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The Relationship Of Parental Barriers To Parents Feeding Their Children Health-Promoting, Functional Foods

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THE RELATIONSHIP OF PARENTAL BARRIERS TO PARENTS FEEDING THEIR CHILDREN HEALTH-PROMOTING, FUNCTIONAL FOODS

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ABSTRACT

Studies have discovered barriers that prevent parents from feeding children nutritiously. There is sparse information about whether parents intentionally feed their children functional foods, raising the question of whether there are barriers that inhibit parents when feeding their children nutritiously. This study of parents in two Mississippi school districts in 2015 (n=193) examined the barriers parents face to consuming health-promoting, functional foods as well as the relation of these barriers to feeding their children functional foods. The age group 45-54 was less likely to perceive taste as a barrier ($p<.05$)to consuming functional foods, while individuals with some college education ($p<.05$) and individuals with an associate degree ($p<.05$) were more likely to perceive taste as a barrier. Additionally, the age group 55+ was less likely to perceive availability of food as a barrier ($p<.01$). Lastly, the females were more likely than males to perceive knowledge as a barrier ; lack of knowledge of foods' health benefits was significant for the female gender ($p<.05$) to consuming functional foods. This study also found a significant relationship between parent's lack of knowledge of health-promoting foods when feeding their children functional foods for specific health benefits. The findings concluded that parents who perceived lack of knowledge as a barrier to consuming functional foods, were more likely to feed their children foods with health benefits for cancer prevention ($p<.01$), heart health ($p<.05$), and other health benefits ($p<.01$), while not for bone, digestive, and weight health. Further investigation showed that foods beneficial for cancer prevention, heart health, and other health benefits are among food items incorporated in children's diets through foods such as fruits, vegetables, fortified foods/beverages, etc.

DEDICATION

This thesis is dedicated to everyone who helped me through the process of completing this project and my own times of stress and anxiety. Without the support of family and friends, the completion of this project would not have been possible. In particular, I thank my husband, Kyle Thornton, for being a constant encourager and motivator.

LIST OF ABBREVIATIONS AND SYMBOLS

CDC Centers for Disease Control and Prevention

IFIC International Food Information Council

IRB Institutional Review Board

PTO Parent/Teacher Organization

SPSS Statistical Package for the Social Sciences

USDA United States Department of Agriculture

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CHAPTER I. INTRODUCTION

Introduction

Overweight and obesity in children is a growing epidemic in the United States. According to the Centers for Disease Control and Prevention (CDC) (2014), childhood obesity has more than doubled in children and quadrupled in adolescents in the past 30 years. In 2012, more than one third of children and adolescents were overweight or obese. Overweight is defined as having excess body weight for a particular height from fat, muscle, bone, water, or a combination of these factors (CDC, 2014). The cause of overweight and obesity is a caloric imbalance, which means more calories are consumed than are expended. Overweight and obesity can also be affected by genetic, behavioral, and environmental factors. There are also many health effects of childhood obesity including, but not limited to: cardiovascular disease, diabetes, bone and joint problems, sleep apnea, social and psychological problems, and stroke, cancer, and osteoarthritis later in life (CDC, 2014).

Due to the many health effects that childhood overweight and obesity produce, it is imperative that individuals focus on prevention of this issue. Healthy eating and physical activity can lower the chance of children becoming overweight or obese. Consumption of food is especially important when considering childhood overweight and obesity. Hayes (2014) states that the choices parents make when feeding their children can have a lifetime impact on their child's eating habits, health, and weight. Therefore, types of foods children eat and eating patterns of children are very important.

Specifically, functional foods have become an area of interest. The International Food Information Council (IFIC) defines functional foods as foods or dietary components that may

provide a health benefit beyond basic nutrition and may play a role in reducing or minimizing the risk of certain diseases and other health conditions. For example, dairy foods, such as milk, cheese, and yogurt provide calcium, which promotes bone health and reduces the risk of osteoporosis (IFIC, 2013). Foods such as these are essential to an individuals diet and can be very beneficial for children (Mayo Clinic, 2012). Sugary, calorie-dense, and nutrient-poor foods seem to be prominent in the American diet (Mayo Clinic, 2012). With a shift from this type of diet to a diet more rich in functional foods, children could gain multiple health benefits including benefits for cancer prevention, bone, heart, digestive, weight, and other health benefits (Mayo Clinic, 2012).

IFIC states that 90% of consumers agree that certain foods have health benefits beyond basic nutrition (IFIC, 2012). Additionally, consumers seem to be interested in learning more about functional foods, with nine in ten Americans showing interest (IFIC, 2012). Because parents/guardians are the main providers of food for most children (Vereecken, Keukelier, & Maes, 2004), it is crucial for them to understand the importance of feeding their children healthy foods and foods that provide health benefits, such as functional foods. Although many parents find importance in feeding their children healthy foods, there are many barriers associated with doing so (Chang, Nitzke, Guilford, Adair, & Hazard, 2008), in which this study sought to explore. The barriers supported by the literature include: expense of food (Baruth, Sharpe, Parra-Medina, & Wilcox, 2014; Bisogni, Jastran, Seligson & Thompson, 2012; Chang et al., 2008; Coe, 2013; Crockett and Sims, 1995), taste of food (Chang et al., 2008; James, 2004; Lloyd, Paisley, & Mela, 1995), availability of food (Bader, Purciel, Yousefzadeh, & Neckerman, 2010; Bisogni et al., 2012; Crockett and Sims, 1995; Martin et al., 2014), knowledge of foods' health benefits (Baruth et al., 2014; Bisogni et al., 2012; Coe, 2013; Crockett and Sims, 1995;

James, 2004), conflicting information about food (Bisogni et al., 2012; James, 2004; Nagler, 2014), uncertainty of how to prepare foods (Baruth et al., 2014; Bisogni et al., 2012), and lack of desire to try new foods (Bisogni et al., 2012; James, 2004).

Therefore, the purpose of this research study was to determine the barriers parents face to consuming health-promoting foods as well as their relationship to parent's feeding of functional foods to their children for specific health benefits related to barriers. The overarching research question guiding this project was: Is there a relationship between parental barriers to consuming health-promoting foods and parents feeding their children foods with health benefits beyond basic nutrition? Parental barriers to feeding their children functional foods, such as expense of food, taste of food, availability of food, knowledge of foods' health benefits, conflicting information about food, uncertainty of how to prepare foods, lack of desire to try new foods, and belief that their diet is already healthy were examined. By answering this question, the findings sought to provide insight into issues that inhibit parents from incorporating functional foods in their children's diets.

CHAPTER II. REVIEW OF LITERATURE

Review of Literature

There can be many barriers parents encounter when feeding children functional foods. The goal of this examination is to determine existing barriers that have been found through previous research, as well as examine any additional areas that need further investigation. Additionally, a goal is to contribute findings from the current research to further enhance the existing literature.

Expense of Food

One of the many barriers to feeding children functional foods includes the expense of food. According to the United States Census Bureau, the poverty rate for children under 18 was 19.9 percent in 2013, and the poverty rate for people aged 18 to 64 was 13.6 percent. In 2013 the average American family or individual spent 11.4 percent of their income on food purchases, and the food price inflation rates have been shown to increase on average about 2.6 percent per year (USDA). These statistics show that food expenses are substantial for many families. Because food is an essential part of life, it is important to understand how the expense of food can effect the purchasing of food, especially functional foods within the family.

Socio-economic status shows a direct correlation with the diets of adults. As a result, the diets of children are affected because children usually live with either a parent or guardian (Attorp et al., 2014). Therefore, parents' perceptions of how the expense of food influences their purchasing practices are major considerations. Coe (2013) stated that parents believe poverty to be the primary reason children suffer from food insecurity. Families living in poverty are at risk of hunger and suffer from food shortages (Crockett & Sims, 1995). There are many reasons socio-economic status and poverty influence the purchasing of food.

A large body of evidence suggests that parents believe higher quality diets result in higher expenses of food for the family (Aggarwal, Monsivais, Cook, & Drewnowski, 2011; Baruth et al., 2014; Bathgate & Begley, 2011; Bisogni et al., 2012; Chang et al., 2008; Omar, Coleman, & Hoerr, 2001; Walker & Cunningham, 2014). Diets rich in nutrients were perceived to be more expensive than diets poor in nutrients but rich in energy; diets higher in grains, sweets, and fats were less expensive per calorie than diets higher in fruits and vegetables (Aggarwal et al., 2011). This is a major barrier for parents when trying to buy healthy foods. Baruth et al. (2014) study of women about environmental barriers to healthy eating, found expense to be a major barrier, with many of the participants agreeing that they were faced with the decision to buy healthier, more expensive food, or cheaper, less healthy food to obtain greater quantities. Parents compromise on food selection based on the perceived high expense of healthy foods, and the child's food preferences, stating, "it would be a waste of money buying foods they (children) would not eat" (Bathgate & Begley, 2011). Many mothers stated that lack of money prohibited them from purchasing healthy foods, as they were perceived to be more expensive than less healthy foods (Bisogni et al., 2012; Chang et al., 2008; Omar, Coleman, & Hoerr, 2001).

