DOES PRESENCE OF THE PARENT AND CHILD IN THE SAME ROOM AFFECT FOOD SELF-SELECTION AND PORTION SIZE?

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by

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The purpose of this study was to determine if there are differences in the portion sizes of food self-selected by the same group of children and parents, in the presence of each other during one session and without the presence of each other during a second session. Weight classifications were determined for 18 children, 6 normal weight, and 12 overweight. Participants in the program were between the ages of 8 and 11 years old and were asked to have the same parent present for each session of the study. Children and parents were asked to eat the same meal of spaghetti and meatballs, salad, ice cream, and beverage on two different occasions. Significant interactions were found for parents influencing children’s food selection and portion size. Significant interactions were found for children influencing parent’s food selection and portion size.
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CHAPTER I
INTRODUCTION

The percentage of young people who are overweight has more than tripled since 1980 (Department of Health and Human Services). The CDC (Department of Health and Human Services) estimates that over nine million young people between the ages of 6-19 years old are considered overweight. Research has found that children that are overweight or obese as a child or adolescent have a greater chance of becoming overweight and obese adults (Serdula, Ivery, Coates, Freedman, Williamson, & Byers, 1993). As the rate of obesity continues to grow within the pediatric population it is important to recognize the impact it will have on them throughout their lives. “Overall, the risk for becoming an obese adult was two to 6.5 times higher for obese children than for non-obese children (Serdula, et al., 1993). It is clear that obesity is a multifaceted problem that does not have an easy solution.

There are many diverse factors influencing the obesity epidemic such as what foods are made available and accessible to the child, parental modeling in regards to trying different foods, and the way that parents interact with their children about eating (Birch, 1999). Research studying children’s food preference development (Birch, 1999) found that the parent’s potential to determine their child’s eating environment and other environmental factors within the home appear to influence food preferences. Young children form food preferences that follow them throughout life. A child’s experience with food has the capacity to modify, and maintain new preferences (Birch, 1999). The food environment that children grow up in can be influential in their willingness to try new foods as a result of the types of foods they are exposed to as a child. The food
environment at home can be a risk factor for childhood obesity if children are exposed to poor food choices in the home environment.

The parent's potential to influence food preferences is also an important part in determining what affects a child's food choices. In a study by Robinson (2000) looking at children's perceptions of who controls their food choices, two-thirds of the children reported that adults decided how much each child was going to eat, and over half said that an adult encouraged them to eat food if they left it on their plate.

More specifically, a study by Laessle, Uhl, Lindel, & Muller (2001), looked at whether mothers' influence their child's food preferences based on if the child was overweight or normal weight. They found that mothers have a great amount of influence over what their child eats by their presence in the same room with her child consuming a meal. The mother does not enhance, but decreases self-control of the overweight child. Parental control over the diet of their child may be a contributing factor to the obesity epidemic in the United States and this relationship should be looked at as a risk factor for obesity.

Statement of the Problem

The effect of children and parents influencing each others self-selection of food and portions has not been widely studied. One previous study looked at the influence of parents being present in the laboratory with their children while self-selecting food (Laessle et al., 2001). Differences in eating style between normal weight and overweight preadolescents emerged only when a parent was present during the experimental meal (Laessle et al., 2001). No research has been completed with respect to children and parents influencing each others self-selection of foods and portion sizes by their presence
in the room. Therefore, whether a child influences their parent’s food selection with their presence in the room has yet to be determined.

Purpose

The purpose of this study is to determine if there are differences in the portion sizes of food self-selected by the same group of children and parents, in the presence of each other during one session, and without the presence of each other during a second session.

Hypotheses

1. The presence of the parent being in the room with the child has an influence over the self-selection of food choice and portion size by the child.

2. The presence of the child being in the room with the parent has no influence over the self-selection of food choice and portion size by the parent.

3. Children who are overweight will serve themselves larger portion sizes and total amount of food than normal weight children.

Definition of Terms

- Parent Present with Child- Child and parent are present in the same room self-selecting and portioning foods for their meals at the same time. They are also both present in the same room while consuming their meal.

- Parent Absent from Child- Child self-selects and portions food without their parent present in the room with them. Parent self-selects and portions their food without their child present in the room with them. Children and parents consume their meals in separate rooms from each other.
CHAPTER II

REVIEW OF LITERATURE

Obesity has grown to epidemic proportions in the United States. What used to be primarily an adult onset disease is being found in the pediatric populations at younger and younger ages. The National Center for Health Statistics found that 60 million adults 20 years of age and older in the United States are obese. This increase is not only limited to adults. The percentage of young people who are overweight has more than tripled since 1980. Among children and teens aged 6-19 years, over nine million young people are considered overweight (Department of Health and Human Services). An estimated 300,000 deaths per year may be attributable to obesity (Surgeon General, 2001). This deadly disease has several different factors that contribute to its development and management within the population. This review of literature will discuss the prevalence of obesity, assessment of obesity measures and classifications. As well as factors influencing obesity such as hereditary and environmental factors, health risks for obesity, and the factors influencing why children choose the foods that they do.

Prevalence of Obesity

As the adult population in the United States continues to deal with risk factors from obesity, becoming proactive about childhood obesity prevention should be a top priority. Overweight adolescents have a 70% chance of becoming overweight or obese adults. This increases to 80% if one or more parent(s) is overweight or obese (Surgeon General, 2001). Results from the 1999-2002 National Health and Nutrition Examination Survey (NHANES), using measured heights and weights, indicate that an estimated 16% of children and adolescents ages 6-19 years are overweight. This
represents a 45% increase from the overweight estimates of 11% obtained from NHANES III (1988-1994) (Department of Health and Human Services).

The incidence of obesity in teenagers is increasing; among 12-19-year-olds in the United States, the prevalence of overweight is 21%, which is 6% higher than it was in the previous decade (Mahon & Escott-Stump, 2004). A large number of America’s adolescents are overweight and obese at a critical time in their body’s development into an adult. Obesity is occurring in younger children and continuing to grow with them into their adolescent years.

Assessment of Obesity

Assessment of obesity is classified differently for adults and children depending on their age, weight, and height. Adults are assessed using BMI (Body Mass Index) classifications and children are categorized into percentiles on a growth chart based on their BMI. Body mass index (BMI) is calculated by W divided by H², in which W is weight in kilograms and H is height in meters (Mahon & Escott-Stump, 2004). BMI provides a reliable indicator of body fatness for most people and is used to screen for weight categories that may lead to health problems (Centers for Disease Control and Prevention, n.d.). BMI is classified into different intervals that are then associated with predicting health risk factors of obesity.
Table 1: Adult BMI Classifications

<table>
<thead>
<tr>
<th>BMI</th>
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<td>Below 18.5</td>
<td>Underweight</td>
</tr>
<tr>
<td>18.5-24.9</td>
<td>Normal</td>
</tr>
<tr>
<td>25.0-29.9</td>
<td>Overweight</td>
</tr>
<tr>
<td>30.0 and above</td>
<td>Obese</td>
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(Centers for Disease Control and Prevention, n.d.).

BMI is a tool for assessing obesity and risk for diseases related to obesity. BMI classification is one of the strongest predictors of diabetes (Mokdad et al., 2001). Assessing obesity risk for children is critical in the prevention of childhood obesity and its associated health risks at a young age.

BMI is used as a primary evaluation for adult weight status and differs with evaluation of children’s growth status. Growth charts are used as a screening tool to assess the nutritional status and general well-being of infants, children, and adolescents (Lee & Nieman, 2003). Growth charts list BMI-for-age percentiles developed by the Center for Disease Control and Prevention (CDC) for children and adolescents ages 2 to 20 years old. Growth charts allow a child’s physical development (size and growth) to be compared with that of healthy children of the same sex and age (Lee & Nieman, 2003).
Table 2: Child and Adolescent Classification for BMI-for-Age Percentiles

<table>
<thead>
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<th>BMI-for-age</th>
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<tr>
<td>≥ 95&lt;sup&gt;th&lt;/sup&gt; percentile</td>
<td>Overweight</td>
</tr>
<tr>
<td>≥85&lt;sup&gt;th&lt;/sup&gt; - &lt; 95&lt;sup&gt;th&lt;/sup&gt; percentile</td>
<td>At risk of overweight</td>
</tr>
<tr>
<td>&lt; 85&lt;sup&gt;th&lt;/sup&gt; percentile</td>
<td>Normal weight</td>
</tr>
<tr>
<td>&lt; 5&lt;sup&gt;th&lt;/sup&gt; percentile</td>
<td>Underweight</td>
</tr>
</tbody>
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(Centers for Disease Control and Prevention, n.d.).

