accuracy of parents’ perception of their child’s weight status and the accuracy of parents’ perception of their child’s diet quality and lead me to fail to reject the Null Hypothesis. Therefore, there was NOT a significant relationship between parents’ perception of their children’s weight status and parents’ perception of their children’s diet quality.
Summary of Study Findings

In summary, this study’s findings indicated that parents of preschool children did not have an accurate perception of their child’s weight status and diet quality. There was a negative relationship between parents’ BMI and the accuracy of parents’ perception of their children’s weight status. There was a positive relationship between parents’ level of education as well as parents’ socio-economic status and the accuracy of parents’ perception of their children’s diet quality. This study also found a negative relationship between parents’ perception of preschool children’s diet quality and children's HEI-2015 scores (Table 21).
### Table 21

**Summary of Study Findings**

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Hypotheses</th>
<th>Rejected Ho</th>
<th>Failed to Reject Ho</th>
</tr>
</thead>
</table>
| **RQ 1** | **1 - Ha:** Parents of preschool children have an accurate perception of their child's weight status.  
**1 - Ho:** Parents of preschool children do NOT have an accurate perception of their child’s weight status. |  | X |
| **RQ 2** | **2A - Ha:** There is a positive relationship between parents’ **level of education** and the accuracy of parents’ perception of their children’s weight status.  
**2A - Ho:** There is NOT a positive relationship between parents’ level of education and the accuracy of parents’ perception of their children’s weight status. |  | X |
|  | **2B - Ha:** There is a positive relationship between parents’ **socio-economic status** and the accuracy of parents’ perception of their children’s weight status.  
**2B - Ho:** There is NOT a positive relationship between parents’ socio-economic status and the accuracy of parents’ perception of their children’s weight status. |  | X |
|  | **2C - Ha:** There is a negative relationship between parents’ **BMI** and the accuracy of parents’ perception of their children’s weight status.  
**2C - Ho:** There is NOT a negative relationship between parents’ BMI and the accuracy of parents’ perception of their children’s weight status. | √ |  |
|  | **2D - Ha:** The accuracy of parents’ perception of their children’s weight varies based on their **ethnicity / race**.  
**2D - Ho:** The accuracy of parents’ perception of their children’s weight does NOT vary based on their ethnicity / race. |  | X |
| **RQ 3** | **3 - Ha:** There is a positive relationship between the accuracy of parents' perception of preschool children's weight status and children's HEI-2015 scores.  
**3 - Ho:** There is NOT a positive relationship between the accuracy of parents' perception of preschool children's weight status and children's HEI-2015 scores. |  | X |
|  | **3A - Ha:** Preschool children, whose parents under-estimated their child’s weight, have lower HEI-2015 scores.  
**3A - Ho:** Preschool children, whose parents under-estimated their child’s weight, do NOT have lower HEI-2015 scores. |  | X |
| RQ 3 | 3B - Ha: Preschool children, whose parents over-estimated their child’s weight, have higher HEI-2015 scores. | 3B - Ho: Preschool children, whose parents over-estimated their child’s weight, do NOT have higher HEI-2015 scores. | X |
| RQ 4 | 4 - Ha: Parents of preschool children have an accurate perception of their child’s diet quality. | 4 - Ho: Parents of preschool children do NOT have an accurate perception of their child’s diet quality. | X |
| RQ 5 | 5A - Ha: There is a positive relationship between parents’ level of education and the accuracy of parents’ perception of their children’s diet quality. | 5A - Ho: There is NOT a positive relationship between parents’ level of education and the accuracy of parents’ perception of their children’s diet quality. | √ |
| RQ 5 | 5B - Ha: There is a positive relationship between parents’ socio-economic status and the accuracy of parents’ perception of their children’s diet quality. | 5B - Ho: There is NOT a positive relationship between parents’ socio-economic status and the accuracy of parents’ perception of their children’s diet quality. | √ |
| RQ 5 | 5C - Ha: There is a negative relationship between parents’ BMI and the accuracy of parents’ perception of their children’s diet quality. | 5C - Ho: There is NOT a negative relationship between parents’ BMI and the accuracy of parents’ perception of their children’s diet quality. | X |
| RQ 5 | 5D - Ha: The accuracy of parents’ perception of their children’s diet quality varies based on their ethnicity / race. | 5D - Ho: The accuracy of parents’ perception of their children’s diet quality does NOT vary based on their ethnicity / race. | X |
| RQ 6 | 6 - Ha: There is a negative relationship between the accuracy of parents’ perception of preschool children's diet quality and children's HEI-2015 scores. | 6 - Ho: There is NOT a negative relationship between the accuracy of parents' perception of preschool children's diet quality and children's HEI-2015 scores. | √ |
| RQ 7 | 7 - Ha: There is a positive relationship between the accuracy of parents’ perception of preschool children's weight status and the accuracy of parents’ perception of their children’s diet quality. | 7 - Ho: There is NOT a positive relationship between the accuracy of parents' perception of preschool children's weight status and the accuracy of parents’ perception of their children’s diet quality. | X |
Chapter 5

Discussion

In order to add to the limited literature about parental perception of their children’s diet quality this research study sought to assess and evaluate the accuracy of parental perception of their preschool (3-5 years old) children’s weight status and diet quality, and to explore if there is a relationship between parents’ perception of their preschool children’s weight, parents’ perception of their preschool children’s diet quality, and children’s diet quality as measured by Healthy Eating Index (HEI-2015). The current study also examined the relationship between four key demographic factors – parent’s level of education, parent’s socio-economic status, parent’s BMI, and parent’s ethnicity/race – and parents’ perception of their preschool children’s weight status and diet quality.