Many of the studies list differences in food consumption between high- and low-socioeconomic groups. A number of studies noted that groups with lower socioeconomic status adopt a diet that conflicts with dietary recommendations, and groups with higher socioeconomic status have a diet more consistent with dietary guidelines (Rauber, Louzada, Feldens, & Vitolo, 2013; Shahar et al., 2005; Vereecken, Keukelier, & Maes, 2004). Lower socioeconomic groups

were found to consume more energy dense and nutrient poor diets (Aggarwal et al., 2011). Further, higher-income parents were found to have good access to fruits and vegetables, while lower-income parents did not (Attorp et al., 2014). In addition, parents with higher incomes spent more money on food, and justified spending more money on healthier foods due to the belief that what their children were eating was more important than the expense (Aggarwal et al., 2011; Bathgate & Begley, 2011).

Lastly, expense of food can fluctuate based on location. Researchers reported that in rural areas, people relied on small- to medium-sized grocery stores, which resulted in higher food expenses when compared to supermarkets (Crockett& Sims, 1995; James, 2004). Another study showed that although lower income individuals did not show concern for lack of healthy food alternatives in the grocery store, they did identify price as an issue (Walker & Cunningham, 2014); if individuals cannot afford to purchase healthy items in the smaller grocery stores, then availability is irrelevant. Expense of food is an important factor when considering diet quality.

Taste of Food

Taste of food is another barrier to consider when feeding children functional foods. Although there is limited information in the literature regarding taste as a barrier, most articles mention the idea that taste is one of the most frequently seen barriers to eating healthy foods (Chang et al., 2008; Eikenberry & Smith, 2004; Glanz, Basil, Maibach, Goldberg, & Snyder, 1998; Hartman, Wadsworth, Penny, Assema, & Page, 2013; James, 2004; Lloyd, Paisley, & Mela, 1995; Nuss, Clarke, Klohe-Lehman, & Freeland-Graves, 2006). Chang et al. (2008) concluded that the individuals surveyed in their study were unfavorable of healthier items such as low-fat foods. Additional studies agreed with this conclusion stating that healthier foods seemed to decrease in tastiness (James, 2004; Lloyd, Paisley & Mela, 1995). Other studies

highlighted the idea that taste is the most important factor when consuming foods, and "being picky" is a situation some individuals face (Eikenberry, & Smith, 2004; Nuss et al., 2006). Glanz et al. (1998) and Hartman et al. (2013) both agreed that individuals will only consume foods that taste good, regardless of the nutritional value.

Availability of Food

Availability of food is another barrier to feeding children functional foods. Areas with low availability of foods can often be called food deserts. The United States Department of Agriculture (USDA) defines a food desert as urban neighborhoods and rural towns without ready access to fresh, healthy, and affordable food. This is largely due to a lack of grocery stores, farmers' markets, and healthy food providers. The USDA also states that these areas lack superstores and only have access to convenience stores or fast food restaurants, of which may not offer healthy and affordable food. Walker & Cunningham (2014) found that food deserts sometimes lack fruit, vegetable, and meat stores.

Travel burden, which includes time, expense, and difficulty of getting from one place to another, is the most popular concept related to availability of food (Bader et al., 2010). Martin et al. (2014) considered an urban food desert to be a place where a grocery store was 0.75 to 1.0 mile away. Additional studies were consistent with the idea that households in food deserts are not located within walking distance, or more specifically, are a 10-minute walk away from the closest grocery store (Crockett & Sims, 1995; Jiao et al., 2012). Other aspects of travel burden include individual/household characteristics such as vehicle ownership, or neighborhood characteristics such as public transportation and safety (Bader et al., 2010; Martin et al., 2014). Martin et al. (2014) confirmed that of the 36 stores included in their study, all of them had a bus stop within 0.25 miles of the store. Although that seems like a good statistic, it does not take into

consideration how far the bus stop is from the resident's homes, and still, the fact that the bus riders have a 0.25 mile walk before arriving to the store. Additionally, safety concerns are an important topic when considering "travel burden" (Bader et al., 2010). Lower income areas are often associated with higher crime rates, which results in individuals being less likely to wait on public transportation or walk to find food (Bader et al., 2010).

Affordability is another concept related to availability of foods. The USDA states that 23.5 million people live in food deserts, with 13.5 million of those people being low income. With this statistic it is obvious that affordability and expense of food for these communities is an issue. It has been noted that small- to medium-sized grocery stores, which are the ones seen in food desert areas, usually have higher food prices than larger supermarkets (Crockett& Sims, 1995; James, 2004). This creates additional expense burdens for low-income status individuals. And, the "expense of food" and "availability of food" are two barriers for families eating healthy that are related.

Knowledge of Foods' Health Benefits

Knowledge of foods' health benefits is an additional barrier when considering feeding children functional foods. While there is a wealth of information on adult level of nutritional knowledge, research on parental knowledge of foods' health benefits is limited. The majority of the literature highlights the fact that lack of knowledge is a barrier to healthy eating/feeding of children (Baruth et al., 2014; Bisogni et al., 2012; Coe, 2013; Nelson, Lytle, & Pasch, 2009; Nicklas et al., 2013; Omar, Coleman, & Hoerr, 2001). Studies specifically address the lack of knowledge regarding dietary recommendations, and establish that parents do not know how much food to feed their children, what to eat, or how to eat and cook healthily (Baruth et al., 2014; Coe, 2013; Nicklas et al., 2013). One study examined parents' ability to assess energy

intake and expenditure along with calories contained in certain food groups (carbs, protein, fat). These researchers found that parents' knowledge based on energy intake, energy expenditure, and specific calorie information was poor (Nelson, Lytle, & Pasch, 2009). Further, two more studies highlighted the idea that a decrease in parental education equaled a decrease in fruit and vegetable intake among themselves and their children (Attorp et al., 2014; Rauber et al., 2013). Knowledge of foods' health benefits as a barrier to healthy eating, specifically related to consumption of health-promoting, functional foods was not found in the literature.

Conflicting Information about Food

There are concerns regarding conflicting information about food presented to the general public by health professionals, and in media and advertising. The most prevalent finding is that individuals observe inconsistent messages about healthy food in different forms of media and advertisements (Bathgate & Begley, 2011; Bisogni et al., 2012; Dwyer, Needham, Simpson, & Heeney, 2008; Hesketh, Waters, Green, Salmon, & Williams, 2005; James, 2004; Mastin & Campo, 2006; Nagler, 2014). Many individuals do not follow dietary guidelines due to the fact that the information in the media is always changing (Bisogni et al., 2012); much of the information is confusing about what is and is not healthy foods (Nagler, 2014).

Similarly, studies have shown that the majority of food advertisements in the media are for "unhealthy" type foods/drinks (Mastin & Campo, 2006). In addition, some parents mentioned that because of the advertisements and battles with children in the grocery store, they have refrained from bringing their children with them to the store (Dwyer et al., 2008). Parents express feeling uncomfortable distinguishing between healthy and unhealthy snacks themselves, due to the labeling, advertisements, and conflicting information (Hesketh et al., 2005). As the

research suggests, media and advertising are important factors that contribute to conflicting information about food.

Additional factors relating to conflicting information about food mentioned in the literature include changing or conflicting information provided by health professionals and conflicts in consumer information compared to an individual's personal beliefs and traditions. Studies mention that individuals observe changing and conflicting information about food from health professionals (Bisogni et al., 2012; James, 2004; Nagler, 2014), which results in less trust in the health information due to nutrition experts "changing their minds" (Nagler, 2014). Lastly, family beliefs/traditions contribute to conflicting information about food and cooking practices. Many individuals grow up eating and cooking in specific ways, and when presented with new nutrition information may push the information to the side because it does not match their cultural beliefs. This is seen especially in the African American culture (James, 2004; Omar, Coleman, & Hoerr, 2001).