The definition of overweight among children is a statistical definition based on the 2000 CDC and Prevention growth charts for the United States; “overweight is defined as at or above the 95<sup>th</sup> percentile of body mass index for age” (Ogden, Flegal, Carroll, & Johnson, 2002). Continual assessment of growth during childhood can detect and protect against a risk for obesity during crucial growth years. A BMI-for-age greater than the 95<sup>th</sup> percentile identifies those children and adolescents with a significant likelihood of obesity continuing with them into adulthood (Lee & Nieman, 2003). The classification of at risk for overweight can determine the amount of intervention necessary to keep children within the normal growth percentiles of weight.

Health Risks Associated with Obesity

*Diabetes*

Obesity is associated with a long list of secondary health risk factors. Over 80% of people with type 2 diabetes are overweight and obese (Surgeon General, 2001). The link between obesity and type 2 diabetes has shown an increase in the numbers of adults
with both diseases. “In 2000, 2.9% of United States adults were both obese and had diabetes, compared with 1.4% in 1991” (Mokdad et al., 2001). A weight gain of 11 to 18 pounds increases a person’s risk of developing type 2 diabetes to twice that of individuals who have not gained weight (Surgeon General, 2001). The growth in the number of persons diagnosed with type 2 diabetes is not limited to adults. Previously considered an adult onset disease, type 2 diabetes has increased dramatically in children and adolescents (Surgeon General, 2001).

*Heart Disease*

A deadly health risk factor from obesity is heart disease. The incidence of heart disease (heart attack, congestive heart failure, sudden cardiac death, angina, or chest pain, and abnormal heart rhythm) is increased in persons who are overweight or obese (Surgeon General, 2001). Heart disease and obesity together put extra strain on the body. The combination of obesity and heart disease can cause unwanted additional health risks.

*Stroke and Hypertension*

Hypertension is a blood pressure associated with a higher than normal blood pressure. High blood pressure (greater than 140/90 mmHg) is twice as common in adults who are obese than in those who are at a healthy weight (Surgeon General, 2001). A body mass index of greater than 27 in adults is closely correlated with hypertension (Lee & Nieman, 2003). Hypertension and obesity are linked not only in adults but also in adolescent ages too. The CDC found that overweight in adolescence is associated with hypertension (Surgeon General, 2001). Similar to diabetes prevention, a weight reduction of as little as 10 pounds is effective at reducing elevated blood pressure in overweight persons with hypertension (Lee & Nieman, 2003). Research has connected the link
between hypertension and diabetes with obesity. "Elevated blood pressure and insulin level are twice as common in children above the 97th percentile as in children between the 95th and 97th BMI percentiles" (Freedman, Dietz, & Srinivasan, & Berenson, 1999).

**Sleep Apnea**

Sleep apnea is a sleep-associated breathing disorder that can cause a person to stop breathing while sleeping that lasts for at least 10 seconds. Sleep apnea is characterized by loud snoring and labored breathing (Surgeon General, 2001). Sleep apnea is a health risk associated with obesity and can be hard for many to cope with because it interferes with the amount of sleep a person gets at night. After a restless night a person with sleep apnea could wake up feeling sleep deprived. Research by CDC has found that sleep apnea is more common in obese people (Surgeon General, 2001) causing a person to experience a decrease in productivity while on the job or during school.

**Asthma**

Asthma is also linked with obesity as a health risk factor. The CDC defines asthma as a disease of the lungs in which the airways become blocked or narrowed causing difficulty breathing (Centers for Disease Control and Prevention, n.d.). Obesity is associated with a higher prevalence of asthma. The combination of airway blockage from the asthma and extra weight on the body from obesity makes it more difficult to breathe correctly (Surgeon General, 2001). Asthma and sleep apnea are both health risk factors associated with obesity. Both diseases inhibit proper breathing which can lead to unpleasant nights and mornings for those that suffer from either disease.

**Certain Cancers**

Obesity is linked to an increased chance of developing certain types of cancer.
Overweight and obese BMI classifications are also associated with an increased risk for some types of cancer including endometrial, colon, gall bladder, prostate, kidney, and postmenopausal breast cancer (Surgeon General, 2001). Research has shown that female children that gain weight steadily have an increased risk of getting cancer earlier in life. Furthermore, the research found that women who gain more than 20 pounds from age 18 years to midlife double their risk of post-menopausal breast cancer, compared to women whose weight remains stable (Surgeon General, 2001).

**Osteoarthritis**

Osteoarthritis is associated with obesity as a health risk factor. Osteoarthritis strains joints and muscles on the body daily which may not be noticeable until muscles are aching from overuse and pain. For every two-pound increase in weight, the risk of developing arthritis is increased by 9 to 13% (Surgeon General, 2001). Weight is the agitator for joint and muscle pain that makes osteoarthritis so uncomfortable for people to deal with. Obese people who are suffering from symptoms of arthritis could find relief by losing weight. Osteoarthritis symptoms can improve with weight loss (Surgeon General, 2001).

**Hereditary Factors**

Hereditary and environment are two major factors that determine a child’s susceptibility to obesity. Many of the hormonal and neural factors involved in normal weight regulation are determined genetically. These include the short- and long-term signals that determine satiety and feeding activity. Although numerous genes are involved in obesity, two have received much attention: the obesity gene (ob gene) and the B3-adrenoreceptor gene (Mahon & Escott-Stump, 2006). The ob gene was studied on
mice for obesity and research concluded that it produces leptin and mutations in the mouse ob gene which resulted in obesity (Mahon & Escott-Stump, 2004). B3-adrenoreceptor is the other gene in question with regard to obesity. The B3-adrenoreceptor gene is not likely to be a major determinant of obesity, but it may contribute to weight gain in some persons (Mahon & Escott-Stump, 2004). Both genes can lead to increases in susceptibility to obesity if they are inherited by children at birth.

Environmental Factors

Environment also plays a role in determining obesity risk for children. The home environment and lifestyle that children grow up in can shape their food choices for the rest of their lives. Research has found that in general, people tend to eat when it is convenient, based on routine and or because of social factors rather than the need for energy regulation. Initiating food consumption is up to each individual based on their environment and lifestyle (Woods, 2004). The ability to control food consumption by an individual allows them to decide when they are hungry and what they want to eat. This type of control allows considerable flexibility, such that individuals can adapt their meal patterns to their environment and lifestyle while still maintaining control over the amount of food consumed (Woods, 2004).

Adult Food Selection

Adults choose certain foods for different reasons and this can ultimately influence their children’s choice of foods also. A study looking at why adults choose the foods they do found that most adults based their food choices on life course events and experiences (Bisogni Conners, Devine & Sobal, 2002). Bisogni and colleagues (2002), also found that a person’s current identity related to eating was dependent on their past and present
environments, their attentiveness to food and eating, and the recognition of differences. Research looking at why adults choose particular foods when grocery shopping, found that ‘quality/freshness’ ‘price’ ‘taste’ ‘trying to eat healthy’ and ‘what my family wants to eat’ were perceived to be among the top five influences on food choice (Lennernas et al., 1997).

Multiple factors influence what adults choose to eat and buy for their families. These factors influence the foods that children may be exposed to in their home environments since the majority of food choices are made by their parents. In research assessing parent and child adiposity and eating styles, Johnson & Birch (1994) found that “heavier parents reported a higher incidence of disinhibited eating, which refers to a tendency to eat uncontrollably even when they were not hungry.”