Parents’ Perception of Their Children’s Weight Status

Based upon the data evaluated in this research study, parents of preschool children did not display an accurate perception of their 3-5 years old child’s weight status, which is in alignment with much of the prior studies reported, even though the demographics and diversity of the participating parents were not the same as in this study and unlike this study most of the previous studies only examined mothers’ perceptions of their child’s weight status (Aparicio, et. al., 2013; Baughcum, et. al., 2000; Bracho & Ramos, 2007; Carnell, et. al., 2005; Hackie & Bowles, 2007; Hirschler, et. al., 2006; Manios, et. al., 2009; Maynard, et. al., 2003; Myers & Vargas, 2000; Rosas, et. al., 2010). In a study done by Remmers, et. al. (2014) almost half of participating parents did not have an accurate perception of their 5-year-old child’s weight status. Hudson, McGloin, & McConnon (2012) also found that most parents underestimated their 5-17
years old children’s weight. Hong, Peltzer, & Jalayondeja (2019) reported inaccurate parental weight perception, with 33.9% of parents underestimating their 4th-6th grade child’s weight status. In the current research study almost half of the parents underestimated their 3-5 years old child’s weight status. Foster & Hale (2015) also reported 58% of parents of 2-5 years old children who participated in their study, underestimated their overweight or obese children. However, it is important to note that there were only 40 child-parent pairs of participants from south Texas in Foster & Hale (2015) study; furthermore, most parents identified themselves as Hispanic, were overweight or obese, and had lower socio-economic status thus generalizability of these study findings are limited. The current research study explored parental weight perception using a much larger sample size and more diverse population of parents of preschool (3-5 years old) children.

As noted in the literature, accuracy of parental weight perception is an important factor which enables parents to address their children’s weight related problems (Hong, Peltzer, & Jalayondeja, 2019; Remmers, et. al., 2014). It is unquestionable that parents have an “instrumental” role in managing their young children’s weight and diet quality, therefore it was important to address how accurately parents perceived their child’s weight status in the current study (Adamo & Brett, 2014, p. 989). Based upon prior literature, it could be assumed that parents who underestimated their overweight or obese child’s weight would be “less motivated” to initiate any healthy changes (Howe, Alexander, & Stevenson, 2017, p. 61), until they realize the necessity for healthy changes or “perceive their child at risk” (Hudson, McGloin, McCConnon, 2012, p. 1801). Parents’ failure to identify their overweight and obese children’s weight status accurately could reduce the effectiveness of childhood obesity preventive and treatment plans (Hudson, McGloin, & McCConnon, 2012). As Eckstein, et. al. (2006) stated identifying the
problem and recognizing the need for change is foundational for any successful behavioral changes to be made. Therefore, parental misperceptions of their children’s weight “may be the first barrier to successful treatment of childhood overweight” (Hudson, McGloin, & McConnon, 2012, p. 1806).

In current study, there was a negative relationship between parents’ BMI and the accuracy of parents’ perception of their 3-5 years old children’s weight status. Remmers, et. al. (2014) also reported overweight or obese parents were less likely to have an accurate perception of their child’s weight status. Pasch, et. al. (2016) found parents with higher BMI were more likely to underestimate their child’s weight. Other studies also found that mothers’ weight status is negatively correlated with the accuracy of their weight perception; obese mothers with higher BMI were less likely to accurately perceive their children’s weight compared to healthy weight mothers (Hudson, McGloin, & McConnon, 2012; Maynard, et. al., 2003). According to Mareno (2014) “societal normalization of overweight” and parents own weight status could affect how parents perceive their children’s ideal or current weight. Higher rates of childhood overweight/obesity may be one of the factors that affect parents’ perception of healthy weight and limit their ability to identify overweight or obesity in children (Eckstein et. al., 2006; Foster & Hale, 2015; Mareno, 2014; Hudson, McGloin, & McConnon, 2012; Spargo, & Mellis, 2014). As Howe, Alexander, & Stevenson (2017) suggested high prevalence of overweight and obesity among children is “changing social norms of what is perceived as normal” (p. 60). Adams et. al. (2005) suggested parents who struggle with overweight or obesity issues themselves may also misperceive their children’s overweight status and consider their child’s weight as normal. According to Pasch, et. al. (2016) parents’ denial of their own overweight or obese status may
lead to a detrimental misperception of their child’s weight status and could lead to overweight becoming a norm in their family.

In this research study parents’ ethnicity/race, parents’ level of education, and parents’ socio-economic status were not significantly correlated with the accuracy of parents’ perception of their preschool children’s weight status. Howe, Alexander, & Stevenson (2017) also reported parents’ race, ethnicity, education, and income were not significantly associated with the accuracy of parental perception of their 7-12 years old children’s weight. However, the correlation between these factors and accuracy of parental weight perception remains uncertain since some studies found a significant correlation while others reported no significant correlation. For example, Francescatto, et. al. (2014) reported that ethnicity was correlated with parental perception, and Black, et. al. (2015) found that parents from minority groups are more likely to underestimate their child’s weight status, while other researchers did not find any significant association between parents’ race/ethnicity and the accuracy of parental weight perception (Maynard, et. al., 2003; Howe, Alexander, & Stevenson, 2017) which is aligned with this study’s findings.

While the current study did not find any significant relationship between parents’ education level and the accuracy of parental weight perception, Remmers, et. al. (2014) reported that parents with lower education were less likely to have an accurate perception of their 5-year-old child’s weight status. Pasch, et. al. (2016) also did not find any significant relation between parents’ education and accuracy of parental weight perception. Some studies reported mothers’ misperception of their preschool children’s weight was associated with mothers’ low education level (Manios, et. al., 2009; Baughcum, et. al., 2000), but Hudson, McGloin, & McConnon
(2012) found no significant relationship between mother’s education level and the accuracy of their weight perception.