Uncertainty of How to Prepare Foods

Parental uncertainty of how to prepare healthy foods is another barrier. Although the literature on this topic was sparse, the overarching theme is that parents do not feel they have the cooking skills needed to assemble and prepare healthy meals (Baruth et al., 2014; Bisogni et al., 2012; Shriver, Hildebrand, & Austin, 2010). Shriver, Hildebrand, and Austin (2010) reported that parents have low self-efficacy when it comes to cooking fruits and vegetables, and combining fruits and vegetables with other foods that their children will like.

Additionally, parents that know what healthy foods to buy, still find trouble in preparing and putting a meal together (Baruth et al., 2014). According to Bathgate and Begley (2011), parents not only find difficulty in preparing the evening-time meal, but also face difficulty in

choosing and preparing foods for their children's lunches, and are uncertain about what is healthy and what is not. Other researchers note that men and younger individuals report they were not taught to cook, which has led to uncertainty in how to prepare meals (Bisogni et al., 2012). Food preparation skills are extremely essential for healthy cooking and meal or snack preparation (Hyland, Stacy, Adamson, & Moynihan, 2006).

Lack of Desire to Try New Foods

There is no research discovered in the literature on the lack of desire for parents to try new foods or allow their children to try new foods; however, there is limited research on adults lacking the desire to eat healthy. For example, Bisogni et al. (2012) observed that some individuals view healthy eating as "weird, fanatical, picky, extreme, deviant, and boring," which suggests a lack of desire to try healthy foods. Their study also found that individuals desired to distance themselves from the negative perceptions attached to healthy eating. In another study (James, 2004), women with children were found to be less concerned with their weight and healthy eating, stating that they were comfortable with their bodies, and did not have a desire to change their eating habits or food practices. Additionally, men are less concerned with changing their eating habits, and instead look to exercising as a way of staying healthy (James, 2004).

Belief One's Diet Is Already Healthy

No studies were found regarding whether there is a barrier between belief in one's diet (the parent's) already being healthy that would result in the individual no desiring nutritional change or improvement for themself or would affect feeding their children health-promoting foods.

Conclusion

Current literature points to many barriers to parent's feeding their children nutritiously that can possibly relate to barriers parents experience in feeding health-promoting, functional foods to their children to improve their health and nutrition. Barriers such as expense of food, availability of food, knowledge of foods' health benefits, and conflicting information about food are prevalent in the literature, while taste of food, uncertainty of how to prepare foods, lack of desire to try new foods, and belief one's diet is already healthy are less prevailing. This research study sought to add to and fill some of the gaps present in the current literature.

CHAPTER III. METHODS

Methods

Research Design

A quantitative, analytical, cross-sectional study design was used for this research project. The Institutional Review Board (IRB) from the University of Mississippi approved the research protocol.

Participants

Participants included parents of children 18 years of age or younger in two public school districts in North Mississippi. One school district included parents of three schools; an elementary school, middle school and high school.. Another school district included parents of four schools from the lower and upper elementary schools, middle school and high school.

Survey Instrument

The instrument used to conduct the research study on functional foods was a quantitative survey in electronic and paper format adapted with permission from the 2009 and 2013 International Food Information Council surveys (IFIC, 2009; IFIC, 2013).

The survey asked questions regarding barriers toward consuming health-promoting foods, along with questions on awareness and usage of functional foods, attitudes and knowledge toward food and nutrition, and parental demographic questions. Participants were asked two screening questions: 1. “Are you at least 18 years of age?” and 2. “Are you the parent or guardian of a child 18 years of age or younger living with you?” If the participant answered “no” to either of those questions they were informed that further completion of the survey would not be necessary, and were thanked for their time.

Specifically for this study, the section on parental barriers of feeding children health-promoting foods was utilized. This section consisted of twelve questions assessing reasons why

parents do not consume more health-promoting foods, with the options for them to answer it is "a major reason," "a minor reason," or "not a reason". Additionally, the functional foods usage section was assessed, which included 27 "yes" or "no" questions regarding parents' usage of functional foods in feeding children.

A pilot study using twelve participants was conducted in 2014 to determine the average time it took to complete the survey and any errors that needed correcting. Minor errors were found by pilot study participants, and were corrected by researchers. Additionally, it was determined that the survey took approximately 15-20 minutes to complete.

Procedures

Participants (parents/guardians) were recruited by take-home flyer or flyer via email. Only students at one school were asked to take the flyer home to their parents due to specific school requirements. All other schools were sent an email solicitation by the school directly to the parent's email address. Additionally, flyers were handed out at sporting events, parent/teacher organization (PTO) meetings, and other school functions, to increase the participation rate and inform parents of the study.

The flyer included information on the study including the purpose of the study, and benefits and risks associated with taking the survey. The flyer also provided specific information on completing the survey including the link to the survey: http://www.kidsfood.us. Because not all households may have a computer or access to the internet, the flyer encouraged participants to use a local library, or gave the option to have a paper survey mailed to them. Additionally, the flyer contained a statement asking that only one survey per household be completed. When completion of the survey was achieved, participants were thanked for their time. Participant

confidentiality was kept throughout the study. Any incomplete surveys were discarded and eliminated from the study.

Variables

The demographic variables included: age, education, race, gender, and marital status. Age was measured as a categorical variable, and a set of dummy variables, *18-24, 35-44, 45-54, and 55 plus,* were created to indicate 1 if in that age group and 0 if in any other age group. Education was measured as a categorical variable, and a set of dummy variables, *High School, Some College, Associate Degree, and Graduate Degree*, were created to indicate 1 if completed that level of education and 0 if in any other education category. For race, a dummy variable *Black* was created to equal 1 if the race was black or 0 if white or other race. For gender, a dummy variable *Female* was created to equal 1 if gender was female and 0 if male. For marital status, a set of dummy variables, *Single* and *Other*, were created to indicate 1 if that marital status defined their relationship or 0 if any other status. Responses recoded into the "other" category included divorced, widowed, and other.

Barrier variables were created from the survey question regarding the extent respondents did not consume more health promoting foods and food components. Eleven survey questions were categorized into eight barriers (*see* Table 1). Responses identifying it as a major reason (1) or a minor reason (2) were recoded to "a barrier"=1; responses identifying it as not a reason (3) were recoded to "not a barrier"=0. The barriers included: expense of food, taste of food, availability of food, knowledge of foods' health benefits, conflicting information about food, uncertainty of how to prepare foods, lack of desire to try new foods, and belief one's diet is already healthy. These variables were used as dependent variables in the logistic regression and independent variables in the multiple regressions.

The question assessing parental feeding of functional foods to their children was phrased, "Do you currently feed your children this food for that health condition?" and 27 items were presented. Participants were asked to choose between "yes" and "no" for each of the 27 items. The responses were coded as "1" if parents responded that they fed their children this food for that health condition and "0" if they responded they did not. The 27 functional food questions were categorized into six health benefit category variables (see Table 2). The six health benefit variables included foods for cancer prevention, bone health, heart health, digestive health, weight health, and other health.

Table 1
Eight Barriers and Corresponding Survey Questions

Barrier Categories	Corresponding Survey Questions
Expense of food	These foods are sometimes more expensive.
Taste of food	These foods sometimes do not taste as good.
Availability of food	It is not easy to find these foods.
Knowledge of foods' health benefits	I do not know enough about how much of these foods to consume for the desired health benefits., I do not know enough about which foods to purchase for the desired health benefits.
Conflicting information about food	I am confused over conflicting information I read or hear about these foods., I lack confidence in the science supporting the health benefit claims.
Uncertainty of how to prepare foods	I am uncertain about how to prepare these foods.
Lack of desire to try new foods	Lack of desire to try new foods or to make changes to my regular shopping list., It takes too much mental effort to learn about and determine what foods are best to eat.
Belief one's diet is already healthy	My diet is already healthful enough so I do not need an extra boost from these foods.

Note: Based on question 5 of the survey. Question 5f was omitted from analysis, due to unclear wording.

Table 2
Health Benefit Category and Corresponding Functional Food/Food Component by Survey Question

Health Benefit Category	Functional Food/Food Component and Corresponding Survey Questions
Cancer Health	Q4C: lycopene, fiber, soy/soy protein
Bone Health	Q4C: calcium, vitamin D
Heart Health	Q4C: monounsaturated fats, plant sterols, potassium, B vitamins, whole grains, fiber, soy/soy protein, folate, omega-3 fatty acids
Digestive Health	Q4C: prebiotic fiber, fiber, probiotics
Weight Health	Q4C: herbs and spices, fiber, protein
Other Health	Q4C: antioxidants, lutein and other carotenoids, xylitol, protein, folate, omega-3 fatty acids, probiotics

Analysis

Data were entered into Qualtrics and statistical analysis of data was conducted using the Statistical Package for the Social Sciences (SPSS) software, version 22.0 (IBM, 2013). Descriptive statistics were conducted on the participants' demographics, the 27 functional foods, the eight barrier categories and the six health benefit categories. Logistic regressions were used to analyze respondents' demographics and barriers to consuming health-promoting, functional foods. Multiple regressions were used to analyze parental barriers to consuming health-promoting, functional foods and parents feeding their children functional foods for each of the six health benefit categories.