Factors Influencing Food Selection

_Hunger, Satiety, and Appetite_

Satiety, as defined by Mosby’s Medical Dictionary (2002), is a state of being satisfied, as in the feeling of being full after eating. Recognizing satiety signals is crucial to gaining control of eating. A locus of nerve tissue within the hypothalamus is thought to control appetite and is called the satiety center. The satiety center sends and receives signals (hormones) to control appetite (Johnson, 2000). According to DiCarlo (1998),

The hypothalamus is located in the lower central area of the brain and is a control center for regulation of eating, drinking, body temperature, behaviors, and the autonomic nervous system. The important function of the hypothalamus regarding satiety signals is the recognition of hormones traveling from the gastrointestinal tract (GI) through the blood to specific receptors of the hypothalamus.

Satiety is a very important function within the hypothalamus due to its control over appetite. Satiety signals alert a person to stop eating because their stomach is full. This
happens by the release of specific hormones from the brain and GI tract (Johnson, 2000). Not knowing when to stop because the brain and stomach do not communicate contributes to the problem of obesity; therefore, causing a person to continue to think they are still hungry.

Appetite is defined as “a natural desire to eat, especially when food is present” (Mahon & Escott-Stump, 2004). Appetite coupled with satiety and hunger can influence a child’s food preferences. Although subjective, appetites usually follow the rate of a child’s growth and nutrient needs. Appetite, satiety, and hunger all work together in the body keeping the balance of food intake under control. If the signals are continually ignored or crossed within the body, there is no equilibrium to know when to start or stop.

Hunger, satiety, and appetite in children all influence food selection. Hunger signs are learned very early on in life. Infants express signs of hunger by moving their heads from side to side with their mouths open or bringing their hands to their mouths and sucking on them. When these signs appear a mother would nurse or feed. When the infant is full, the infant stops nursing (Brown, 2002). During infancy, a baby may be responding to internal cues that register fullness (Fisher, Rolls, & Birch, 2003). Hunger is a response that is learned at a young age and can be lost as a child. If a child is unable to tell when they are hungry, they could continue to eat even when they are not really hungry which can lead to obesity.

Parents

Parents have a unique role in the obesity epidemic in the United States. They are the role model for the child in regards to trying different foods and the environment they try them in. Parents set an example in their relationship with food for their children to
model. They also impact the way that food is used within their relationship with their child. Parents ultimately decide what foods are available and accessible to the child. A child’s experience with food has the capacity to modify innate preferences and to establish and maintain new preferences. The learning of these preferences appears to be influenced by a broad range of environmental factors, many of which are played out in the home (Birch, 1999). The family environment may shape these preferences unknowingly and contribute to why certain food selections are made by the child. Parents have a multifaceted role within each child’s life and impact it in numerous ways with food preferences.

Food preferences of children are hard to understand and to pinpoint a reason for them liking a certain food or not. Birch (1999) found in a study looking at children’s food preferences that the earlier exposure that children have to fruits and vegetables, and to foods high in energy, sugar, and fat plays an important role in establishing a hierarchy of food preferences and selection. Birch (1999) concluded that young children’s preferences for a food increases as exposure to the food increases. The role of the parent becomes critical at this point because children will not be exposed to foods that parents do not like therefore, limiting the child’s opportunity to try different foods. In a study of five to 11-year old children and their parents looking at neophobic (rejecting new foods) responses to ten novel and ten familiar foods, the researchers found that children’s level of neophobia was significantly related to parental neophobia (Sullivan & Birch, 1994). Parents have an enormous impact on a child’s preferences for food depending on if they have been exposed to trying new foods before. There is evidence that the “foods that mothers eat (and hence model eating) appear to provide a particularly powerful influence
in shaping children’s food preferences, with young children being more likely to imitate their mother’s eating behaviors than that of other caregivers” (Harper & Sanders, 1975).

The way that parents interact with their child during a meal time can influence the child’s relationship with food. Many of the feeding practices commonly used by parents, such as restricting certain foods considered being unhealthy, or using food as a reward, inadvertently promotes behaviors counter to their intentions (Birch, 1999). This type of counter productive relationship with food as a child is not a good example for parents to show children to follow because it can lead to risk for obesity. “Force feeding type practices push children to eat even if they are not hungry, and food-trading practices use larger amounts of high calorie items (e.g. bowl of ice cream) to entice children to take smaller amounts of parent-preferred food items (e.g. three bites of broccoli)” (Brewis & Gartin, 2006).

Disguising the relationship between the child and food can turn negative due to parents pushing for certain foods to be eaten. The child may respond by eating more of the food the parent does not want them to eat which in turn causes more alarm for the parents when they are trying to curb specific eating habits. In a study looking at restrictive food practices by parents on female children, Fisher & Birch (2002) found that parent’s use of restrictive feeding practices is not effective in limiting children’s food intake and can actually promote children’s consumption of the restricted foods, even in the absence of hunger. Parents may think that by restricting certain foods from their child it will lower the chance of them eating it but what they fail to realize is that they are actually causing detrimental effects on the child’s relationship with food by restricting access to that food. The child will want to eat the food and will consume more of it
because they know that they will not get the opportunity to from their parent. Therefore, Fisher and colleagues (2003) concluded that "restriction is counterproductive and not an effective approach to limiting food intake, emphasizing the importance of providing guidance to parents on alternative methods of setting limits for children in the feeding context that allow the development of adequate self-control mechanisms".

Through having a healthy relationship with food, children may be better able to have self-control when around foods that may provoke overeating. Without self-control, children may increase their risk of overeating restricted foods and increase their risk of becoming overweight and obese.

*Mothers*

Parents are key factors in the obesity epidemic; specifically, the mother may be more in charge of a child’s food selection in the home and therefore has a greater influence over what foods are offered to the child. In a study looking at differences in eating style between normal weight and over-weight preadolescents, differences emerged only under the condition, that a parent (the mother) was present during the experimental meal. Therefore, the researchers concluded that mothers do not enhance, but actually decrease self-control of the overweight child (Laessle et al., 2001). The presence of the mother affecting the child’s food preferences can lead to a negative effect on the child because they may choose to overeat the foods that they can not have around their mom when they are away from their mom. This could lead to risk of obesity because the child is overeating. A study done by Spruijt-Metz, Lindquist, Birch, Fisher, & Goran (2002) showed that a mother’s concern about her child’s weight is related to fat mass of the child. This is the first study to show that a mother’s concern about her child’s weight and
her pressure in child feeding are directly related to the child’s total fat mass. Results show that a mother’s concern for her child’s weight is related to higher total fat mass in the child and that a mother’s pressure to eat is related to lower total fat mass in the child. This puts mothers in the spotlight for their relationship with their child and their food selection.

Mothers have a strong influence over what and how their child eats. “The eating style of the obese as the result of former reinforcing processes during family meals, where the mother has probably prompted high eating rates and eating the plate empty” (Laessle, et al., 2001). These prompts to eat, even when a mother is not present in the room, may be causing the child to feel like they need to eat even when they are not hungry. Children may be negatively impacted by mothers pushing them to choose the right food selections. This push by the mother can have negative effects on the child because they may make the mother happy by picking the foods she wants the child to eat when she is there. However, when the mother is not there then the child may rebel against that trapped feeling of only being able to pick certain foods and gorge themselves on the restricted foods.

Conclusion

Children have so many different influences on them when it comes to choosing foods and why they pick them. Parents are key proponents of influencing their child’s food preferences whether they realize it or not. Mothers have a unique role and relationship as model for food preferences with their children and therefore, influence the response their child has around food. Previous research has not looked at what response the child has if a mother is present or absent during food selection by a child and parent.
CHAPTER III

METHODOLOGY

The purpose of this study was to determine if there were differences in the portion sizes of food self-selected by the same group of children and parents, in the presence of each other during one session and without the presence of each other during a second food selection session.