Parents’ socio-economic status was not significantly correlated with the accuracy of parents’ weight perception in this study. Howe, Alexander, & Stevenson (2017) also reported parents’ income was not significantly associated with the accuracy of parental perception of their 7–12-year-old children’s weight. However, in a study done by Hong, Peltzer, & Jalayondeja (2019) mothers with higher household income were more likely to underestimate their 4th-6th grade children measured healthy weight. Hudson, McGloin, & McConnon (2012) reported positive correlation between parents’ socioeconomic status and the accuracy of parents’ perception of their 5–17-year-old children’s weight and found that parents with low socioeconomic status were less likely to accurately perceive their children’s weight compared to parents with medium or high socioeconomic status. Given the inconsistencies observed in the literature, more research in this area is needed to comprehensively understand how parents’ level of education, parents’ socio-economic status, and parents’ ethnicity/race relate to the accuracy of parents’ perception of their children’s weight status. Additionally, future studies must further explore differences in children’s ages to determine if age impacts parents’ perceptions.

Parents’ Perception of Their Children’s Diet Quality

To the best of my knowledge, there is very limited literature regarding the evaluation of parental perception of their children’s diet quality regardless of children’s age. There was only one study found in the literature that directly compared mothers’ perception of their preschool child’s diet quality with the actual quality of child’s diet using HEI (Kourlaba, et. al., 2009). Therefore, the findings of this current research study which compared parents’ perception of
their 3-5 years old children’s diet quality with children’s HEI-2015 scores and found that parents of pre-school children did not have an accurate perception of their child’s diet quality filled a gap in the literature. Surprisingly, a vast majority of parents in this study over-estimated their 3-5 years old child’s diet quality. The results of the current study support Kourla, et. al. (2009) findings as 82.5% of mothers who participated in their study overestimated diet quality of their 2-5 years old children. Broilo, et. al. (2017) also found that 72% of mothers participating in their study perceived their 2-3 years old child’s diet as healthy. Although Broilo, et. al. (2017) did not assess children’s actual diet quality to compare with maternal diet perception, other studies with similar sample populations suggested young children’s diet quality “fall well short of recommendations”, indicating mothers did not have an accurate perception of their child’s diet quality (p. 8).

It has been previously reported that young children’s poor diet quality is linked with the increase of childhood obesity (Kourlaba, et. al., 2009). Usually, parents of younger children have more control over their children’s food intake than parents of older children (Robson, et. al., 2016). As Robson, et. al. (2016) stated “parents are considered to be the gatekeepers of food, particularly for young children” (p. 984). Since parents have an important role in providing food and developing dietary habits of their young children, it is important that parents can identify their child’s diet quality accurately (Kourlaba, et. al., 2009; Adamo & Brett, 2014). To modify children’s diet, parents have to first identify that their child’s diet is not considered healthy and recognize the risks associated with a poor diet for young children (Broilo, et. al., 2017). If parents do not have an accurate perception of their child’s diet quality, they would not identify a need for improving their child’s diet and they would not make any effort to modify their child’s eating habits (Kourlaba, et. al., 2009; Adamo & Brett, 2014). Parents, who identify issues related
to their child’s diet quality correctly, might be more likely to initiate changes toward a healthier diet which could ultimately lead to a healthier weight status of their children. The fact that, in the current research study, more than 30% of parents believed that their children’s diet was healthy while only 1.4% of children in this study had a HEI-2015 score signifying a healthy diet, lead us to infer that parents in general might not have enough knowledge about dietary recommendations for a healthy diet for children.

Furthermore, this study explored the relationship between parents’ level of education, parents’ socio-economic status, parents’ BMI, and parents’ ethnicity/race and the accuracy of parents’ perception of their 3-5 years old children’s diet quality. A limited number of published research studies were found exploring parental diet perception thus making it difficult for comparison to be made to the current findings. In this study there was a positive relationship between parents’ level of education and the accuracy of parents’ perception of their children’s diet quality, which agrees with Broilo, et. al. (2017) findings; these findings are not consistent with Kourlabà, et. al. (2009) who did not find any significant association between mothers’ misperception of their child’s diet quality and maternal level of education. Also, a positive relationship between parents’ socio-economic status and the accuracy of parents’ perception of their children’s diet quality was found in current research study. In the current research study, a significant positive relationship was found between parents’ level of education and parents’ socio-economic status. Therefore, in the current study, parents with higher socio-economic status also had higher level of education. The findings of current study suggested that parents’ socio-economic status and parents’ level of education were significantly correlated with the accuracy of parental perception of their child’s diet quality. Broilo, et. al. (2017) also reported that parents with higher education level had more accurate perception of their child’s diet quality. This
research study did not find any significant relationship between parents’ BMI or parents’ ethnicity/race and the accuracy of parents’ perception of their 3-5 years old children’s diet quality. Kourlaba, et. al., (2009), also did not find any significant association between mothers’ misperception of their child’s diet quality and maternal BMI. The correlation between these key factors and accuracy of parental diet perception remains uncertain since there is very limited literature available in this area. Based upon the available research, further exploration is warranted to secure a comprehensive understanding of how these key factors relate to the accuracy of parents’ perception of their preschool children’s diet quality.

**Relationships between Parental Perceptions and Children’s HEI-2015 Score**

The relationship between the main three variables - parents’ perception of their preschool children’s weight, parents’ perception of their preschool children’s diet quality, and children’s diet quality as measured by Healthy Eating Index (HEI-2015) - was also explored in this research study. While a statistically significant relationship between parents’ perception of their preschool children’s weight and parents’ perception of their preschool children’s diet quality was not found in the current study, Hong, Peltzer, & Jalayondeja (2019) in their work did find a correlation between parental perception of weight and parental perception of diet and reported that parents of overweight and obese 4th-6th grade children who underestimated their child’s weight, were more likely to misperceive their child’s diet quality as healthy.

While the current research study did not find any significant relationship between the accuracy of parents’ perception of their 3-5 years old children’s weight status and children’s actual diet quality as measured by HEI-2015 scores, Adamo & Brett (2014) suggested based upon their research findings that the accuracy of parents’ perception of their child’s weight status
could affect their child’s diet quality. Specifically, this research study found a significant negative relationship between parents' perception of preschool children's diet quality and children’s HEI scores. Therefore, parents of children with higher HEI-2015 scores were less likely to overestimate their children's diet quality. Since parents of young children have an important role in providing and preparing food for their children (Robson, et. al., 2016), it could be assumed that children with healthier diet as indicated by higher HEI-2015 scores are likely to have parents who are more knowledgeable about dietary recommendations for a healthy diet for young children and are less likely to falsely overestimate their child’s diet quality.

