



An Examination of Parental Influences on Eating Habits of School age Children

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Abstract

This study examined the factors that influence caregivers' dietary behaviors and their perceptions of their children's consumption of fruits and vegetables. A survey instrument, framed by the Social Ecological Model, was administered to parents or caregivers whose children attend school in Leon County, Florida. Inclusion criteria for participants included being 18 years of age or older and being a parent or caregiver of a school aged child. There were a total of 178 participants.

Results show that the percentage of parents in the study who consume at least five fruits and vegetables daily are low. Parents who report consuming recommended amounts of fruit and vegetable servings daily, also perceive that their child(ren) consume fruits and vegetables daily. However, the factors associated with parental consumption of fruits and vegetables (race/ethnicity and breakfast most days) differ from the one associated with child fruit and vegetable consumption (parental approval). This study also highlights parents' perceptions of the school setting as a secondary source of fruit and vegetable availability for their children, with the home being a primary source.

Keywords: fruit and vegetable consumption; parental perceptions;

1. Introduction

More than one third of United States adults are considered obese [1]. In recent years, obesity has reached epidemic proportions. This occurs particularly in populations whose environments encourage physical inactivity and increased ingestion of high-calorie foods [1]. Obesity also affects 17% of all children and adolescents in the United States.

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Adolescents who are obese are likely to be obese as adults and are therefore more at risk for health problems that normally have their onset in adulthood. Such health problems include type 2 diabetes mellitus, cardiovascular disease, gallbladder disease, hypertension and cancer [2]. Obese children and adolescents have a greater risk of social and psychological problems, such as discrimination and poor self-esteem, which can continue into adulthood [3].

Obesity results from an energy imbalance, which may involve a high caloric intake and a low amount of physical activity [1]. Body weight is also the result of the interaction of factors on multiple levels, including genes, metabolism, behavior, environment, culture, and socioeconomic status. Poor diet and physical inactivity are the most important factors contributing to an epidemic of overweight and obesity affecting men, women, and children worldwide [1]. Even in the absence of overweight, poor diet and physical inactivity are associated with major causes of morbidity and mortality in the United States [4].

Dietary behaviors, especially fruit and vegetable intake, have direct links to health outcomes. Fruit and vegetables are important components of a healthy diet, and their sufficient daily consumption may help prevent major diseases, such as cardiovascular diseases and certain cancers [5]. Worldwide, roughly 1.7 million (2.8%) of deaths are attributable to inadequate consumption of fruits and vegetables. Insufficient intake of fruit and vegetables is estimated to cause around 14% of gastrointestinal cancer deaths, roughly 11% of ischemic heart disease deaths and 9% of stroke deaths [5].

In the United States, fruit and vegetable consumption is low overall, although average consumption is higher in some states than others [6]. The 2010 Dietary Guidelines for Americans describes a healthy diet as one that includes emphasis on the consumption of fruits, vegetables, and whole grains, lean protein based foods, with low amounts of fats, cholesterol, salt, and added sugars [4]. Based on the Guidelines, the U. S. Department of Agriculture Center of Nutrition Policy and Promotion emphasizes a plant-based diet for Americans 2 years and older, or that half of one's plate or meal consists of fruits and vegetables [4].

On average, adults in the United States consume fruit 1.1 times per day and vegetables about 1.6 times per day. In the state of Florida, average fruit and vegetable consumption among adult matches the national average [6]. In Florida, 37.7% of adults report consuming fruit less than one time per day and 22.6% report having vegetables less than one time per day [6]. Among adolescents, 37.2% report fruit less than once a day and 42.1% less than one time a day consuming vegetables. The CDC report also tracks a number of environmental and policy indicators of fruit and vegetable consumption such as the number of healthier food retailers in a census tract and having a state-level farm to school / preschool policy [6]. The state of Florida ranks high in the number of healthier food retailers and does have a farm to school policy [6].

In Leon County in 2012, it was reported that 63.9% of all adults do not consume five servings of fruits and vegetables per day [7]. Five fruit and vegetable servings per day has been the recommended minimum amount for consumption, so this data indicates that most adults in Leon County were not consuming the minimum amount recommended [7].