Participants

Participants were recruited from a community nutrition education program that took place at Kent State University and also through a nutrition education program in Kent City Schools. The subjects ranged in ages from 8-11 years old and consisted of both males and females.

Measurement

Participants and their parents were divided into two different groups depending on the child’s BMI classification. SECA freestanding stadiometer model 214 and model 882 SECA digital scale were used to take height and weight. Height and weight of each child participant was taken to classify the child into the normal weight group or the overweight and obese group. Strict confidentiality of children’s heights and weights were taken into account to avoid embarrassment by any child. “Children and adolescents having a BMI-for-age greater than or equal to the 95th percentile are overweight, while those greater than or equal to the 85th percentile but less than the 95th percentile are considered at risk of overweight” (Lee & Nieman, 2003). A child was classified within the normal weight
group if they were at or below the 85th percentile. Parents were classified according to their child’s BMI classification and gender.

Procedures

Children and parents were asked to eat the same meal on two separate occasions. The meal consisted of a main dish of spaghetti and meatballs with marinara sauce, salad with choice of ranch or Italian dressing, vanilla ice cream, and choice of skim-milk, coke, diet coke, sprite or water for a beverage. Children and parents were asked to fast for four hours before coming to the study as they were able to self-select from any or all of the food offered during the study time for their meal. Each food item was offered to parents and children separately so that they could portion what they wanted on their plates. Escali digital food scale model 136DK was used to weigh food items. Before each food item was portioned, the food scale was tared to accurately record the weight of each food item. For example, if a child portioned plain spaghetti on their plate, it was placed on the scale and measured the spaghetti weight. The scale was tared before each new food item. Parent food choices and weights were recorded under the child’s name. The same size and kind of plates, bowls, and cups were used for every session. Before each session, scales were checked to ensure consistency of plate, bowl, and cup weights. At the start of each session, new containers of beverages were used with participants. The same utensils were used for each session for each individual food to ensure consistency when portioning foods. All food items were individually weighed and a sum of each food weight was completed according to if a participant took the same food more than once. Waste was tracked for each participant at the completion of each meal session. Once participant’s added spaghetti and sauce with meatballs to their plate, waste left on the
plate could not be distinguished between food items when weighed. All waste was compiled together if left on the plate, bowl, or cup and weighed individually by.

Parental consent and child assent forms were obtained from each parent before each child participated in the study. Kent State University’s Review Board approved the study before proceeding with collecting data.

**Session I**

Parents and children were asked to attend together at two different sessions to complete the research. Each time the participants were offered the same meal between 4:30-7:30pm. Each child and parent were randomly assigned to start one of two different sessions. At Session I, each child was present in the room with their parent while the child and parent together self-selected food at the same time. All parents/children that self-selected food together with their parent present then ate within the same room.

**Session II**

Session II had the child self-selecting their own food absent from their parent. Each parent and child self-selected their food alone without the other person present to ensure consistency. Children that self-selected food without a parent present were put into room together to eat with other children that self-selected by themselves and the same for parents that self-selected their food absent from their child were put into a room together to eat separate from their child. Before eating, all participants were reminded that they were allowed to take as much food as they liked at any time during the study.

At the conclusion of Session II, children and parents were given the opportunity
to be mailed the findings of the research if they would like that information. Parents and children that completed both research sessions were put into a raffle for prizes that included gift cards to local stores.

*Data Analysis*

The dependent variables were the presence of the parent or child in the room when self-selecting food. Independent variables were the food selection and portion size of each food selected. Data were assessed using SPSS. ANOVA was used to assess differences between child BMI, child gender compared with whether or not the parent was present in the room with the child or not. For all statistical tests, p-values were set at $p \leq 0.05$. 
CHAPTER IV

JOURNAL ARTICLE

Introduction

Childhood overweight has become a major health concern in the United States. "Approximately nine million children over the age of six years are considered overweight, defined as BMI greater than the 95th percentile on the Center for Disease Control and Prevention (CDC) growth charts" (Centers for Disease Control and Prevention, n.d.). In a study assessing child and adolescent BMI-for-age growth charts, Ogden, Carroll, & Flegal (2008) found that in the years from 2003-2006, 11.3% of children and adolescents age 2-19 years old were at or above the 97th percentile while 16.3% were at or above the 95th percentile, and 31.9% were at or above the 85th percentile. Childhood overweight is a multi-faceted problem in the United States that has grown in prevalence. Nutrition is key in preventing the continual growth in numbers of children classified as overweight or obese.

Childhood overweight has many different factors contributing to the increase in prevalence such as foods made accessible and available to children and adolescents (Birch, 1999). Parent’s role modeling food preferences and the way that parents interact with their child while eating could influence their child’s reaction to food preferences.

Birch (1999) found that the earlier the exposure that children have to fruits and vegetables, and to foods high in energy, sugar, and fat that children have can play an important role in establishing a hierarchy of food preferences and food selection.
Birch (1999) concluded that young children's preferences for a food increases as exposure to the food increases. In a study of five to 11-year old children and their parents which assessed neophobic (rejection of new foods) responses to ten novel and ten familiar foods, researchers found that children's levels of neophobia was significantly related to parental neophobia (Sullivan & Birch, 1994). The role of the parent becomes critical because children may not be exposed to foods that parents do not like; thus, limiting the exposure of the child to trying different foods.

The effect of the reciprocal influence children and parents have on each others self-selection of food and portions has not been widely studied. One previous study looked at the influence of parents being in the laboratory with their children while self-selecting a portion of their own food (Laessle et al., 2001). Differences in eating style between normal weight and overweight preadolescents emerged only when a parent (the mother) was present during the experimental meal (Laessle et al., 2001). No research has been completed with respect to children and parents influence on each others' self-selection of foods and portion sizes by their presence in the room.

The purpose of this study was to determine if there were differences in the portion sizes of food self-selected by the same group of children and parents, in the presence of each other during one session with and without the presence of each other in a second session during food selection.
Methods

Participants

A total of 18 participants were recruited for the study through two different community nutrition education program sponsored by Kent State University. Subjects were males and females ranging in age between 8 and 11 years old. Children who participated in the program were also asked to have a parent present with them for the study. A total of six male and twelve female children and their parents were included in the study.

Measurements

Height and weight for each child participant was taken during the first session to classify them into BMI groups. SECA freestanding stadiometer model 214 and model 882 SECA digital scale were used to take height and weight. Strict confidentiality of each child’s height and weight was taken into account to avoid embarrassment by any child. Children were classified into BMI classifications based on Center for Disease Control (CDC) growth charts (Centers for Disease Control and Prevention, n.d.). Children with a BMI greater than the 95th percentile were considered overweight. Children with a BMI ≥ 85th percentile but < 95th percentile were considered at risk for overweight and children that were < 85th percentile were considered normal weight. Parents were classified according to their child’s BMI classification and gender. For example, if a child was classified as normal weight and female, the parent data was also classified as a female normal weight child.
Procedures

The children and parents were asked to eat the same meal on two separate occasions. The meal consisted of salad with choice of ranch or Italian dressing, spaghetti and meatballs with marinara sauce as the main dish, vanilla ice cream for dessert, and choice of skim-milk, coke, diet coke, sprite or water as their beverage. Children and parents were asked to fast for four hours before coming to the study so they would be hungry. They were able to self-select from any or all of the food offered during the study time for their meal. Each food item was offered to parents and children as separate entities so that they could portion what they wanted of each constituent on their plates. Escali digital food scale model 136DK was used to weigh food items. Before each food item was portioned, the food scale was tared to accurately record the weight of each food item. For example if a child portioned plain spaghetti on their plate, it was placed on the scale and measured, and the scale was tared before each new food item was added.

The same size and kind of plates, bowls, and cups were used for every session. Before each session scales were checked to ensure consistency of plate, bowl, and cup weights. At the start of each session new containers of beverages were used with participants. The same utensils were used for each session for each individual food to ensure consistency when portioning foods. All food items were individually weighed and a sum of each food weight was completed according to if a participant took the same food more than once. Waste was tracked for each participant at the completion of each meal session. Once participant’s added spaghetti and sauce with meatballs to their plate, waste left on the plate could not be distinguished between food items when weighed. All waste was compiled together if left on the plate, bowl, or cup and weighed individually by.
Parental consent and child assent forms were obtained from each parent and child who participated in the study. Kent State University’s Institutional Review Board approved this study before proceeding with collecting data.