**Revisiting the Conceptual Framework**

Informed by what is known in the literature, the conceptual framework for this study suggested that parents’ perception of their child’s weigh is correlated with how parents perceive their child’s diet quality, and both variables are correlated with child’s actual diet quality as measured by HEI-2015. While, this research study found significant relationship between the accuracy of parents’ perception of their children’s diet quality and children’s HEI-2015 score, it did not find a significant relationship between parental perception of weight status and parental perception of diet quality, as well as parental perception of weight status and children’s HEI-2015 score. However, these findings are not surprising as there are few published research studies that infer that these relationships could exist (Adamo & Brett, 2014).

It is important to understand that parental perception could be affected by unique individual, social, and cultural factors. Many factors including environmental factors, cultural norms, previous experiences, social and individual expectations, individual’s values, attitude, and beliefs may impact parental perception (Maren, 2013; Jenkins, 2014; Howe, Alexander,
The conceptual framework for the current research study suggested four key factors – parent’s socio-economic status, parent’s education level, parent’s BMI, and parent’s ethnicity/race – are correlated with the accuracy of parental perception of their children’s weight status and diet quality. The results of current study showed a significant correlation between the accuracy of parental weight perception and parents’ BMI. Also, the accuracy of parental diet perception was significantly correlated with parents’ level of education and parents’ socio-economic status in the current research study. However, correlations between parent’s ethnicity/race, parent’s level of education, and parent’s socio-economic status and the accuracy of parental weight perception, as well as correlations between parent’s BMI and parent’s ethnicity/race and the accuracy of parental diet perception remain uncertain since some research studies found a significant correlation while others, including the current study, reported no significant correlation. The current study’s conceptual framework requires validation through more extensive research. Future research studies in this area could employ, examine, and validate the current study’s conceptual framework by further exploring correlations between the three main variables and investigating how the selected key factors relate to the accuracy of parental perception of their children’s weight status and diet quality (Figure 27).
Practical Implications

An important aspect of this study was to understand how parents perceive their 3-5 years old child’s weight status and diet quality. Parents with a misperception of their child’s weight status will most likely fail to recognize health risks related to childhood overweight or obesity (Bossink-Tuna, et. al., 2009; Doolen, et. al., 2009; Garrett-Wright, 2010). If parents fail to identify their children’s overweight/obesity status or poor quality of diet, campaigns and initiatives trying to motivate parents to make healthy changes in their children’s lifestyle would most likely not be as effective in addressing this major health issue (Howe, Alexander, & Stevenson, 2017). Therefore, addressing parental misperceptions is an essential focus “for early
intervention and prevention work in childhood obesity” (Adamo & Brett, 2014, p. 990). Any effort to correct parental perception may fail without a comprehensive understanding of why parents do not have an accurate perception of their child’s weight and diet quality. Exploring the array of factors correlated with the accuracy of parental perception will help to better understand parental weight and diet perceptions and to identify the reasons behind parents’ misperceptions. Understanding parental perception is essential to develop and implement successful policies and programs to prevent and treat childhood obesity (Hudson, McGolin, McConnon, 2012). Studying parents’ perception of their young children’s weight status and diet quality and factors correlated with the accuracy of parental perception could lead to a better understanding of childhood obesity among young children which in-turn “can improve the effectiveness of nutritional interventions, which is of prime importance in early childhood” (Broilo, et. al., 2017, p. 2).

Considering the Perception Action Cycle lens used to orient this study, the key findings of this study contribute to a better understanding of parental perception of their preschool children’s weight status and diet quality. The finding of this study can help researchers studying childhood obesity, policy makers developing action plans to reduce rates of obesity among preschool children, and healthcare professionals planning weight management programs to address young children’s weight and diet quality. Since parents of preschool children have the greatest impact on their children’s diet intake and physical activity engagement, these findings could help researchers, policy makers, and healthcare professionals to address childhood obesity more effectively by enabling them to better understand and incorporate parents’ perceptions through identifying and concentrating on key factors related to parents’ misperceptions based on characteristics of their target population such as parents’ socio-economic status, parents’ education level, and parents’ own weight status.
Limitations

This study has several limitations. First, this study used convenient sampling so the results may not be generalized to the total population. In addition, this study used a survey design research approach which assumes that participants answered the survey questions honestly and accurately; however, there is no way to test the accuracy of this assumption. Also, the quality of children’s diet was calculated based on a 24-hour Food Recall completed by parents. Participants were asked to recall their child’s food/beverage intake for the past 24-hour and report the information as accurate and as detailed as possible. But again, there is no way to test the accuracy of parents’ reports of their child’s dietary intake. Finally, parents were asked to report their child’s height and weight as well as their own height and weight. Although a short paragraph was included in the questionnaire to instruct parents how to measure their child’s height and weight accurately at home, self-reported height and weight remains another limitation of this study. Despite these limitations, the results of this study added to the literature available about parental perception of their 3-5 years old children’s weight and diet quality in relationship to children’s HEI-2015 score.

Future Research

More research is needed to explore parental perception and to expand upon the factors underlying parental perception of their children’s weight and diet quality. Research studies exploring the relationship between the accuracy of parents’ perception, and parents’ knowledge of weight management programs as well as parents’ beliefs and experiences about weight management programs will add to the literature about parental perception of weight and diet quality. A mixed methods approach might be effective, especially if qualitative methods are used
to explore parental values, beliefs, and experiences, while quantitative approach is used to collect data about parents’ knowledge. Parental perception “is a dynamic process” (Mareno, 2013, p. 39), therefore, employing a longitudinal study design or a more robust experimental study design may also provide valuable insight about parental perception of their young children’s weight status and diet quality. Conducting focus group studies to take a deeper dive into parental perception and how it relates to parents’ readiness to make changes would also be another step toward understanding parental weight and diet perception. Designing research studies to assess the effectiveness of various tools and ways in which to improve parents’ perceptions could also assist to develop more effective strategies to help parents identify their young children’s weight status and diet quality more accurately.