CHAPTER IV. RESULTS

Results

Data from a total of 395 participants were collected and examined for missing responses. In all, 193 participants were usable and made up the survey sample for this study. Table 3 presents the demographics of the participants. The greatest number of respondents fell between 35 – 44 years of age (38.3%). Of the 193 parents, 127 (35.2%) completed a bachelor's degree or graduate/professional degree, while few (3.6%) graduated from high school only. Eighty-six percent were of Caucasian or "other" race, while 14.5percent were African American. Female participants made up 92.2 percent (n=178) of the participants and male participants totaled 7.8%. The majority of the sample (77.2%) was married, with 11.4 percent single and 11.4 percent "other".

Table 3
Descriptive Statistics of Demographics of Parents (n=193)

Category	# of Participants	%
Age		
18 – 24	7	3.6
25 – 34	40	20.7
35 – 44	74	38.3
45 – 54	62	32.1
55 or Older	10	5.2
Education		
Graduated from High School	7	3.6
Some College	33	17.1
Associate Degree	26	13.5
Bachelor Degree	68	35.2
Graduate/Professional Degree	59	30.6
Race		
White	160	82.9
Black or African American	28	14.5
Other	5	2.6
Gender		
Male	15	7.8
Female	178	92.2
Marital Status		
Single	22	11.4
Married	149	77.2
Other	22	11.4

Descriptive statistics were conducted to determine mean barrier scores based on parents' response (a reason=1, not a reason=0) for not consuming health-promoting foods and food components (*see* Table 4). From the barrier questions, this table shows the eight barrier categories created and ranked from most to least responses. The top three barriers for parents for not consuming health-promoting foods were conflicting information about food, lack of desire to try new foods and belief their diet is already healthy. Other barriers in rank order included knowledge of foods' health benefits, uncertainty of how to prepare foods, availability of food, taste of food, and expense of food.

Table 4
Means and Ranking of Barriers for Parents Not Consuming Health-Promoting Foods

Barrier Category	Rank	Mean
Conflicting Information about Food	1	.9741
Lack of Desire to Try New Foods	2	.9585
Belief Their Diet is Already Healthy	3	.9534
Knowledge of Foods' Health Benefits	4	.8601
Uncertainty of How to Prepare Foods	4	.8601
Availability of Food	6	.8446
Taste of Food	7	.6684
Expense of Food	8	.6010

Note: Due to some barriers having the same mean score, tied mean scores were assigned the same rank number.

Descriptive statistics were run to determine mean functional food scores based on parents' response (yes=1; no=0) to feeding their children certain functional foods for the specified health condition (*see* Table 5). From the functional food scores, six health benefit categories were identified, sorted, and ranked from most to least responses for that functional food condition and benefit. Ranked from highest to lowest, parents fed their children functional foods based on the following health benefits: bone, digestive, heart, weight, other, and cancer.

Ranking of the 27 functional foods is also shown in Table 5. Calcium for bone health, protein for weight, and whole grains for heart were found to be the most widely used functional foods/functional food components by parents for their children. Additionally, xylitol and soy protein were the least fed functional foods.

Table 5
Means and Ranking of the Six Health Benefits and 27 Functional Foods

Health Benefit Category	Rank	Mean	Food	Rank	Mean
Bone	1	.8264	Calcium	1	.9585
			Vitamin D	11	.6943
Digestive	2	.7219	Fiber	5	.7617
			Probiotics	7	.7098
			Prebiotic fiber	11	.6943
Heart	3	.5953	Whole grains	3	.7927
			Fiber	6	.7565
			Potassium	7	.7098
			B Vitamins	7	.7098
			Monounsaturated fat	10	.7047
			Omega 3 fatty acids	14	.6425
			Plant sterols	21	.4456
			Folate	23	.4249
			Soy protein	27	.1710
Weight	4	.5786	Protein	4	.7720
			Fiber	17	.5337
			Herbs & spices	22	.4301
Other	5	.5700	Protein	2	.8446
			Antioxidants	13	.6891
			Probiotics	15	.6114
			Lutein & carotenoids	16	.5389
			Omega 3 fatty acids	18	.5233
			Folate	20	.4508
			Xylitol	25	.3316
Cancer	6	.3368	Fiber	19	.4611
			Lycopene	24	.3420
			Soy protein	26	.2073

Note: Due to some functional foods having the same mean score, tied mean scores were each assigned the same rank number. Therefore, subsequent functional foods were assigned the rank number that would follow if each food had it's own label. The highest rank (=1) and low (=6) for the health benefit categories. The highest rank for functional foods (=1) and lowest rank (=27).

A logistic regression was conducted to predict barriers to parents consuming health-promoting, functional foods based on parents' demographics (*see* Table 6). The dependent variables for barriers included: expense of food, taste of food, availability of food, knowledge of foods' health benefits, conflicting information about food, uncertainty of how to prepare foods, lack of desire to try new foods, and belief their diet is already healthy. The independent variable included parents' demographics. In the age category, parents in the age group 45-54 was significantly less likely to indicate that taste of food was a barrier (b=-1.195, $p<.05$) compared to 25-34 year olds. For educational status, some college (b=1.028, $p<.05$) and associate degree (b=1.207, $p<.05$) were significantly more likely to indicate that taste of food was a barrier compared to parents with a bachelor degree. Additionally, compared to the age group 25-34, the age group 55+ was significantly less likely to indicate that availability of food was a barrier (b=-2.311, $p<.01$). Lastly, when compared to males, females were significantly more likely to indicate that lack of knowledge was a barrier (b=1.421, $p<.05$).

Table 6

Logistic Regression of Parental Demographics as Determinants of Barriers to Consuming Health-Promoting Foods (n=193)

	Expense	Taste	Availability	Knowledge	Conflicting Info	Uncertainty	Lack of Desire	Belief in Diet
	B (SE_B)	B (SE_B)	B (SE_B)	B (SE_B)	B (SE_B)	B (SE_B)	B (SE_B)	B (SE_B)
Age								
18-24	-.334 (.895)	-.430 (.984)	-.034 (1.265)	.275 (1.222)	16.897 (12662.696)	-.144 (1.296)	-.488 (14557.812)	17.550 (14025.275)
25-34 [a]								
35-44	-.273 (.424)	-.601 (.467)	-.112 (.601)	.342 (.597)	-1.767 (1.472)	.927 (.666)	-17.145 (5921.542)	.479 (1.041)
45-54	-.153 (.439)	-1.195 (.476)*	-.186 (.616)	.037 (.603)	-.589 (1.618)	-.105 (.579)	-19.118 (5921.542)	-.589 (.883)
55+	-.308 (.772)	19.613 (12418.309)	-2.311 (.881)**	.031 (1.017)	15.513 (10943.093)	-1.035 (.893)	-18.766 (5921.543)	18.210 (11493.188)
Education								
Graduated from HS	.950 (.941)	1.403 (1.186)	1.276 (1.296)	-1.296 (.884)	.326 (13273.791)	-1.725 (.908)	-19.253 (4421.775)	17.624 (13754.371)
Some College	-.075 .453	1.028 (.505)*	.418 (.601)	.145 (.616)	-18.980 (4400.261)	.380 (.668)	-18.513 (4421.775)	.203 (1.225)
Associate Degree	.655 (.521)	1.207 (.578)*	2.061 (1.096)	.344 (.712)	-17.915 (4400.261)	19.441 (7724.357)	-18.248 (4421.775)	17.633 (7376.673)
Bachelor Degree [a]								
Grad./Prof. Degree	-.041 (.379)	.611 (.397)	.805 (.520)	1.265 (.646)	-17.588 (4400.261)	.043 (.529)	-18.046 (4421.775)	-.495 (.778)