Parents and children were asked to attend together at two different sessions to complete the research. Each time the participants were offered the same meal between 4:30pm and 7:30pm. Each child and parent was randomly assigned to start one of two different sessions.

Session I

For session I, each child was present in the room with their parent while the child and parent together self-selected food at the same time. All parents/children that self-selected food together then ate their meal together in the same room.

Session II

Session II had the child self-selecting their own food absent from their parent. Each parent and child self-selected their food alone without the other person present to ensure consistency. Children that self-selected food without a parent present were put into a room together with other children that self-selected by themselves and the same for parents that self-selected their food absent from their child were put into a room together to eat separate from their children. Before eating all participants were reminded that they were allowed to take as much food as they liked at any time during the study.

Session I and II were counterbalanced between each session. Subjects were randomly selected into each trial prior to their first session.
Data Analysis

The dependent variables were the presence of the parent or child in the room when self-selecting food. Independent variables were the food selection and portion size of each food selected. Data were assessed using SPSS. ANOVA was used to assess differences between child BMI, child gender compared with whether or not the parent was present in the room with the child or not. For all statistical tests, p-values were set at p≤0.05.

Results

Comparisons were made with respect to BMI classification, gender, and time (present or absent with a parent while self-selecting food). Each individual food item was recorded for both child and parent. Results were broken into each individual food category and analyzed to determine statistical significance with respect to selections made by both parent and child. Three children and their parents were excluded from the study due to completing one session of data collection. Table 3 depicts child and parent demographics.
Table 3: Child and Parent Demographics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Male Children</td>
<td>5</td>
</tr>
<tr>
<td>Total Female Children</td>
<td>13</td>
</tr>
<tr>
<td>Male</td>
<td>2</td>
</tr>
<tr>
<td>Female</td>
<td>4</td>
</tr>
<tr>
<td>Total Normal Weight Children</td>
<td>6</td>
</tr>
<tr>
<td>Male</td>
<td>3</td>
</tr>
<tr>
<td>Female</td>
<td>9</td>
</tr>
<tr>
<td>Total Overweight Children</td>
<td>12</td>
</tr>
<tr>
<td>Mother</td>
<td>16</td>
</tr>
<tr>
<td>Father</td>
<td>4</td>
</tr>
<tr>
<td>Total Parents</td>
<td>20</td>
</tr>
</tbody>
</table>

*Differences in Self-Selection in Children*

Overall for children, spaghetti weight, sauce weight, salad weight, and dressing weight were not found to have significant differences in weight of food portioned when their parent was present or absent in the room (p>0.05).

Figure 1 illustrates a significant interaction between weight status and condition (p= 0.05) for meatball weight between children when their parents were present versus absent. (means±standard deviations: normal weight child with parent present = 5.03±4.73, overweight child with parent present=6.13±4.21, normal weight child with parent absent=7.89±4.69, overweight child with parent absent=4.46±4.12 ).
Figure 1: Interaction between Weight Status and Condition for Meatball Weight in Ounces for Children (p=0.05)

Figure 2 demonstrates a main effect for drink weight between child gender (p=0.05) and weight status (p=0.05) (means± standard deviations: normal weight child =10.53±1.34, overweight child=6.92±0.95, male child=10.45±1.34, female child=7.00±0.95).

Figure 2: Main Effect for Mean Drink Weight in Ounces by Gender (p=0.05) and Weight Status (p=0.05) in Children

* Like letters denote significant differences p≤0.05.
Figure 3 illustrates a significant interaction between weight status and condition (p=0.02) for ice cream weight between children when their parents were present versus absent (means±standard deviation: normal weight child with parent present=1.85±0.48, overweight child with parent present=2.86±0.34, normal weight child with parent absent=3.12±0.63, overweight child with parent absent=2.07±0.45).

Figure 3: Interaction between Weight Status and Condition for Ice Cream Weight in Ounces for Children (p=0.02)

*Gender differences in self-selection by children.*

Figure 4 demonstrates a main effect (p=0.04) for meatball weight between child gender (means±standard deviations: male child= 8.74±1.55, female child= 4.45±1.09).
Figure 4: Differences in Mean Meatball Weight in Ounces with Respect to Gender in Children (p=0.04)

*D Denotes Significance.

Differences in Parent Self-Selection

Differences in Self-Selection of Parents Based on Child Weight Classification

No significance was found for salad weight with respect to parents in the presence of their child while self-selecting their food.

Table 4 demonstrates significant interaction between condition by child’s BMI classification and child’s gender (p=0.02) for salad dressing weight.
Table 4: Interaction between Condition by Child’s Weight Status and Gender for Parent Salad Dressing Weight in Ounces (p=0.02)

<table>
<thead>
<tr>
<th>Trial</th>
<th>Child’s BMI Classification</th>
<th>Parent Based on Child Gender</th>
<th>Mean Salad Dressing Weight in Ounces</th>
<th>Standard Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Present</td>
<td>Normal</td>
<td>Male Female Total</td>
<td>0.90 1.12 1.06</td>
<td>0.28 0.17 0.21</td>
<td>2 6 8</td>
</tr>
<tr>
<td>Child Present</td>
<td>Overweight</td>
<td>Male Female Total</td>
<td>0.45 0.94 0.78</td>
<td>0.31 0.32 0.39</td>
<td>4 8 12</td>
</tr>
<tr>
<td>Child Present</td>
<td>Total</td>
<td>Male Female Total</td>
<td>0.60 1.01 0.89</td>
<td>0.36 0.28 0.35</td>
<td>6 14 20</td>
</tr>
<tr>
<td>Child Absent</td>
<td>Normal</td>
<td>Male Female Total</td>
<td>1.00 0.93 0.95</td>
<td>0.28 0.16 0.18</td>
<td>2 6 8</td>
</tr>
<tr>
<td>Child Absent</td>
<td>Overweight</td>
<td>Male Female Total</td>
<td>0.54 0.96 0.82</td>
<td>0.37 0.30 0.37</td>
<td>4 8 12</td>
</tr>
<tr>
<td>Child Absent</td>
<td>Total</td>
<td>Male Female Total</td>
<td>0.69 0.95 0.87</td>
<td>0.39 0.25 0.31</td>
<td>6 14 20</td>
</tr>
</tbody>
</table>

*Classification of overweight children is ≥ 85th percentile on CDC BMI-for-age growth charts. Classification of normal weight children is >5th but < 85th percentile on CDC BMI-for-age growth charts (Appendix A).

Figure 5 illustrates an interaction for parents between child’s weight status and gender (p=0.03) for spaghetti weight (means±standard deviations: parent of normal weight male=6.78±0.90, parent of normal weight female=4.41±0.52, parent of overweight male=3.91±0.64, parent of overweight female=4.73±0.45).
Figure 5: Interaction for Parents between Child’s Weight Status and Gender for Mean Spaghetti Weight in Ounces (p=0.03)

Figure 6 demonstrates a main effect for sauce weight (p=0.04) between parents based on weight status of their child (mean±standard deviation: parent of normal weight child =3.89±0.30, parent of overweight child=3.05±0.22).
Figure 6: Main Effect for Parents between Child’s Weight Status and Mean Spaghetti Sauce Weight in Ounces (p=0.04)

*Denotes Significance.

Figure 7 illustrates a main effect (p=0.04) for meatball weight for parents based on their child’s weight status (means±standard deviations: parent of normal weight child=8.04±1.06, parent of overweight child=5.01±0.79).