**Conclusion**

Although childhood obesity is a major public health problem and despite the increased rates of overweight and obesity among young children, parents often fail to accurately perceive their preschool children’s weight status and diet quality. This study explored the relationship between parental perception of weight status and diet quality of their 3-5 years old preschool children and children’s HEI-2015 scores, focusing on correlations between parental perception and four parental characteristics: BMI, education level, socio-economic status, and ethnicity/race. The results of the current study support that parents’ perception of their 3-5 years old children’s weight status and diet quality are not accurate. Yet, further research is needed to better understand the factors that might be related to the inaccuracy of parental perceptions of their preschool children’s weight status and diet quality. Parents’ failure to recognize their young children’s overweight/obesity status or poor diet quality could eventually lead to higher rates of childhood obesity and further negatively impact this major health issue. Ultimately, exploring
parental perceptions and helping parents to establish an accurate perception “may be a small stepping-stone” in reducing the epidemic of childhood obesity but a truly needed one (Remmers, et. al., 2014, p.7).
References


World Health Organization (2021). *Obesity*. Retrieved from https://www.who.int/health-topics/obesity#tab=tab_1

Appendices

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Appendix A

IRB Approvals

This is to certify that:

Taraneh Hazhin

Has completed the following CITI Program course:

- Social & Behavioral Research - Basic/Refresher (Curriculum Group)
- Social-Behavioral-Educational (Course Learner Group)
- 1 - Basic Course (Stage)

Under requirements set by:

Seton Hall University

Verify at www.citiprogram.org/verify/w688a9b80-1410-4bfa-93c6-617932a470d2-31788083
June 26, 2019

Taraneh Hazhin

Dear Ms. Hazhin,

The Research Ethics Committee of the Seton Hall University Institutional Review Board office has reviewed your research proposal entitled “Exploring Relationship between Three Variables: Parents’ Perception of their Preschool Children’s Weight, Parents’ Perception of their Preschool Children’s Diet Quality, and Children’s Healthy Eating Index (HEI) Score” and categorized it as exempt (reflecting the intent of the new federal regulations).

Enclosed for your records is the signed Request for Approval form.

If used, Informed Consent documents and recruitment flyers are no longer stamped.

Thank you for your cooperation.

Sincerely,

Mary F. Ruzicka, Ph.D.
Professor
Director, Institutional Review Board

cc: Dr. Terrence Cahill

Please review Seton Hall University IRB's Policies and Procedures on website (http://www.provost.shu.edu/IRB) for more information. Please note the following requirements:

Adverse Reactions: If any untoward incidents or adverse reactions should develop as a result of this study, you are required to immediately notify the Seton Hall University IRB Director, your sponsor and any federal regulatory institutions which may oversee this research, such as the OHRP or the FDA. If the problem is serious, approval may be withdrawn pending further review by the IRB.

Amendments: If you wish to change any aspect of this study, please communicate your request in writing (with revised copies of the protocol and/or informed consent where applicable and the Amendment Form) to the IRB Director. The new procedures cannot be initiated until you receive IRB approval.
REQUEST FOR APPROVAL OF RESEARCH, DEMONSTRATION OR RELATED ACTIVITIES INVOLVING HUMAN SUBJECTS

All material must be typed.

PROJECT TITLE: "Exploring Relationship between Three Variables: Parents' Perception of their Preschool Children's Weight, Parents' Perception of their Preschool Children's Diet Quality, and Children's Healthy Eating Index (HEI) Score"

CERTIFICATION STATEMENT: [Signature] [Date] 2019.6.7

In making this application, (I/we) certify that (I/we) have read and understand the University's policies and procedures governing research, development, and related activities involving human subjects. (I/we) shall comply with the letter and spirit of those policies. (I/we) further acknowledge my(our) obligation to (1) obtain written approval of significant deviations from the originally-approved protocol BEFORE making those deviations, and (2) report immediately all adverse effects of the study on the subjects to the Director of the Institutional Review Board, Seton Hall University, South Orange, NJ 07079.

Taraneh Hazhin
RESEARCHER(S) [Signature] [Date] 6/10/19

**Please print or type out names of all researchers below signature. Use separate sheet of paper, if necessary.**

My signature indicates that I have reviewed the attached materials of my student advisee and consider them to meet IRB standards.

Terrence F. Cahill
RESEARCHER'S FACULTY ADVISOR [for student researchers only] [Signature] [Date] 6/10/19

**Please print or type out name below signature**

The request for approval submitted by the above researcher(s) was considered by the IRB for Research Involving Human Subjects Research at the ______ meeting.

The application was approved ___ not approved ____ by the Committee. Special conditions were ____ were not ___ set by the IRB. (Any special conditions are described on the reverse side.)

Mary J. Angele, Ph. D.
DIRECTOR
SETON HALL UNIVERSITY INSTITUTIONAL REVIEW BOARD FOR HUMAN SUBJECTS RESEARCH

6/26/19

Seton Hall University
3/2005
June 17, 2020

Taraneh Hazhin

Dear Ms. Hazhin,

The Research Ethics Committee of the Seton Hall University Institutional Review Board reviewed your Annual Progress Report for the research proposal entitled “Exploring Relationship between Three Variables: Parents’ Perception of their Preschool Children’s Weight, Parents’ Perception of their Preschool Children’s Diet Quality, and Children’s Healthy Eating Index (HEI) Score.” This memo serves as official notice of the Institutional Review Board’s acceptance of this report.

The Institutional Review Board approval of your research is extended for a one-year period from the date of this letter. During this time, any changes to the research protocol, informed consent form or study team must be reviewed and approved by the Institutional Review Board prior to their implementation.