The importance of fruit and vegetable consumption among adults cannot be overemphasized, especially considering the influence of adult behavior on children. The primary role of a parent is to meet the child's basic everyday necessities, including sustenance [8]. Research suggests that both parents' and children's diet quality is less than optimal. However, parent's perception of their child's diet may not accurately reflect this reality. Parental perception of children's diets may be influenced by a number of factors [9]. Parent attitudes and perceptions are just as important to address as is knowledge, because parents must first be able to recognize that a child's diet may be lacking, before knowledge of how to make the necessary changes can be applied [8].

The factors that influence parental eating habits are associated with child diet and physical activity, and weight status [10]. These factors include parental attitudes, parental behaviors, and external factors. This study sought to answer the following research questions: Is there a significant difference between the fruit and vegetable consumption patterns of parents based on parental perception of child fruit and vegetable consumption? Which factors influence parental dietary behaviors? Which factors influence parental perception of child dietary behaviors?

2. Materials and Methods

2.1 Study Population

Data for this study was collected using a cross sectional survey. Inclusion criteria were being over 18 years of age and being a parent or caregiver of a school-aged child. A total of 178 participants were recruited from selected intercept locations in Leon County, Florida area between January and April of 2014.

Paper and pencil surveys were completed by participants at intercept locations and were provided in English only. Participants were recruited from a local catholic school, after school program, local churches (one Catholic, one Baptist), and a child development center. Surveys were distributed with an information letter explaining the study and an approved educational pamphlet regarding nutrition and serving sizes attached. Written permissions were obtained from each site prior to the study.

2.2 Conceptual Framework

The conceptual framework for this study is based on the parental factors identified in the literature (intervention studies) as having an association with child diet and physical activity as summarized by Skouteris [10]. Four categories of relevant factors were identified: 1) parent cognitions and beliefs, 2) parent behaviors, 3) parenting, and additionally, 4) external factors. Selected beliefs and behaviors were examined in this study. In addition, guided by the Social Ecological Model (SEM) as described by Robinson [11], the study considers the parental factors as influencing child eating behaviors through multiple levels of influence including the social and environmental levels with policy-level implications. Ultimately, this study operationalizes the SEM as a planning model for a planning intervention employing two of its key concepts, 1) behavior affects and is affected by multiple levels of influence, and 2) reciprocal determinism in which individual behaviors shape and are shaped by individual level factors, such as cognitions, and the physical and social environment [11]. In this study, parental behaviors will be examined both as dependent variable, and a predictor of parental perceptions of child behavior.

2.3 Instrumentation

Survey questions were developed based on findings in the literature and were conceptually framed by the Social Ecological Model. The survey was designed to explore multiple levels of influence on dietary behavior and the interactions between levels. The questions were designed to elicit responses to key factors that are relevant to current eating habits and dietary choices for parents, as well as parents' perceptions of their child or children's dietary behaviors. The study protocol was approved by the Institutional Review Board at Florida Agricultural and Mechanical University.

The primary goal of this research is to explore the outcome measure of parental perceptions of child fruit and vegetable consumption as predicted by parental behavior and beliefs. Measures examined child fruit and vegetable consumption and included an open-ended response to identify the source of the fruits and vegetables consumed. Respondents answered Yes or No to the question "Do you believe that your child is getting at least one serving of vegetables a day?," which was followed by an open-ended response, "If yes, from where? (Home, school, etc.)".

Parent cognitions and beliefs in this sample were measured using a single item which assessed parental attitudes toward healthful eating. Respondents were asked to rate a single item regarding their value of the importance of healthy eating on a scale from 1 (not at all) to 5 (very important). Using the same rating scale, participants were asked to evaluate the importance of keeping fruits and vegetables in their home. The availability of fruits and vegetables in the home has been shown to influence intake for some children [12].

Parental behaviors were examined by asking respondents about their breakfast, fruit, vegetable, and fast food consumption. Participants rated each item based on the number servings of both fruits and vegetables on average that they consumed each day in the previous week, from no servings to more than five. In addition, fast food consumption was measured from 0 days to more than 5 days. Fruit consumption and daily breakfast consumption have been found to be associated with having a healthy body weight [14].