Figure 7: Main Effect for Parents Based on Child Weight Status in Mean Meatball Weight in Ounces (p=0.04)

*Denotes Significance.
Differences in Parent Self-Selection Based on Child Gender

No significance was found for parent drink weight and spaghetti weight. Figure 8 demonstrates a main effect for dressing weight \((p=0.04)\) between parents based on their child’s gender and weight status \((\text{means} \pm \text{standard deviations}: \text{parent of male child} = 0.72 \pm 0.10, \text{parent of female child} = 0.99 \pm 0.06, \text{parent of normal weight child} = 0.99 \pm 0.09, \text{parent of overweight child} = 0.72 \pm 0.07)\).

Figure 8: Main Effect for Parents with Respect to Child Gender and Child Weight Status for Mean Dressing Weight in Ounces \((p=0.04)\)

\* Like letters denote significant differences \(p \leq 0.05\).

Differences in Plate Waste of Children

Differences in Plate Waste of Children Based on Weight Status and Gender

Overall for children no significant differences were found for spaghetti weight and salad weight \((p>0.05)\).

Figure 9 illustrates a main effect for drink weight wasted \((p=0.01)\) by child weight
status (means±standard deviation: normal weight child=1.72±0.43, overweight child=0.21±0.30).

Figure 9: Main Effect for Mean Drink Weight Wasted in Ounces by Weight Status in Children (p=0.01)

*Denotes Significance.

Figure 10 demonstrates a main effect for mean ice cream weight wasted (p=0.00) between child gender and weight status (means and standard deviation for: male normal weight child=2.95±0.49, male overweight child=0.15±0.35, female normal weight child=0.00±0.35, female overweight child=0.13±0.24).
Figure 10: Main Effect for Mean Ice Cream Weight in Ounces Wasted by Gender and Weight Status for Children (p=0.00)

* Like letters denote significant differences p≤0.05.

Table 5 illustrates a significant interaction between condition and child weight status and gender (p=0.00) for ice cream weight wasted in ounces by children.
Table 5: Interaction between Condition by Child Weight Status and Child Gender for Mean Ice Cream Weight Wasted in Ounces for Children (p=0.00)

<table>
<thead>
<tr>
<th>Trial</th>
<th>Gender</th>
<th>BMI Classification</th>
<th>Mean Ice Cream Weight Wasted in Ounces</th>
<th>Standard Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Present with Parent</td>
<td>Male</td>
<td>Normal</td>
<td>0.85</td>
<td>1.20</td>
<td>2</td>
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<tr>
<td></td>
<td></td>
<td>Overweight</td>
<td>0.30</td>
<td>0.60</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>0.48</td>
<td>0.77</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>Normal</td>
<td>0.00</td>
<td>0.00</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Overweight</td>
<td>0.26</td>
<td>0.74</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
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<td>12</td>
</tr>
<tr>
<td>Child Present with Parent</td>
<td>Total</td>
<td>Normal</td>
<td>0.28</td>
<td>0.69</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Overweight</td>
<td>0.28</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>0.28</td>
<td>0.66</td>
<td>18</td>
</tr>
<tr>
<td>Child Absent From Parent</td>
<td>Male</td>
<td>Normal</td>
<td>5.05</td>
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<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Overweight</td>
<td>0.00</td>
<td>0.00</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
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<td>3.03</td>
<td>6</td>
</tr>
<tr>
<td>Child Absent From Parent</td>
<td>Female</td>
<td>Normal</td>
<td>0.00</td>
<td>0.00</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Overweight</td>
<td>0.00</td>
<td>0.00</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>0.00</td>
<td>0.00</td>
<td>12</td>
</tr>
<tr>
<td>Child Absent From Parent</td>
<td>Total</td>
<td>Normal</td>
<td>1.68</td>
<td>3.03</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Overweight</td>
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<td>0.00</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>0.56</td>
<td>1.84</td>
<td>18</td>
</tr>
</tbody>
</table>

* Classification of overweight children = ≥ 85th percentile on CDC BMI-for-age growth charts. Classification of normal weight children = >5th but < 85th percentile on CDC BMI-for-age growth charts (Appendix A).

**Differences in Plate Waste of Parents**

Overall, parents’ plate waste was not found to be significantly different in the weight of food portioned (p>0.05).

**Summary of Results**

Normal weight children portioned a greater weight of food than overweight children when the parent was absent from the child. Normal weight children portioned less food when their parent was present with the child. Overweight children portioned less food when their parent was absent from them when self-selecting their food than
when the parent was present with the child. Parent’s food self-selection was affected by the child being present or absent in the room with the parent. Parents of normal weight children portioned a greater weight of food than parents of overweight children. Normal weight children had greater weight of plate waste than overweight children. Overall parent plate waste was not significantly different.

Discussion

*Differences in Self-Selection in Children*

The current study examined the dietary relationship between the presence of the parent and child influencing each other when self-selecting food. There was a significant interaction in meatball weight and whether or not the parent was present in the room with the child. Normal weight children self-selected a greater amount of meatballs while they were self-selecting food when they were absent from their parent. The results from this finding suggest that normal weight children may in the presence of their parent be responding to feelings of pressure when self-selecting their foods. The findings from the current study correspond with research related to feelings of restriction according to child weight status. Sprujiit-Metz and colleagues (2002) found that “mothers pressured their thinner children to eat, whereas they are concerned about their heavier children”. Normal weight children may have felt greater pressure in their food selection when their parent was present with them in the room while selecting their foods. This feeling of pressure could have prompted a restriction of portion sizes of foods when a parent was present. However when normal weight children self-selected food without their parent present they felt less pressure to eat and in turn selected greater ounces of meatballs in the
absence of their parent.

Birch, Fisher, Grimm-Thomas, Markey, Sawyer, & Johnson (2001) studied parental concern about their child’s weight status using the Child Frequency Questionnaire and found that “parents of heavier children reported using less pressure to eat and greater use of restriction of the child’s access to foods”. Birch and colleagues findings are similar to that found in this current research that overweight children self-selected smaller portions of food when their parent was absent from them. This finding could be attributed to the overweight child feeling their parents’ presence and restriction of food regardless of the parent being present or absent during the food selection process.

Parental concern related to food self-selection of overweight children also may be contributing to greater amount of food selected when parents were present with overweight children. Laesalle et. al (2001) studied whether parents influence their child’s eating habits and found that differences in eating styles was present with overweight children eating in the presence of their parent. In contrast, this study found that normal weight children consistently over portion themselves food even when the parent was present in the same room with the child while self-selecting their food. In another study done by Mirch, M.C., McDuffie, J.R., & Yanovski, S.Z., (2006) researchers looked at binge eating habits in overweight children between the ages of six and twelve. The children in the study were given the opportunity to eat all they wanted at a lunch buffet on two different occasions. Children who were classified as binge eaters reported a greater desire to eat, consumed a greater amount of food, and were hungrier sooner after eating than those who were not classified as binge eaters. A limitation in this study was that only overweight children were included in the research. In contrast to the findings by
Mirch and colleagues, the current research found that normal weight children consistently over portioned and selected food as opposed to overweight children found in Mirch’s study. Normal weight children portioning greater weight of food than overweight children is concerning as research related to obesity prevention has not focused greatly on normal weight children. This research finding indicates that more obesity prevention and education should be focused on not only overweight children but also normal weight children and their parents.

Gender also had an impact on the amount of food that children self-selected. Male children who self-selected present with their parent in the same room portioned 3.5 ounces more of meatballs than females present with their parents self-selecting their food. Male children who self-selected food absent from their parents portioned 3.4 ounces more of meatballs than females absent from their parent. Overall, male children portioned a greater weight of meatballs than female children. The findings from this study correspond with research concerning male children’s selection of greater amount of meat than females. Fisher & Birch (1999) looked at parental restriction associated with gender differences in food self-selection and concluded that “in the eating domain, parents may report similar levels of restriction for boys and girls, but may allow boys to take more initiative and make more choices than girls”. The findings from Fisher & Birch correlate with the findings from this study and demonstrate that males were allowed more choice in portioning greater weight in meatballs than females. However, total number of females in this current study outnumbered males, 13 to 5 respectively.