You will receive a communication from the Institutional Review Board at least 1 month prior to your expiration date requesting that you submit an Annual Progress Report to keep the study active, or a Final Review of Human Subjects Research form to close the study. In all future correspondence with the Institutional Review Board, please reference the ID# listed above.

Thank you for your cooperation.

Sincerely,

[Signature]

Maria C. Fidley, PhD, OTR
Associate Professor
Co-Chair, Institutional Review Board

Office of the Institutional Review Board
Presidents Hall · 400 South Orange Avenue · South Orange, New Jersey 07079 · Tel: 973.275.4654 · Fax 973.275.2978 · www.shu.edu

WHAT GREAT MINDS CAN DO
June 17, 2020

Taraneh Hazhin

Dear Ms. Hazhin,

The Seton Hall University Institutional Review Board reviewed and approved the amendment to your research proposal entitled “Exploring Relationship between Three Variables: Parents’ Perception of their Preschool Children’s Weight, Parents’ Perception of their Preschool Children’s Diet Quality, and Children’s Healthy Eating Index (HEI) Score” as submitted. This memo serves as official notice of the aforementioned study’s approval.

Approval of this amendment does not change the previous expiration date from your one-year approval period. You will receive a communication from the Institutional Review Board at least 1 month prior to the original expiration date requesting that you submit an Annual Progress Report to keep the study active, or a Final Review of Human Subjects Research to close the study.

Thank you for your cooperation.

Sincerely,

Mara Podvey, PhD, OTR
Associate Professor
Co-Chair, Institutional Review Board

Office of the Institutional Review Board
Presidents Hall · 400 South Orange Avenue · South Orange, New Jersey 07079 · Tel: 973.777.3454 · Fax 973.777.2978 · www.shu.edu
WHAT GREAT MINDS CAN DO
Appendix B

Permission to Use Instruments

Kathryn Jalovec <kathrynody@gmail.com>

Hello -
I received your voicemail about your PhD research.
I cc’d Helen Binnis, MD because she knows more details about the rights to the tools/drawings we used for our research.

Good luck!

Kathryn Jalovec

Binns, Dr. Helen <HBinnes@luriechildrens.org>

We are happy to have you use the sketches for your research —
https://www.luriechildrens.org/en/research/research-areas/health-services-policy-research/ppsrg/
you can download them from this web link.

Helen Binnis, MD, MPH

Tarameh Hazhim <tahzim@luriechildrens.org>

Dear Dr. Binnis and Dr. Jalovec,
Thank you so much for your response and for giving me permission to use the sketches for my dissertation. I will keep you posted as my research progresses.

Have a great day and Happy Thanksgiving,

Tarameh
20. Please circle the drawing which most resembles your child.

<table>
<thead>
<tr>
<th>Ages 2-5</th>
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<tbody>
<tr>
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<th>Ages 6-9</th>
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</table>

© 2003 Scott Millard

Thank you for completing this survey.
Boys

20. Please circle the drawing which most resembles your child.

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<thead>
<tr>
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<th>![Images of boys' figures for ages 2-5]</th>
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<tbody>
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<td>![Images of boys' figures for ages 6-9]</td>
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<td>Ages 10-13</td>
<td>![Images of boys' figures for ages 10-13]</td>
</tr>
<tr>
<td>Ages 14-17</td>
<td>![Images of boys' figures for ages 14-17]</td>
</tr>
</tbody>
</table>

© 2003 Scott Millard

Thank you for completing this survey.
Taraneh Hazhin <hazhinn@gmail.com>

Jan 30, 2019, 1:05 PM

to Kristine

Dear Dr. Gauthier,

My name is Taraneh Hazhin and I am a PhD student at Seton Hall University, NJ.
I found the revised visual scale that you used in your study to measure parents’ perception of their children’s weight status very interesting [“Hispanic parents’ perception of their preschool children’s weight status,” Journal for Specialists in Pediatric Nursing 21 (2016) 84-93].

I would greatly appreciate if you could please give me permission to use the revised circular version of preschool children sketches you adopted for your study to measure parents’ perception of their child’s weight status as part of the survey I am developing for my dissertation (for preschool boys and girls 2-5 years old). My dissertation is about the relationship between parents’ perception of their preschool children’s body size and children’s diet quality.

I contacted Dr. Eckstein and Dr. Helen Binns, authors of the original article, and got their permission to use the original tool of children’s sketches to measure parents’ perception.

Thank you so much for your consideration.
I am looking forward to hearing from you,

Gauthier, Kristine <KRISTINE.GAUTHIER@ucdenver.edu>

Jan 30, 2019, 1:47 PM

to me

Taraneh,

Thank you for your email. Yes, you can certainly use the revised figures with appropriate acknowledgement. I am interested to hear about your study and findings.

Thank you,
Kristine

Kristine Gauthier, PhD, MPH, PNP-BC
Assistant Professor
PNP Primary Care Specialty Director
University of Colorado
College of Nursing
Education 2 North
13120 E. 19th Avenue
Aurora, CO 80045
Ph: 303-274-3898
ID: ____________________

Please select the drawing which most resembles your child:

Por favor encierre con un circulo el dibujo que mas se parece a su niño/niña:
Please select the drawing which most resembles your child:

Por favor encierre con un círculo el dibujo que más se parece a su niño/niña:
Appendix C

Study Procedures
Appendix D

Proposal Hearing Form

PROPOSAL HEARING SIGN OFF SHEET

DOCTORAL CANDIDATES NAME: Taraneh Hazhin

PROJECT TITLE: "Exploring Relationship between Three Variables: Parents’ Perception of their Preschool Children’s Weight, Parents’ Perception of their Preschool Children’s Diet Quality, and Children’s Healthy Eating Index (HEI) Score”

PROPOSAL HEARING DATE: May 21, 2019

I HAVE PARTICIPATED IN THE ABOVE NOTED PROPOSAL HEARING AND MY Signature PROVIDES SUPPORT OF THE PROPOSED METHODOLOGY.