Table 6, *continued*

	Expense	Taste	Availability	Knowledge	Conflicting Info	Uncertainty	Lack of Desire	Belief in Diet
	B (SE_B)	B (SE_B)	B (SE_B)	B (SE_B)	B (SE_B)	B (SE_B)	B (SE_B)	B (SE_B)
Race								
White [a]								
Black	-.702 (.464)	-.637 (.512)	.376 (.702)	-.096 (.625)	-.721 (1.154)	-.087 (.693)	-.018 (1.449)	-.033 (1.180)
Gender								
Male [a]								
Female	.117 (.575)	-.154 (.634)	-.035 (.752)	1.421 (.710)*	-16.103 (9147.286)	-.300 (.848)	.592 (1.311)	1.013 (.903)
Marital Status								
Single	-.398 (.520)	.022 (.560)	-.034 (.742)	-.376 (.704)	-1.569 (1.244)	-.076 (.780)	-.403 (1.389)	-.328 (1.203)
Married [a]								
Other	-.964 (.508)	.998 (.649)	.259 (.756)	-.293 (.666)	17.957 (7655.726)	-.259 (.725)	18.513 (7726.679)	17.677 (7817.413)
Constant	.663	.920	1.431	.210	38.781	1.862	38.509	2.125
Nagelkerke R^2	.075	.181	.127	.106	.339	.191	.340	.170

Note: * $p < .05$, ** $p < .01$, [a] *reference*

The barrier labels used in this table are shortened for aesthetic appeal. The correlating extended titles are as listed: Expense = expense of food, Taste = taste of food, Availability = availability of food, knowledge = knowledge of foods' health benefits, Conflicting info = conflicting information about food, Uncertainty = uncertainty of how to prepare foods, Lack of Desire = lack of desire to try new foods, and Belief in Diet = belief one's diet is already healthy.

A multiple regression was performed to examine the relationship of parental barriers to parents' feeding functional foods for specific health benefits to their children. Of the eight barriers used as the independent variables, parents' lack of knowledge of foods' health benefits was the only barrier found significant in feeding their children functional foods for specific health benefits. This barrier was a positive and highly significant predictor of feeding children functional foods for cancer prevention (b=.554, $p<.01$), heart health (b=1.380, $p<.05$), and "other" health benefits (b=1.041, $p<.01$). These results show that parents who stated they did not know enough about health-promoting foods were significantly likely to feed their children foods with health benefits for the above stated health benefit categories: cancer prevention, heart health, and "other" health. The multiple regression found no significance for the other seven barriers: expense of food, taste of food, availability of food, conflicting information about food, uncertainty of how to prepare foods, lack of desire to try new foods, and believing their diet is already healthy.

Table 7

Multiple Regression of Barriers for Consuming Health-Promoting Foods as Determinants of Parents Feeding Functional Foods by Health Benefit Categories (n = 193)

	Cancer Prevention	Bone Health	Heart Health	Digestive Health	Weight Health	"Other" Health
	B (Sig.)	B (Sig.)	B (Sig.)	B (Sig.)	B (Sig.)	B (Sig.)
Expense	.057 (.655)	.021 (.684)	.287 (.445)	.167 (.200)	-.097 (.481)	-.418 (.113)
Taste	.049 (.710)	.009 (.865)	.079 (.835)	.049 (.708)	.154 (.271)	-.118 (.660)
Availability	-.084 (.641)	.078 (.289)	-.505 (.338)	-.017 (.926)	-.271 (.161)	.191 (.603)
Knowledge	.554 (.003)**	.052 (.494)	1.380 (.012)*	.208 (.274)	.333 (.098)	1.041 (.007)**
Conflicting Info	-.185 (.657)	-.282 (.098)	-.999 (.414)	-.496 (.242)	.305 (.495)	-.403 (.638)
Uncertainty	.001 (.994)	.045 (.565)	.583 (.295)	.239 (.214)	.354 (.083)	.258 (.507)
Lack of Desire	-.099 (.756)	.009 (.944)	-.512 (.584)	.145 (.653)	-.340 (.321)	-.391 (.550)
Belief in Diet	-.027 (.929)	.002 (.985)	.510 (.564)	.258 (.399)	.303 (.349)	-.012 (.984)
Constant	.700	1.402	4.276	1.287	.554	3.295
Adjusted R^2	.012	-.012	.017	.001	.024	.030

Note: * $p < .05$, ** $p < .01$

The barrier labels used in this table are shortened for aesthetic appeal. The correlating extended titles are as listed: Expense = expense of food, Taste = taste of food, Availability = availability of food, Knowledge = knowledge of foods' health benefits, Conflicting info = conflicting information about food, Uncertainty = uncertainty of how to prepare foods, Lack of Desire = lack of desire to try new foods, and Belief in Diet = believing their diet is already healthy.

CHAPTER V. DISCUSSION

Discussion

Functional foods are foods or dietary components that may provide a health benefit beyond basic nutrition and may play a role in reducing or minimizing the risk of certain diseases and other health conditions (IFIC, 2013). The main purpose of this study was to determine the barriers parents face in consuming health-promoting foods as well as parental feeding of functional foods to their children for specific health benefits related to those barriers. The 27 functional foods and food components examined in this survey were categorized into six different health benefit categories for cancer prevention, bone health, heart health, digestive health, weight health, and "other" health. The study examined parents' reasons for consuming or not consuming health-promoting foods due to eight barriers: expense of food, taste of food, availability of food, knowledge of foods' health benefits, conflicting information about food, uncertainty of how to prepare foods, lack of desire to try new foods, and believing their diet is already healthy. Although previous studies have examined barriers to healthy eating, this study was unique in that it examined barriers parents face to consuming health-promoting foods and their relationship to feeding their children health-promoting, functional foods. The results showed significance in areas that support previous studies, in addition to contributing new information to the literature.

Barriers for Parents

The current study reported barriers parents face that prevent them from consuming more health-promoting foods and food components. Barriers parents reported the most to those they reported the least were: conflicting information about food, lack of desire to try new foods, belief their diet is already healthy, knowledge of foods' health benefits, uncertainty of how to prepare foods, availability of food, taste of food, and expense of food. This is different from the

literature's report of most prominent barriers to consuming healthy foods, which has included expense of food (Baruth et al., 2014; Bisogni et al., 2012; Chang et al., 2008; Coe, 2013; Crockett and Sims, 1995), availability of food (Bader et al., 2010; Bisogni et al., 2012; Crockett and Sims, 1995; Martin et al., 2014), knowledge of foods' health benefits (Baruth et al., 2014; Bisogni et al., 2012; Coe, 2013; Crockett and Sims, 1995; James, 2004), and conflicting information about food (Bisogni et al., 2012; James, 2004; Nagler, 2014). Less prominent barriers throughout the literature included taste of food (Chang et al., 2008; James, 2004; Lloyd, Paisley, & Mela, 1995), uncertainty of how to prepare foods (Baruth et al., 2014; Bisogni et al., 2012), and lack of desire to try new foods (Bisogni et al., 2012; James, 2004), while the barrier 'belief one's diet is already healthy' was not found in previous literature.

The findings of the current study were surprising in that availability of food and expense of food were two of the lowest ranked barriers, while some of the most prominent in previous literature. Additionally, belief their diet was already healthy and uncertainty of how to prepare foods were ranked higher in this study, but were less significant barriers in previous literature. Perhaps the finding that 'belief their diet was already healthy' was a barrier is because the parents surveyed truly have healthy lifestyles and consume health-promoting foods already. Additionally, it could be that the participants of this survey were mostly educated individuals; higher education is linked to higher consumption of fruits and vegetables and lower consumption of non-healthy foods (Attorp et al., 2014; Crockett & Sims, 1995). The barrier 'uncertainty of how to prepare foods' has been found in previous literature; it is possible those past studies support the current findings. The previous literature suggests that parents do not have confidence in their ability to buy, prepare, and assemble meals, and lack self-efficacy in cooking and combining foods that their children will like (Baruth et al., 2014; Bisogni et al., 2012;

Shriver, Hildebrand, & Austin, 2010). The most surprising finding was that lack of desire to try new foods had not been examined in previous literature, and was the second ranked barrier to consuming health-promoting foods in this examination. Perhaps parents lack desire to try new foods because they are too busy, or maybe they simply do not see the importance of trying new things. It is hard to determine why parents answered the way they did, but these findings fill a gap in previous literature and imply the need for further investigation of barriers to consuming health promoting foods. The following discussions include the findings from examinations of barriers when related to other variables.