Parental restriction with respect to gender and whether the parent is present in the room or not could be influencing the food self-selection of female children. The male
children may feel less restricted even when the parent is present with them self-selecting food and portion greater amount of food. Female children may feel restricted by their parent regardless of if the parent is present with them during food selection.

Another explanation for differences between genders could be external cues from parents contributing to the food self-selection of foods by children. Encouraging or discouraging certain foods could lead to greater or lesser food self-selection. Research studying the relationship between parents and children found that “force-feeding type practices push children to eat even if they are not hungry, and food-trading practices use larger amounts of high calorie items (e.g. bowl of ice cream) to entice children to take smaller amounts of parent-preferred food items (e.g. three bites of broccoli)” (Brewis & Gartin, 2006). During the current investigation parents who were present with female children could be heard encouraging them to have meatballs with their meal which could be contributing to the finding that female children tend not to select meat but that meatballs are encouraged by parents for their children as a meat selection in the lab setting. This could also be attributed to a limitation between food self-selection in a lab setting and food selection in the home environment. In research assessing female food choices from “1994 to 1996 only 22% of girls consumed the number of servings of meat and meat alternatives” from the Food Guide Pyramid (Wilkinson-Enns, Mickle, & Goldman, 2003). Female children on average are not consuming the number of servings daily of meat. In the home environment, parents may be pressuring or restricting female children to eat meat servings and therefore in the current study food selection of meatballs clearly demonstrates that in the home environment females select less meat than male children. More research is needed to determine if this is truly a trend of female
children with regard to meat selection.

Overall, both normal weight and overweight children portioned themselves more of their beverage when their parent was absent from them. Normal weight children portioned themselves 1.00 ounce more of their drink when their parent was not present in the room with them self-selecting their drink with them. Overweight children also portioned themselves greater ounces of beverage when their parent was absent from the room (1.42 ounces more) when they self-selected. The current findings are similar to those found by Mrdjenovic and colleagues (2003) who observed and measured food intake by children between the ages of six and thirteen years old in a camp setting and they found that consumption of sweetened drinks increased the child’s total daily energy intake. However, when amount of drink waste was compared with the amount of drink self-selected by the child, differences occurred. Normal weight children portioned more for their beverage but wasted more of their beverage than overweight children did. Gender differences were apparent also. Male children portioned themselves more beverage overall than females. Male children portioned the greatest amount of beverage when their parent was absent from the room, an average of 10.83 ounces of beverage. In research looking at eating habits, Tippet & Cleveland (1999) found that about 40% of added sugars in the diet are derived from soda consumption. They also stated that soda consumption has increased by 131% between the 1970’s and the mid 1990’s. Over portioning beverages high in sugar with children can contribute to increased energy intake and over a prolonged period of time can contribute to weight gain.

Normal weight children selected a greater weight of ice cream when their parents were absent from the room as opposed to when normal weight parents were present with
their child. In contrast, overweight children selected a greater weight of ice cream when they were in the presence of their parent when self-selecting their own food than when they were absent from their parent. Johnson & Birch (1994) found that differences occurred with children and regulating their own food intake when related to the child’s body fat stores. They concluded that “children who failed to adjust energy intake in response to alterations in caloric density had greater body fat stores”. In contrast to the findings by Johnson & Birch which focused on child intake and weight status, the current study found that normal weight children selected and portioned greater amount of ice cream than overweight children. This finding could be attributed to overweight children having greater control over their ability to recognize they were full and stop eating the ice cream in the current study.

Normal weight children selected and over portioned ice cream thus resulting in greater amount of plate waste. This finding further contradicts Johnson & Birch’s findings that overweight children have less control over their intake. In the current study, normal weight children over-portioned their food selection and thus left a greater amount of waste. Therefore, the current study found that normal weight children have less control over their portion then their overweight counterparts.

Presence of the parent in the room with the child could be encouraging or discouraging the child to portion more or less of the ice cream for themselves. Normal weight children had greater amount of plate waste when their parent was present with them in the same room while they self-selected their food. These findings are similar to research done by Laesalle et. al (2001) looking at whether parents influence their child’s eating habits and they found that differences in eating styles was present with overweight
children eating in the presence of their parent. Ice cream intake related to BMI could be contributing to “children with a higher BMI consumed portions of foods that were as much as 100% larger than those consumed by children with a lower BMI” (McConahy, Smiciklas-Wright, Birch, Mitchell & Picciano, 2002). Ice cream intake of children and adolescents could be contributing to the overweight and obese population in children and adolescents. The findings from this study indicate that normal weight children are self-selecting and portioning greater amounts of ice cream whether their parent is present with them in the room or not. When overweight children were alone from their parents self-selecting ice cream they portioned a smaller amount of ice cream than when they were with their parents. This indicates the influence that parents have over their child’s food preferences and portion sizes.

Differences in Self-Selection of Parents

Overall, the parents of male overweight children ate less both when they were present with their child self-selecting food and absent from their child self-selecting food. The parents of male normal weight children portioned themselves a greater amount of food when their child was present with them in the same room while they were self-selecting food together.

Parents of normal weight children self-selected a greater amount of salad dressing than parents of overweight children. Rolls, Roe, and Meengs (2004) completed research looking at whether varying portion sizes of first course salad had an effect on lunch intake. They found that “compared to having no first course, consuming the salad reduced meal intake by 7% for the small portion and 12% for the large portion”. The
parents of normal weight children portioned a greater amount of salad dressing when their child was present with them self-selecting their own foods. Parents of female children portioned greater amount of salad dressing than parents of male children. “Discretionary fat intake accounted for 25% of calories for girls and 26% for boys” when assessing diet quality from the Food Guide Pyramid from 1994 to 1996 (Wilkinson-Enns, Mickle, & Goldman, 2003). Parents portioning of greater amounts of salad dressing could be contributing to their children portioning greater amounts of dressing and calories coming from fat in the diet. When compared to the diet as a whole, discretionary fat for children and adolescents needs to be assessed for portions as it could be contributing to obesity in children from excess caloric intake.

Parents of normal weight children portioned themselves a larger amount of sauce when they were present with their child self-selecting their own foods together. Parents of normal weight children portioned themselves a larger quantity of meatballs when their child was absent from them when they were self-selecting their foods. Parents of male normal weight children portioned themselves greater ounces of spaghetti portions than parents of male overweight children. This difference could be contributed to the child influencing the food choice preferences of their parents. Parents could be limiting or restricting the portions of meatballs for their child normally during meals in the home environment which could promote this finding in the current research. Similar findings from Johnson & Birch (1994) concluded that “parents who exerted more control over their children’s food intake had children who showed less responsiveness to the caloric density of the diet”. When parents were absent from the child to limit the portion of meatballs, normal weight children portioned a greater amount of meatballs. Parents
portioning greater amount of meatballs when their child was absent from them could indicate that parents tend to model food restrictions in the presence of their children during meals.