The behaviors of parents can be a response to children's weight status, but the feeding practices of parents can

cause certain child eating behaviors that in turn may influence weight development [15]. General parenting was measured using a question asking participants to rate the degree to which they believed their own parents would approve of their feeding style. This unique item was included as a measure of the familial/cultural influences that form the basis of parental behaviors. Studies have shown that parents' attitudes and behaviors are influenced by many unique human factors, including culture, cuisine, economics, ethnicity and education [8], therefore external factors were also examined in the study. Research has shown that a key factor that has negatively influenced parental eating habits is work related stress [16]. Participants were asked to rate the degree to which both finances and work each hinders their ability to eat fruits and vegetables or to prepare healthy meals, respectively.

Socio-demographic characteristics that were examined included race/ethnicity, educational attainment and marital status. A 5- point Likert-type scale was used to quantify response categories in addition to multiple choice and categorical options. Open-ended questions pertaining to parents' perceptions of children's fruit and vegetable sources allowed for richer descriptions of these perceptions.

3. Results

3.1 Data Analysis

Data was analyzed using version 19 of Statistical Package for the Social Sciences (SPSS). Fruit and vegetable consumption was assessed for all participants. Participants reported the number of servings per day that they consumed both fruits and vegetables which resulted in a score ranging from 0 (none) to 6 (more than five servings) for both variable. The average number of servings for fruit consumption was 2.65 servings, and the average servings per day for vegetables was roughly 3.2 servings. The average of combined fruit and vegetable consumption per day was 2.93. Both variables were also collapsed into categorical variables indicating consumption of fruits and of vegetables in recommended amounts. For vegetables, three or more servings or less was a binary categorization. For fruits, 2 or more servings or less than 2 was a binary categorization. For fruit consumption, 24.6% of adults reported they consumed the recommended amount of fruit and for vegetables 36.5% reported consumption of the recommended amount. Further collapsing the variables together, a combined calculation of parents who consumed at least five fruits and vegetables daily determined that only 19% (45) of parents consumed at least five servings of both fruits and vegetables daily.

Frequencies for factors related to parental fruit and vegetable consumption were also analyzed and included attitude, work and financial barriers, and other dietary behaviors (eating out, eating breakfast). Roughly 57% of parents rated healthy eating as very important to them. Financial barriers were reported to either often or always prevent healthy eating among 13.1% of the respondents. Among 40.9% of respondents, work was reported to present a significant barrier to the preparation of meals at home. For fast food consumption, 19.1% of participants reported not eating from a fast food restaurant, while 15.7% reported eating out most days (4 or more) of the week. For breakfast consumption, 31% of participants reported eating breakfast between one and three days a week and 67% reported eating breakfast most days of the week.

The main outcome of interest for this study was children's fruit and vegetable consumption as perceived by the parent/caretaker. The results showed that 88.8% (n=158) of parents believe their child is consuming fruit each day. Of these, 56.5% of participants reported that their child receives their fruit from home, 9.2% of participants reported that their child receives their fruit from school only and 34.4% of participants reported both home and school as a source of fruit for their child(ren). Descriptive statistics of the child vegetable consumption item showed that 80.9% of participants believe their child is eating at least one serving of vegetables a day. Of these, 62.3% of participants reported that their child receives this daily serving of vegetables at home, 5.7% of participants reported that their child receives their vegetables from school, 31.1% of participants reported that their child receives vegetables from both home and school and .8% of participants reported that their child receives their vegetables from another source.

To answer the first research question, a correlation conducted to test the association between the fruit and vegetable consumption patterns of parents based on parental perception of child fruit and vegetable consumption. Results show a statistically significant and positive, but moderately weak relationship between parental fruit and vegetable consumption and child fruit and vegetable consumption perception. This means parents who stated that they consume the appropriate amount of fruits and vegetables daily perceived that their children also consume at least one serving each of fruits and vegetables each day.