Barriers and Demographics

Significant barriers to parents not consuming health-promoting foods related to parents' demographics included taste of food, availability of food, and knowledge of foods' health benefits. In previous literature, taste is one of the most prominent barriers to eating healthy foods (Chang et al., 2008; Eikenberry & Smith, 2004; Glanz et al., 1998; Hartman et al,, 2013; James, 2004; Lloyd, Paisley, & Mela, 1995; Nuss et al., 2006). Similarly, this study found that parents with some college and associate degree, when compared to bachelor degree were more likely to indicate taste of food as a barrier to consuming health-promoting foods. Additionally, this study found individuals 45-54 years of age, when compared to 25-34 age group, reported taste was less of a barrier to consuming health-promoting, functional foods. These findings give support to previous literature, along with presenting the idea that individuals in upper age groups may see taste as less of a barrier than individuals in lower age groups. Rahmawaty, Charlton, Lyons-Wall, and Meyer (2013) found that among parents and children who consumed fish for the benefit of omega-3 fatty acids, taste had a positive influence on fish consumption. Another study examining overweight individuals' beliefs on omega-3-enriched

foods concluded that the participants would not sacrifice taste for health benefit purposes (Patch, Tapsell, & Williams, 2005). Additionally, researchers found that past experiences play a large role in attitudinal determinants about food (Hartman et al., 2013). Perhaps this suggest, that no matter the age or education, if an individual has pleasant or non-pleasant past experiences with food, taste could become a barrier or a building block to their consumption of health-promoting foods.

This study found that availability of food could be a barrier for parents feeding their children functional foods in some demographic groups. According to the United Nations Statistics Division (2013), an urbanized area is an area of 50,000 or more inhabitants, while and urban cluster is an area of at least 2,500 to 50,000 inhabitants. One study determined that an urban area tends to have greater access to local grocery stores, farmers' markets, and healthy retail food providers, compared to "food deserts" which have little or no access to fresh produce or other healthy foods (Bader et al., 2010). The school districts in this study would be classified as urban and urban cluster areas based on their population in 2014 (US Census Bureau, 2015) of 52,930 and 35,688 people where fresh, healthy, and affordable foods are more likely to be found at local grocery stores, farmers' markets, and other healthy food providers. The current study concluded that compared to the age group 25-34, individuals age 55 years of age or older, were less likely to indicate that availability of food was a barrier to consuming health-promoting foods. One could speculate that this is due to the location of the area the surveys were distributed, and the easy access to fresh, healthy foods, if desired.

This study also showed significance between subjective knowledge of foods' health-promoting benefits as a barrier with regard to gender. Specifically, females, when compared to males, were more likely to state lack of subjective nutrition knowledge as a barrier. No previous

research has supported the idea that lack of knowledge as a barrier to consuming health-promoting foods is related to gender. Knowledge has been formerly discussed as a barrier to eating healthy foods due to individuals simply not knowing the risks associated with low fruit and vegetable consumption (Attorp et al., 2014; Bisogni et al., 2012) or the benefits of consuming health-promoting foods (Baruth et al., 2014; James, 2004; Nelson, Lytle, & Pasch, 2009). Previously, knowledge has also been linked to educational status: individuals with less education are less likely to know about foods' health benefits (Attorp et al., 2014; Crockett & Sims, 1995), and studies have found that individuals who lack knowledge of healthy foods find it difficult to know how to organize, plan, buy and prepare those foods (Baruth et al., 2014; Bisogni et al., 2012). However, in this study, age and education were not significant barriers related to knowledge.

Barriers examined in this analysis in which no significance was found when related to demographics include: expense of food, conflicting information about food, uncertainty of how to prepare foods, lack of desire to try new foods, and belief one's diet is already healthy enough. Surprisingly the findings of this study did not show significance in expense of food, which is a barrier that has been found in previous literature (Aggarwal et al., 2011; Attorp et al., 2014; Baruth et al., 2014; Bathgate & Begley, 2011; Bisogni et al., 2012; Chang et al., 2008; Coe, 2013; Crockett & Sims, 1995; Omar, Coleman, & Hoerr, 2001; Walker & Cunningham, 2014). The current findings showing expense of food was not a barrier could be because most of the participants in this study had an associate degree or higher; educated individuals have higher incomes (Attorp et al., 2014; Baruth et al., 2014), which would result in expense of food not being a barrier to consuming health-promoting foods. Former studies have examined associations between environmental factors such as economic status, food availability, family

and home influences, media, etc., and consumption of healthy foods (Attorp et al., 2014; Crockett & Sims, 1995; Shahar, Shai, Vardi, Shahar, &Fraser, 2005), along with perceived barriers to consuming healthy foods, which included cost as a significant barrier (Baruth et al., 2014; Bathgate and Begley, 2011; Chang et al., 2008; Omar, Coleman, & Hoerr, 2001). Other studies showed that parents found eating healthful and buying healthy foods simply cost too much (Bisogni et al., 2012; Chang et al., 2008). For example, the price of fish was a significant barrier to the family's consumption of fresh fish, when examining consumption for omega-3 fatty acid benefits (Rahmawaty et al., 2013). Additionally, Shahar et al. (2005) found that low socioeconomic status individuals had lower intake of all nutrients examined than high socioeconomic status individuals, while another investigation found parents with higher incomes were more likely to eat fruits and vegetables (Attorp et al., 2014).

While this study did not produce significant findings for conflicting information about food as a barrier when related to demographics, previous literature supports the idea that conflicting information about food is a barrier to healthy eating. The most prominent source of conflicting information is found in the media, where advertisements highlight foods high in empty calories and low in nutritional value (Bathgate & Begley, 2011; Bisogni et al., 2012; Hesketh et al., 2005; James, 2004; Mastin & Campo, 2006; Nagler, 2014). Bathgate and Begley (2011) specifically noted that parents found the media as a negative influence on their food purchases. Additionally, researchers found that the changing and conflicting nutrition advice provided by experts was one reason individuals did not follow nutrition recommendations, and these shifts in information also created skepticism among the public (Bisogni et al., 2012).

Another barrier not found significant in this study but noted in previous research is that parents, even when knowing what healthy foods to buy, still find difficulty in preparing and

assembling healthy meals that their children will eat (Baruth et al., 2014; Shriver, Hildebrand, & Austin, 2010). Additional research found that young people and men were less likely to consume fruits and vegetables because they were not taught to use them, which resulted in uncertainty of how to prepare those foods (Bisogni et al., 2012). Parallel findings between Bathgate and Begley (2011) and Hyland et al. (2005) stated that individuals need help selecting health-promoting foods and learning food preparation skills, because these two ideas are essential to healthier eating on a budget. The current study's findings showed no significance with uncertainty of how to prepare foods as a barrier when related to demographics, however, one can attest to the importance of education on this matter.

Lack of desire to try new foods is another barrier that was examined in this study but was not significantly related to demographics. Previous literature has found that some individuals show resistance to trying new and healthier foods (Bisogni et al., 2012; James, 2004). Grandes et al. (2008) discovered that individuals of age 50 and younger had a higher willingness to change compared to individuals who are 50 years of age and older. These discoveries, along with the previous findings of this study where lack of desire to try new foods was ranked as the second most likely barrier to not consuming health-promoting foods, in the current study express a need for further investigation in this area. Perhaps a stronger relationship can be found between the lack of desire to try new foods and other demographic variables.

Lastly, parents' belief that their diet is already healthy enough as a barrier in relation to demographics is not supported in previous literature. However, previous studies have examined self-confidence and the effects it may have on the healthiness of an individual's diet.. In a study examining the motivators for older adults to improve their diet and exercise patterns, researchers found an increase in healthy diet and physical activity behaviors when perceived self-confidence

in the individuals' ability to make changes was increased (Bardach, Schoenberg, & Howell, 2016). Another study found that low self-confidence was a significant barrier for eating behavior changes in patients with obstructive sleep apnea and obesity (Spörndly-Nees, Igelström, Lindberg, Martin, & Åsenlöf, 2014). Based on these findings in the literature, one could speculate that parents' increase in self-confidence in the healthiness of their own diet would be a motivator for feeding children health-promoting foods, and not be a barrier. Additionally, further research on this barrier would help support the previous findings of this study that belief their diet is already healthy is the third most likely barrier to not consuming health-promoting foods.