DISSERT. COMMITTEE MEMBER CHAIR: Terrence F. Cahill
COMMITTEE MEMBER SIGNATURE: 

DISSERT. COMMITTEE MEMBER: Genevieve Pinto Zinn
COMMITTEE MEMBER SIGNATURE: 

DISSERT. COMMITTEE MEMBER: Shahla Wunderlich
COMMITTEE MEMBER SIGNATURE: 

School of Health and Medical Sciences
Department of Interprofessional Health Sciences and Health Administration
Interprofessional Health Sciences Campus (IHS)
340 Kingsland Street, Building 123, Nutley, NJ 07110

What great minds can do.
Appendix E

Letter of Solicitation and Questionnaire

Welcome to My Survey
Dear parents,

My name is Taraneh Hazhin. I am a PhD candidate at the School of Health and Medical Sciences at Seton Hall University. I am conducting this research study as part of my doctoral dissertation.

The purpose of this study is to assess the accuracy of parents’ (parents, guardians, and caregivers) perception of their preschooler children’s weight status and diet quality. It is further to determine if there is a relationship between the parent’s perception of their children’s weight, parents’ perception of their children’s diet quality, and the children’s diet quality.

You are invited to participate in this survey study if you have a healthy preschool child between ages 3 to 5 years old and you live in the United States. If you choose to participate in this study, you will be asked to complete a short demographic questionnaire and to report your CHILD’s food intake for the past day. Providing this information takes no more than 15 minutes. You may begin by clicking on the link provided at the end of this letter.

By clicking below, you provide your consent to participate in this study. You will be asked to answer questions about your child’s height, weight, and diet, and to report your CHILD’s food intake for the past day, as accurately as possible. If you are interested to learn more about the results of this study, please feel free to email me (taraneh.hazhin@student.shu.edu) and I will forward a summary report of the study findings to you after the study is completed.

Your participation in this research study is completely voluntary. You may choose not to participate at any time during the survey. There will be no risk or discomfort for you or your child if you choose to participate in this study. There is no direct benefit, monetary or any other type of compensation for participating in this study. However, the results of this study may help researchers to have a better understanding of childhood weight management and diet quality.

This research study is completely anonymous. Your personal information such as name, address, or other specific personal identifications will not be collected as part of this research study and all your answers will be recorded anonymously using a coding system and the results of this study will be reported in aggregate.

The data collected for this study will be confidential and stored electronically on a USB memory key, and will be kept in a locked, secure cabinet in the primary investigator’s home-office for at least 3 years after completion of this research project.

If you have any questions about this study and the survey, please feel free to contact the office of Dr. Terrence Cahill, Dissertation Chair and Department Chair in the Department of Inter-Professional Health Sciences and Health Administration in the Seton Hall University School of Health and Medical
Sciences, at (973)275-2449. Additionally, Dr. Michael LaFountaine, Chair of the Institutional Review Board (IRB), in the Office of the IRB at Seton Hall University, may be reached at (973)313-6314.

Thank you for your time and consideration. Your participation and contribution to this research study is greatly appreciated.

Taraneh Hazhin, M.S., R.D.
Parents' Perception of their Preschool Children's Weight and Diet Quality: How accurate is it?

Instructions for Measuring Children's Height and Weight

This survey is for parents / caregivers of healthy preschool children 3 to 5-year-old residing in the United States.

If you wish to participate in this study and you have a healthy child between ages 3 to 5 years old and you live in the United States, please measure your child’s weight and height (following the instructions below) before you answer the study questions.
Instructions for measuring children’s height accurately at home:

1. Remove the child’s shoes, bulky clothing, and hair ornaments, and unbraided hair that interferes with the measurement.

2. Take the height measurement on flooring that is not carpeted and against a flat surface such as a wall with no molding.

3. Have the child stand with feet flat, together, and against the wall. Make sure legs are straight, arms are at sides, and shoulders are level.

4. Make sure the child is looking straight ahead and that the line of sight is parallel with the floor.

5. Take the measurement while the child stands with head, shoulders, buttocks, and heels touching the flat surface (wall). (See illustration.) Depending on the overall body shape of the child, all points may not touch the wall.

6. Use a flat headpiece to form a right angle with the wall and lower the headpiece until it firmly touches the crown of the head.

7. Make sure the measurer’s eyes are at the same level as the headpiece.

8. Lightly mark where the bottom of the headpiece meets the wall. Then, use a metal tape to measure from the base on the floor to the marked measurement on the wall to get the height measurement.

9. Accurately record the height to the nearest 1/8th inch.

Wall
Instructions for measuring children’s weight accurately at home:

1. Use a digital scale. Avoid using bathroom scales that are spring-loaded. Place the scale on firm flooring (such as tile or wood) rather than carpet.

2. Have the child remove shoes and heavy clothing, such as sweaters.

3. Have the child stand with both feet in the center of the scale.

4. Record the weight to the nearest decimal fraction (for example, 55.5 pounds).
Parents' Perception of their Preschool Children's Weight and Diet Quality: How accurate is it?

NOTE: Please proceed with the questionnaire ONLY if you have a healthy preschool child between ages 3 to 5 years old and you live in the United States.

* 1. What is your child's date of birth?

your Child's date of birth

Date

MM/DD/YYYY

* 2. What is your child's current weight in pounds?

* 3. My child's reported weight is:
   - [ ] Measured at home
   - [ ] Estimated without measurement
   - [ ] Measured at the last pediatrician visit (within previous 3 months)
   - [ ] Measured at preschool/school (within previous 3 months)
   - [ ] Other (please specify)

* 4. What is your child's current height in feet and inches? For example, if your child is 3 feet and 4 inches, write 3' 4".