Table 1. Correlation between parent behavior and child perceptions

Parent Perceives that Child Consumes at least one Fruit and Vegetable Daily				Spearman's rho Correlation Coefficient	Sig (2-tailed)
	Less than 5 fruits and vegetables per day	5 or more fruits and vegetables per day			
Yes	24	5	29	.288	.000*
No	62	77	139		
Total	86	82	168		

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

Logistic regression was performed for the outcome of parent perception of child fruit and vegetable consumption. The goal of this additional step was determine not only the strength and direction of the relationship between the two variables, but also the odds of parents perceptions of their child(ren)'s fruit and vegetable consumption being influenced by parents own consumption. In this model, parents who consume higher amounts of fruits and vegetables were nearly six times more likely than those who did not to perceive that their children consumed at least one serving each of fruits and vegetables.

Table 2. Odds ratio of Parent Behavior and Parent Perceptions

Child Fruit and Vegetable Consumption	Perceived	Coefficient Estimate	Standard Error	Significance	Odds Ratio
		1.785	0.520	.001	5.961
	Constant	-1.57	0.492	.001	.208

Next, logistic regression models were fit to each outcome. Independent variables predicted parent fruit and vegetable consumption as well as parent perceptions of children's fruit and vegetable consumption. Binary logistic regression was performed to assess these outcomes. The model contained eight independent variables, including: breakfast consumption days per week, work load as a barrier to food preparation, having eaten fast food most days of the week, approval of parental feeding style by grandparents, frequency of financial barriers to food acquisition, and attitudes toward the importance of healthy eating. Race and educational attainment were also included in the models.

For parent fruit and vegetable consumption, the full model containing all predictors was statistically significant, χ^2 (df = 8, N = 170) = 15.39, $p < .05$, indicating that the model was able to distinguish between respondents who reported eating at least five fruits and vegetables typical day and those who reported consuming less. The model as a whole explained between 8.9% (Cox and Snell R square) and 11.9% (Nagelkerke R squared) of the variance in parent fruit and vegetable consumption, and correctly classified 68.1% of cases. As shown in Table 1, only two of the independent variables made a unique statistically significant contribution to the model (race and eating breakfast on most days of the week). The strongest predictor of consuming at least five servings of fruits and vegetables was whether or not parents ate breakfast on most days of the week, recording an odds ratio of 1.246. This indicated that respondents who had ate breakfast were slightly more likely to consume more fruits and vegetables daily than those who did not have breakfast, controlling for all other factors in the model. This might be a hint that breakfast may be an important meal for parents who have the goal of consuming more fruits and vegetables. In addition, the results indicate that non-white parents are 1.5 times more likely to consume the recommended amount of fruit and vegetable servings per day than are white participants. This outcome reflects the current literature which indicates variable relationships with race that sometimes indicate that minorities, mainly Latino, often have higher fruit and vegetable consumption [17]. In this study the non-White category includes all other races reported by participants as well as Latino/Hispanic ethnicity whether white or non-white.

Table 3. Regression model of parent fruit and vegetable consumption

Variable	Coefficient Estimate	Standard Error	Significance	Odds Ratio	CI
Parent FV 5 or more (DV)					
Demographic Factors					
Race	.733	.363	.033	2.167	1.065 - 4.410
White vs non White					
Education Level	.366	.368	.319	1.442	.701 - 2.966
Bachelors or higher					
Parent Behaviors					
Fast Food Most Days	.064	.485	.896	1.066	.412 - 2.759
Breakfast Most Days	.220	.102	.031	1.246	1.020 - 1.522
Parent Attitudes					
Importance of Healthy Eating	1.704	1.132	.132	.673	.322-1.405
External Factors					
Work Load	-.396	.375	.292	.673	.322 – 1.405
Finances	.428	.513	.404	1.535	.561 – 4.198
Parenting Factors					
Parents Approval of Feeding Style	.247	.428	.591	1.280	.521 – 3.143