Functional Foods for Health Benefits and Barriers

Lack of knowledge of foods' health benefits was the only significant barrier found when related to parents feeding or not feeding their children functional foods for specific health benefits. Although knowledge as a barrier is found in previous studies, lack of knowledge as a barrier and how it affects parents feeding their children functional foods appears unique to the current literature. This study's results showed lack of knowledge was a predictor of feeding children functional foods for cancer prevention, heart health, and "other" health benefits. Williams, Lamb, & McCarthy (2015), assessed parental feeding in children with existing cancer (leukemia), and found that parents were more likely to practice lax feeding with their children due to the fact that radiation and chemotherapy had resulted in altered tastes, and parents were worried of under-nutrition. Most other studies generally looked at barriers to consuming healthy foods, with knowledge being among those (Attorp et al., 2014; Baruth et al., 2014; James, 2004). It can be concluded from the current study and the many previous examinations that there is a need for educating parent/guardians/caregivers on the importance of feeding children health-

promoting foods (Attorp et al., 2014; Hesketh et al., 2005; James, 2004; Mastin & Campo, 2006; Nelson, Lytle, & Pasch, 2009).

Although the current study found no significance between lack of knowledge of foods' health benefits for weight, previous research has addressed parental feeding in regards to parental concerns about preschoolers' weight. One study concluded that parents practice different feeding strategies based on how they feel about their child's weight (Ek et al., 2016). Aljunaibi, Abdulle, and Nagelkerke (2013) found that parents often underestimate, and sometimes overestimate their child's weight status leading to incorrect perceptions about the child's weight, resulting in discounting of health information. Another study found that parental concern for a child's weight status increased with female children, and children who were already overweight/obese (Moore, Harris, & Bradlyn, 2011).

When examining barriers, self-efficacy plays a contributing role with knowledge. Chang et al. (2008) defined self-efficacy as "a person's confidence about performing a particular activity," and concluded that self-efficacy determines the amount of effort a person is willing to give to his/her health. They also found that self-efficacy was a barrier to practicing healthful lifestyle behaviors such as weight management. Another report found that individuals were much more likely to eat readily convenient fruits and vegetables, rather than prepared fruits and vegetables, because they lacked the self-efficacy to prepare those fruits and vegetables (Hartman et al., 2013). These studies, while focusing on parent's feeding practices, show that the current study fills a gap in the literature, in that there is a significant relationship between lack of knowledge as a barrier and increased feeding children functional foods for health benefit purposes. Prior to this investigation, there have been no other studies to examine these relationships, which proves the need for further investigation of barriers to feeding children

functional foods. Further examination of self-efficacy on this topic may lead to better understanding of ideas on improving parents feeding functional foods for specific health benefits to their children.

Parents Use of Functional Foods and Barriers

As mentioned, parents' lack of knowledge of foods' health benefits was the only barrier found significant in feeding their children functional foods for specific health benefits, and was a predictor of feeding children functional foods for cancer prevention, heart health, and "other" health benefits. These health benefit categories include foods parents are most likely to feed their children; foods beneficial for cancer, heart, and "other" are among food items already incorporated into children's diets. The foods parents were asked about included, but are not limited to, tomato sauce, foods with fiber, fortified foods and beverages, fruits, vegetables, whole-grains, sugar-free chewing gums, and protein foods. These findings are interesting in that parents are feeding their children foods for health benefits, most likely without knowing they are doing so. Alderson and Ogden (1999) found that mothers were more likely to feed themselves healthy foods for weight goals, while not paying as much attention to what their children ate, but were feeding children things such as: dairy products, breads, cereals, and potatoes. This list although thought to be "less healthy" by the mothers, does include whole grains, fiber, fortified foods and beverages, and vegetables (Alderson & Ogden, 1999). The findings presented by Alderson and Ogden (1999) support the idea of the current study, that even with a lack of knowledge of foods' health benefits, parents may still feed their children health-promoting foods.

Limitations

Like all studies, the current investigation has its limitations. All data collected for analyses was from self-reported surveys, which can be considered a limitation. Previous studies

have shown that participants completing self-reporting surveys tend to overestimate physical activity and underestimate food consumption (Lechner, Brug, & De Vries, 1997; Ronda, Van Assema, & Brug, 2002). However, other studies have found success in using self-reported surveys. Guralnik et al. (1994), concluded that self-reported studies along with performance measures complement each other in providing accurate information, while other examinations concluded that self-reported surveys alone were found to be valid for identifying relationships (Patrick et al., 1994; Spencer, Appleby, Davey, & Key, 2002). Additionally, the survey given to participants was extensive and required 15-20 min of time to complete. Given time constraints in individuals with school-aged children, this served as a limitation, in that several participants started the study and did not complete it.

Conclusion

This study identified barriers parents experience that lead to them not consuming health-promoting foods, along with parental demographics related to those barriers, as well as identifying how parents' feeding of functional foods for specific health benefits to their children was related to the barriers. The findings showed significance in barriers for taste of food, availability of food, and lack of knowledge of foods health benefits related to demographics, as well as lack of knowledge related to feeding

children functional foods for specific health benefits. Based on the findings of this study, one can see the importance of educating parents on feeding their children functional foods for desired health benefits like cancer prevention and bone, heart, digestive, weight, and "other" health benefits. This study found that parents are already feeding their children foods for desired health benefits, so education will allow parents to understand the importance of feeding these foods to their children and increase the awareness of the benefits of functional food usage. Additionally,

understanding parents' beliefs and self-efficacy towards feeding their children functional foods is an important implication. It is essential to educate parents not only on the importance of these foods, but also on how to organize, plan, buy and prepare these foods; increased self-efficacy resulting in increased functional food usage. In that context, the current findings highlight the potential value in educating parents not only on the importance of feeding functional foods, but also how to incorporate and use these foods everyday, so perhaps an increasing number of parents will begin feeding functional foods for desired health benefits and preventive health. More importantly these findings suggest a need for further investigation of barriers parents face when feeding children health-promoting, functional foods. Our findings suggest that lack of desire to try new foods was a top ranked barrier, while previous research has not examined this as a barrier. Through further investigation, the barriers can begin to be addressed and become less of barriers for parents' consumption of functional foods along with feeding their children health-promoting foods.

CHAPTER VI. REFERENCES

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APPENDIX

APPENDIX A: SURVEY INSTRUMENT

Survey Regarding Functional Foods in Families with Children 18 Years of Age or Younger

Functional foods include a wide variety of food and food components believed to improve overall health and well-being, reduce the risk of specific diseases, or minimize the effects of other health concerns. The purpose for conducting this research is to determine a participant's awareness, attitudes, and consumption of functional foods in their family's meals and eating patterns.

There may be minor risks by completing the study in that private information will be reported, but it will only be reported as an aggregate (all participants discussed as a whole), not individually. You will benefit by aiding the investigators with their research and by receiving a food item coupon from a local restaurant upon completion.

I have read or been explained information about this study. I have had the opportunity to ask questions and my questions have been answered to my satisfaction. I consent to participate in this research.

Print Name of Participant _____

Signature of Participant _____

Date _____
Day/Month/Year

For this survey, each time we use the word "food," we are referring to everything people eat or drink.

This includes fruits, vegetables, grains, meats, and dairy, as well as beverages, herbs, and spices.

****PLEASE complete every question in this survey. Partially answered surveys cannot be used in this study.**

For the following question, please circle YES or NO.

I am 18 years of age or older.

YES NO

I am the parent/guardian of child(ren) 18 years of age or younger currently living in my home.

YES NO

If you answered NO to the previous question, we thank you for your time and interest in our research, however, we ask you to stop the survey at this point. If you answered YES, please continue to answer the following questions to the best of your ability.

1. Please indicate your agreement or disagreement with this statement:
   "Certain foods have health benefits beyond basic nutrition."
   a. Strongly disagree
   b. Somewhat disagree
   c. Somewhat agree
   d. Strongly agree
   e. Don't know

2. How concerned are you by the possibility that your children are not getting enough of the nutrients and food components that are needed for good health?
   a. Not at all concerned
   b. Slightly concerned
   c. Somewhat concerned
   d. Very concerned

3. How knowledgeable do you consider yourself in the area of nutrition?
   a. Extremely knowledgeable
   b. Very knowledgeable
   c. Somewhat knowledgeable
   d. A little knowledgeable
   e. Not knowledgeable

REMINDER: Please answer every question in this section on specific functional foods.

1. For each of the food components or nutrients listed below, please answer yes/no for each of the following questions:
   A. Are you aware of the relationship between **this food and this health condition**?
   B. Do you already eat **this food for that health condition**?
   C. Do you currently feed your children **this food for that health condition**?