Feet

Inches
* 5. My child's reported height is:
   - Measured at home
   - Estimated without measurement
   - Measured at the last pediatrician visit (within previous 3 months)
   - Measured at preschool / school (within previous 3 months)
   - Other (please specify)

* 6. Does your child have any chronic health problem that has limited his / her growth, food intake, or physical activity?
   - No
   - Yes
   (If YES, please specify)

* 7. Does your child have any acute medical condition that has limited his / her growth, food intake, or physical activity?
   - No
   - Yes
   (If YES, please specify)

* 8. Does your child have any physical or mental disability that has limited his / her growth, food intake, or physical activity?
   - No
   - Yes
   (If YES, please specify)
9. Which race/ethnicity best describes your child? (Please choose only one.)
- Asian / Pacific Islander
- Black / African-American
- Hispanic
- Native American / American Indian
- White / Caucasian
- Other (please specify)

10. Please write down all foods and beverages consumed by your CHILD during the past day. Please list all foods including snacks and all drinks like water, milk, tea, juice ... and record the amount of each food and beverage your CHILD consumed yesterday as detailed as possible.

For Example:
1 (8-oz) cup milk
1 Tablespoon peanut butter / 1 slice toast
1 small plate pasta with meatball sauce

<table>
<thead>
<tr>
<th>TIME OF DAY</th>
<th>FOOD AND DRINKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BREAKFAST</td>
<td></td>
</tr>
<tr>
<td>Snack</td>
<td></td>
</tr>
<tr>
<td>LUNCH</td>
<td></td>
</tr>
<tr>
<td>Snack</td>
<td></td>
</tr>
<tr>
<td>DINNER</td>
<td></td>
</tr>
<tr>
<td>Snack</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

11. Please list all vitamin, mineral, and herbal supplements your CHILD consumed the past day.

* 12. Do you think your child is:
- Very Underweight
- Underweight
- Normal or Healthy Weight
- Overweight
- Obese
13. Do you believe the quality of your child's diet is:
   - Poor
   - Moderate
   - Healthy

14. What is your child's gender?
   - Girl
   - Boy
Parents' Perception of their Preschool Children's Weight and Diet Quality: How accurate is it?

Please look at the picture below and
1. Choose the drawing which most resembles your child
2. Note the letter that is written under the drawing which most resembles your child

GIRLS

Ages 2-5

[Adopted with permission from Eckstein, et. al. (2006)]

*15. Looking at the picture above, please choose the letter under the drawing which most resembles your child:

☐ A  ☐ B  ☐ C  ☐ D  ☐ E  ☐ F  ☐ G

Please look at the next picture below and
1. Choose the drawing which most resembles your child
2. Note the letter that is written beside the drawing which most resembles your child
* 16. Looking at the picture above, please choose the letter beside the drawing which most resembles your child:

- [ ] H
- [ ] I
- [ ] J
- [ ] K
- [ ] L
- [ ] M
- [ ] N
Parents' Perception of their Preschool Children's Weight and Diet Quality: How accurate is it?

Please look at the picture below and
1. Choose the drawing which most resembles your child.
2. Note the letter that is written under the drawing which most resembles your child

BOYS

Ages 2-5

A B C D E F G

[Adopted with permission from Eckstein, et. al. (2006)]

* 17. Looking at the picture above, please choose the letter under the drawing which most resembles your child:

☐ A  ☐ B  ☐ C  ☐ D  ☐ E  ☐ F  ☐ G

Please look at the next picture below and
1. Choose the drawing which most resembles your child.
2. Note the letter that is written beside the drawing which most resembles your child
* 18. Looking at the picture above, please choose the letter beside the drawing which most resembles your child:

- [ ] H
- [ ] I
- [ ] J
- [ ] K
- [ ] L
- [ ] M
- [ ] N
### Parents' Perception of their Preschool Children's Weight and Diet Quality: How accurate is it?

* 19. Please indicate your level of agreement with each statement about your child's dietary intake:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>My child eats a variety of vegetables from all subgroups—dark green, red and orange, legumes (beans and peas), starchy and others.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>My child eats a variety of fruits, especially whole fruits.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>My child consumes grains, at least half of which are whole grains.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>My child consumes dairy products, including milk, yogurt, cheese, and/or fortified soy beverages.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>My child eats a variety of protein foods, including meat and poultry, seafood, eggs, legumes (beans and peas), nuts, seeds, and/or soy products.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

* 20. What is your relationship with the child?

- ○ Mother
- ○ Father
- ○ Guardian
- ○ Step-Mother
- ○ Other (please specify)
21. How old are you?
- 18 - 30 year-old
- 31 - 40 year-old
- 41 - 50 year-old
- 51 - 60 year-old
- 61 - 70 year-old
- 70+ year-old

22. Which gender do you identify yourself with?
- Female
- Male
- Other (please specify)

23. What is your current weight in pounds?

24. What is your height in feet and inches? For example, if you are 5 feet and 3 inches, write 5’ 3’.
- Feet
- Inches

25. Which race/ethnicity best describes you? (Please choose only one.)
- Asian / Pacific Islander
- Black / African-American
- Hispanic
- Native American / American Indian
- White / Caucasian
- Other (please specify)

26. In what state or U.S. territory do you live?
* 27. What is your marital status?
   - Single
   - Married
   - In a domestic relationship
   - Other (please specify)
   - Separated
   - Divorced
   - Widowed

* 28. What is the highest degree or level of school you have completed?
   - Less than a high school diploma
   - High school degree / diploma / or equivalent
   - Some college credits, no degree
   - Technical / trade training
   - Associate degree
   - Bachelor's degree
   - Master's degree
   - Professional degree
   - Doctorate degree
   - Other (please specify)

* 29. What is your household income?
   - Household income < $50 K
   - $50 K ≤ Household income < $100 K
   - $100 K ≤ Household income < $150 K
   - $150 K ≤ Household income < $200 K
   - $200 K ≤ Household income < $250 K
   - $250 K ≤ Household income
   - Do not like to report my household income

Thank you for taking your time and completing this questionnaire.