There is some research that indicates that children may be influenced by role models, specifically, parents or peers. Harper & Sanders (1975) found that “foods that mothers eat (and hence model eating) appear to provide a particularly powerful influence in shaping children’s food preferences”. Parents of normal weight children could be modeling behavior in food self-selection that over portions selections of foods in the home environment. The role modeling behavior could be influencing the child’s food selection when the parent is present or not. Parents of normal weight children and their children both selected greater portions of food overall then parents of overweight children and overweight children. This finding could be attributed to role modeling of the parents in the home environment along with the weight status of the child influencing the role modeling behavior of the parents. Parents of normal weight children may have felt they needed to over-portion their plate with food from concern over their thinner child needing to eat more. This behavior could have been modeled by the normal weight children and therefore, they self-selected greater portions of food with or without the parent present in the room. Parents of overweight children modeled a restrictive behavior for food self-selection. Parents of overweight children selected less food (in ounces) then parents of normal weight children. This could explain why overweight children continually selected less amount of food in ounces then their normal weight counterparts.
Differences in Plate Waste

Differences in Plate Waste for Children

Overall, this study found that plate waste for children was dependent on whether or not the parent was present in the room or not. Male and female children wasted fewer ounces of ice cream when their parents were present in the room with them while they were self-selecting and eating their meal. This finding supports evidence that Birch (1999) found that parental control over what their child consumes may have negative effects on the quality of the child’s diet. The food items that were the highest in sugar, fat, and calories were the items that the children were self-selecting more from. Males had higher amounts of ice cream waste than females. Males portioned themselves greater amounts of ice cream when their parents were absent from the room with them while they were self-selecting their foods. However, males also had a greater amount of ice cream waste. Females wasted less ice cream when their parent was present with them as opposed to when they were self-selecting absent from their parent. This finding is similar to that of findings from Fisher & Birch (2000), who found that parents restrictions on their daughters related to food choice may actually make the girls feel they have expectations to limit their intake of the restricted foods. If this trend continues it could lead children that were in the normal weight group to be at risk for overweight if they continue to self-select foods high in fat, sugar, and calories when their parents are not around them to monitor what foods they are choosing. Serdula and colleagues (1993) concluded that epidemiologic studies have found that “among obese preschool children, 26 to 41% were found to be obese as adults, and among obese school-age children, 42 to 63% were obese as adults”. This is concerning due to the number of children and
adolescents that are at risk for or considered overweight in the United States population. Education on healthy eating is crucial in the fight against childhood overweight.

* Differences in Plate Waste for Parents*

Overall, for parents plate waste was not found to be significantly different in the weight of food portioned. This could be contributed to the parents feeling that they need to role model behavior of only taking what they can finish for their meal.

* Implications*

This study collected data in a unique manner. Not many studies have looked at whether mothers and fathers influence the food choices and food intake of children when they are in the presence of their parent. This study also included fathers in the definition of parents which is unique to other studies looking at if presence of a parent influences the child during a meal. There are no studies that specifically include fathers only in their research and very few that involve fathers as influential figures in food preferences with children. This study also takes into account differences within child gender with respect to food preferences.

Parent's data was collected to determine influence on their child when present in the room which has not been studied extensively. More research is needed to fully determine if there is a link between parent and child food preferences with respect to child and parent BMI classifications.

A major finding from this study is that parents and children do influence each other when self-selecting portions of foods. Education about healthy food choices and
portion sizes for foods is needed for children and adults with respect to the Food Guide Pyramid. Through better education parents and children can make healthier food choices and minimize the amount of high fat sugary foods in their diets.

Limitations

Participants for the study were only recruited from two different nutrition education programs which could influence their food choices as they were educated about making healthy food choices. The findings of this study cannot be generalized due to the low sample size of participants. In addition, there were unequal numbers of male and female children as well as unequal numbers of normal weight versus overweight children participating in the study. The same parent was asked to attend both sessions with each child but some parents alternated sessions between mother and father. This could have led to inconsistencies in influence between parents on the child. Children and parents may not have taken all foods and amounts that they wanted due to eating the meal in the lab-setting. Also, children and parents were asked to fast for four hours prior to the study but if they did not, this could have influenced the amount of food that was taken during the study. Participants’ plates were weighed in front of them after every new food item was placed on it which could have limited the amount taken. However, participants did not seem to mind having their food weighed as they felt comfortable around the researchers due to the participants already taking part in other nutrition programs with the researchers. Some children were using attention deficit disorder medications which can alter appetite. If the medication was taken the day of the study, this could also influence the amount of food portioned.
Counterbalancing between each session was done to ensure consistency within the research. Before each session plates, bowls, and cups were weighed to ensure scale consistency and the same size and kind of plates, bowls, and cups were offered to participants each session. At the start of each session new containers of beverages were used with participants so as to not influence them by thinking there was not enough of a beverage. The same utensils were used for each session for each individual food to ensure consistency when portioning foods. All food items were individually weighed and a sum of each food weight was completed according to if a participant took the same food more than once. Waste was tracked for each participant at the completion of each meal session. Once participant’s added spaghetti and sauce with meatballs to their plate, waste left on the plate could not be distinguished between food items when weighed. All waste was weighed according to what it was left on the plate, bowl, or cup.

**Conclusion**

In conclusion, the findings from this research concluded that presence of the parent does influence food selection of children. The child’s weight status and gender also influenced the child’s food self-selection when the parent was present. This could be attributed to parental restriction of certain foods and portions of those foods with children. The same happened with parents self-selecting with their child in the room with them. Parents were influenced by the child’s presence during food selection. Parental food selection was influenced by the weight status and gender of their child. Little literature exists studying parental influence on child food self-selection. Future research needs to explore parental influence on child food selection and portion sizes. Education about nutrition could be more effective if researchers determine what influences the food
choices of children and parents and therefore prevent childhood obesity.
APPENDIX A
Body mass index-for-age percentiles: Girls, 2 to 20 years
Child’s Name: ____________________________

Parent’s Name: ____________________________

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<th>DOB</th>
<th>Ht</th>
<th>Wt</th>
<th>BMI /Percentile</th>
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</thead>
<tbody>
<tr>
<td>Child</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Salad (g)</th>
<th>Spaghetti (g)</th>
<th>Spaghetti Sauce (g)</th>
<th>Meatballs (g)</th>
<th>Drink (oz)</th>
<th>Ice Cream (c)</th>
<th>Food Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child</td>
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<tr>
<td>Parent</td>
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</tbody>
</table>

Drink Choice:  
- Water____  
- FF Milk____  
- Diet Coke____  
- Coke____  
- Sprite____  
- Kool-Aid____  

Salad Dressing:  
- Italian____  
- Ranch____  

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Dear Parent or Guardian,

Hi my name is Samantha Wait and I am a graduate student from Kent State University. I am currently working on my Masters in Nutrition. In order to fulfill my requirements to receive my degree, I must complete a research project. I would like to do research on food selection. I want to do this because I want to learn more about eating habits of parents and children. I would like you and your child to participate in this project. If you decide to do this, you and your child will be asked to participate in eating a meal prepared for you on two different days from 4:30-7:30pm. Observers will be in the classroom measuring food weight and recording what types of foods are selected from the meal provided for you both. The meal will consist of spaghetti and meatballs, salad, dessert, and choice of drinks (milk, soda, or water). You and your child may be in separate rooms during food selection and meal time.

Taking part in this project is entirely up to you, and no one will hold it against you or your child if you decide not to do it. If you and your child do take part, either of you may stop at any time. (If you or your child decides not to participate in the study, a meal will still be offered to you and your child, unless otherwise requested).

If you want to know more about this research project, please call me at 330-571-4453 or my advisor, Natalie Caine-Bish at 330-672-2148. The project has been approved by Kent State University. If you have questions about Kent State University’s rules for research, please call Dr. John West, Vice President and Dean, Division of Research and Graduate Studies (Tel. 330-672-2704).

Please keep the attached copy of this consent form for your records.
Sincerely,

Samantha Wait

CONSENT STATEMENT
1. I agree to let myself and my child take part in this project. I know what he or she will have to do and that he or she can stop at any time.

____________________________  __________________
Signature                      Date

In order to protect your child from any harm, please answer the following question.

DO YOU OR YOUR CHILD HAVE ANY KNOWN FOOD ALLERGIES?  
YES  NO

IF YES, WHAT TYPE(S) OF FOOD(S) IS YOUR CHILD ALLERGIC TO?
Assent Form

Hi (child's name),

My name is ______ and we are conducting a study today. A meal will be provided for you to eat and we will be measuring your plate and cup. You will be allowed to eat as much or as little as you want. You will be asked to fill out a questionnaire at the end of the study. Do you want to participate in this study?

Yes                      No

Are you allergic to any type of foods?  Yes  No
If yes, what type of foods? ________________________________

Do you have any questions?
If you want to stop at any time just tell me.

Participants Signature ____________________________________________________________________

Witness Signature ________________________________________________________________________
REFERENCES


DiCarlo, S.E. (1998). Gastrointestinal Physiology, Northern Ohio Universities College of Medicine, Spring Term.