Food Components or Nutrients	A. Are you aware of the relationship between **this food and this health condition?**	B. Do you already eat **this food for that health condition?**	C. Do you currently feed your children **this food for that health condition?**
1. **Antioxidants** (found, for example, in fruits and vegetables, whole grains, dark chocolate, and certain teas and spices) **for protection against free radical damage associated with aging and various chronic diseases.**	Yes No	Yes No	Yes No
2. **Lycopene** (found, for example, in processed tomato products, such as tomato sauce) **for reduced risk of prostate cancer.**	Yes No	Yes No	Yes No
3. **Lutein and other carotenoids** (found, for example, in spinach and fortified foods and beverages) **for maintaining eye health.**	Yes No	Yes No	Yes No
4. **Calcium** (found, for example, in dairy foods such as milk, cheese, yogurt, or in calcium-fortified foods or beverages) **for the promotion of bone health (and for reduced risk of osteoporosis).**	Yes No	Yes No	Yes No
5. **Monounsaturated fats** (found, for example, in olive oil and nuts) **for reduced risk of heart disease.**	Yes No	Yes No	Yes No
6. **Plant sterols** (found, for example, in fortified foods and beverages, including table spreads, juices, and yogurt) **for reduced risk of heart disease.**	Yes No	Yes No	Yes No
7. **Potassium** (found, for example, in fruits, vegetables, and juices) **for reduced risk of high blood pressure and stroke.**	Yes No	Yes No	Yes No

Food Components or Nutrients	A. Are you aware of the relationship between **this food and this health condition?**		B. Do you already eat **this food for that health condition?**		C. Do you currently feed your children **this food for that health condition?**	
8. **Prebiotic fiber** (found, for example, in certain fruits, vegetables, and fortified foods) **for maintaining a healthy digestive system.**	Yes	No	Yes	No	Yes	No
9. **Vitamin D** (found, for example, in fortified foods and beverages, such as dairy products, cereals, and juices) **for the promotion of bone health (and for reduced risk of osteoporosis).**	Yes	No	Yes	No	Yes	No
10. **Xylitol** (found, for example, in sugar-free chewing gums) **for maintaining oral health.**	Yes	No	Yes	No	Yes	No
11. **Herbs and spices used to season foods** (for example, cinnamon, red pepper, and oregano) **for reduced risk of chronic diseases and/or weight management.**	Yes	No	Yes	No	Yes	No
12. **B vitamins** (found, for example, in meats, whole grains, vegetables, and nuts) **for reduced risk of heart disease.**	Yes	No	Yes	No	Yes	No
13. **Whole grains** (found, for example, in whole-grain cereals, breads, rice, or pasta) **for reduced risk of heart disease.**	Yes	No	Yes	No	Yes	No
14. **Fiber** (found, for example, in vegetables, fruits, some breads, cereals, and fortified foods and beverages)						
14a. **Fiber for reduced risk of heart disease.**	Yes	No	Yes	No	Yes	No
14b. **Fiber for weight management and to provide a feeling of fullness.**	Yes	No	Yes	No	Yes	No
14c. **Fiber for maintaining a healthy digestive system.**	Yes	No	Yes	No	Yes	No
14d. **Fiber for reduced risk of cancer.**	Yes	No	Yes	No	Yes	No
15. **Protein** (found, for example, in meat, dairy, beans, nuts, soy, and some fortified foods and beverages)						
15a. **Protein for weight management and to provide a feeling of fullness.**	Yes	No	Yes	No	Yes	No

15b. **Protein for maintaining optimal health.**	Yes No	Yes No	Yes No
Food Components or Nutrients	A. Are you aware of the relationship between **this food and this health condition?**	B. Do you already eat **this food for that health condition?**	C. Do you currently feed your children **this food for that health condition?**
16. **Soy/soy protein** (found, for example, in soy-based products such as meat alternatives, nutritional bars, and beverages, such as soymilk).			
16a. **Soy/soy protein for reduced risk of cancer.**	Yes No	Yes No	Yes No
16b. **Soy/soy protein for reduced risk of heart disease.**	Yes No	Yes No	Yes No
17. **Folate or folic acid** (found, for example, in fortified grain products and citrus juices).			
17a. **Folate for reduced risk of brain or spinal cord (neural tube) birth**	Yes No	Yes No	Yes No
17b. **Folate for reduced risk of heart disease.**	Yes No	Yes No	Yes No
18. **Omega-3 fatty acids** (found, for example, in seafood, fish oil, or fortified foods).			
18a. **Omega-3 fatty acids for reduced risk of heart disease.**	Yes No	Yes No	Yes No
18b. **Omega-3 fatty acids for cognitive development, especially in children.**	Yes No	Yes No	Yes No
19. **Probiotics** (found, for example, in yogurt and other products with beneficial cultures).			
19a. **Probiotics for maintaining a healthy digestive system.**	Yes No	Yes No	Yes No
19b. **Probiotics for maintaining a healthy immune system.**	Yes No	Yes No	Yes No

2. To what extent, if at all, are each of the following reasons why you do not consume more health promoting foods and food components? Mark whether it is a Major Reason – 1, Minor Reason – 2, or Not a Reason – 3

		Major Reason	Minor Reason	Not a Reason
A.	These foods are sometimes more expensive.	1	2	3
B.	These foods sometimes do not taste as good.	1	2	3
C.	It is not easy to find these foods.	1	2	3
D.	I do not know enough about how much of these foods to consume for the desired health benefits.	1	2	3
E.	I do not know enough about which foods to purchase for the desired health benefits.	1	2	3
F.	If I don't understand some aspect of a health claim that I see on a food package, I will not buy it.	1	2	3
G.	I am confused over conflicting information I read or hear about these foods.	1	2	3
H.	I am uncertain about how to prepare these foods.	1	2	3
I.	Lack of desire to try new foods or to make changes to my regular shopping list.	1	2	3
J.	It takes too much mental effort to learn about and determine what foods are best to eat.	1	2	3
K.	I lack confidence in the science supporting the health benefit claims.	1	2	3
L.	My diet is already healthful enough so I do not need an extra boost from these foods.	1	2	3

3. To what extent do you **agree or disagree** with the following statements regarding foods that have health benefits beyond basic nutrition?

		Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Completely agree
A.	These foods can make a meaningful impact on my health when I consume them.	1	2	3	4	5
B.	I have enough information to understand which foods provide an added health benefit.	1	2	3	4	5
C.	Added health benefits of these foods provide a compelling reason to consume them more often.	1	2	3	4	5
D.	I would consume more of these foods if my physician or another health professional told me I would benefit.	1	2	3	4	5
E.	It would take little effort to include more of these foods in my diet.	1	2	3	4	5
F.	I have confidence that I could change my diet to incorporate more of these foods.	1	2	3	4	5
G.	I have the skills necessary to prepare these foods in order to get the health benefits they offer.	1	2	3	4	5
H.	I trust that consuming these foods will provide me with health benefits.	1	2	3	4	5
I.	I believe that the health benefits outweigh any potential inconvenience or additional cost of these foods.	1	2	3	4	5

1. Which of the following categories includes your age?
    a. 18-24
    b. 25-34
    c. 35-44
    d. 45-54
    e. 55-64
    f. 65-74
    g. 75 +

2. What is the highest level of education you have completed?
    a. Less than high school
    b. Graduated from high school
    c. Some college (no degree)
    d. Associate degree (technical/vocational)
    e. Bachelor degree
    f. Graduate/professional degree

3. Which of the following best describes your race?
    a. White
    b. Black or African American
    c. American Indian or Alaska Native
    d. Hispanic/Latino/Spanish
    e. Asian
    f. Native Hawaiian or other Pacific Islander
    g. Other (please specify) _____
    h. Don't know

4. What is your gender?
    a. Male
    b. Female

5. In general, would you say your overall health is …
    a. Poor
    b. Fair
    c. Good
    d. Very good
    e. Excellent
    f. Don't know

6. How much do you weigh? _____ pounds

7. How tall are you? _____ feet _____ inches

8. Which parent or guardian in the household is the main grocery shopper?
    a. Mother/Female Guardian
    b. Father/Male Guardian
    c. Other (please specify) _____

9. What is your marital status?
    a. Single
    b. Married
    c. Divorced
    d. Widowed
    e. Other (please specify) _____

10. Please list the age(s) of the child(ren) 18 years of age or younger currently living in your home.

_____	_____	_____
_____	_____	_____
_____	_____	_____

11. Which of the following categories includes your total annual household income?
    a. Less than $35,000
    b. $35,000 to less than $50,000
    c. $50,000 to less than $75,000
    d. $75,000 to less than $100,000
    e. $100,000 to less than $150,000
    f. $150,000 and above
    g. Don't know

12. Which school district does your child attend?
    Lafayette County School District _____
    Tupelo Public School District _____

We appreciate the time you have given to participate in our research study.
THANK YOU!

VITA

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