*Significant at the p < .05 level

For parent perceptions of child fruit and vegetable consumption, the full model containing all predictors was statistically significant, χ^2 (df = 8, N = 165) = 21.359, p < .05, indicating that the model was able to distinguish between respondents who reported eating at least five fruits and vegetables on a typical day and those who reported consuming less. The model as a whole explained between 12.1% (Cox and Snell R square) and 20.1% (Nagelkerke R squared) of the variance in parent fruit and vegetable consumption, and correctly classified 82.4% of cases. As shown in Table 4 only one of the independent variables made a unique, statistically significant contribution to the model (parents approval of feeding style). Thus, the strongest predictor of parents' perception of their children's fruit and vegetable consumption was whether or not parents believed that their own parents approved of their feeding style with their children, recording an odds ratio of 3.953. This indicated that respondents who believed their feeding style would meet the approval of their own parents were nearly four times more likely to perceive that their children ate at least one serving each of fruit and vegetable, controlling for all other factors in the model. This might signal that grandparents and other significant family members may have a strong influence on parents' behavior and perceptions through normative, cultural, or reinforcing pathways of influence.

Table 4. Logistic regression of parent perceptions of child(ren)'s daily fruit and vegetable consumption

Variable	Coefficient Estimate	Standard Error	Significance	Odds Ratio	CI
Perceived Child daily FV consumption DV (yes/no)					
Demographic Factors					
Race	.433	.485	.372	1.542	.596 - 3.991
White vs non White					
Education Level	-1.028	.603	.088	.358	.110 - 1.167
Bachelors or higher					

Parent Behaviors						
Fast Food Most Days	-1.145	.594	.054	.318	.099 -	1.019
Breakfast Most Days	.041	.140	.427	2.018	.791 -	1.371
Parent Attitudes						
Importance of Healthy Eating	.702	.883	.132	5.495	.357 -	11.397
External Factors						
Work Load	-1.224	.678	.071	.294	.078 -	1.109
Finances	.807	.754	.284	2.242	.512 -	9.818
Parenting Factors						
Parents Approval of Feeding Style	1.374	.528	.009*	3.953	1.404 -	11.128

*Significant at the $p < .05$ level

4. Conclusions

The results of this study indicate that both parent and child fruit and vegetable consumption are below the recommended amounts for both parents and children. The study provided insight to factors that influence parents' eating habits as well as the perceptions that parents have about their child receiving appropriate servings of fruits and vegetables. The results indicate that the factors that influence these parent behaviors may not be the same ones that influence their perception of their children's behavior. Non-whites and breakfast-eaters reported higher parent fruit and vegetable consumption. However, the single factor that appeared to influence parents' perception of their child(ren)'s fruit and vegetable consumption was whether they also perceived that their own parents approved of their feeding style for their children. Because the study involves perceptions and attitude, the link between these two factors is important because this unique finding provides a different perspective for the numerous studies that already examine the influence of parental feeding styles (e.g. permissive or restrictive control over food) [18] but may not adequately explore the familial influences or underlying beliefs that are the genesis of specific parenting practices.

Results also revealed that parents' perceptions that children were consuming at least one serving each of fruits and vegetables coincided with parents' report that the child(ren) consumed them, especially vegetables, at home.

4.1 Limitations

As with many self-administered surveys, self-reported data is a major limitation of this study. Social desirability of responses and the accuracy of participants' food recall both have the potential to limit the reliability of the data collected. In addition, a direct measure of child fruit and vegetable consumption was not measured, but rather parent perceptions which might be prone to bias as well.

This study was also delimited by the intention to assess certain factors in specific geographic area and population. These data and the results of the study are not intended to be generalized to a larger audience, although the findings of the study offer valuable insights to research in the area of parental fruit and vegetable consumption. The survey administration of the survey was limited to English only and to adults only. Therefore no direct measures of child dietary behaviors were assessed in this study.

Finally, although data analysis showed significant results in each regression model, each model only explained a relatively small percentage of the variance in each outcome. Therefore, other factors not addressed in this study may also play a significant role and suggest areas for further research.

4.2 Future Research

Further research might explore family and environment issues at greater depth using qualitative methods. Specific interventions designed around the lessons from this research may indicate that grandparents or other

significant family members who play a role in the decision making regarding household food and who ultimately act as a normative or instrumental influence on children's food consumption. Researchers may be interested in knowing more information about the children such as their grade levels or age. This will allow for a closer look as to how child behaviors vary by their developmental (age) and educational levels (elementary, middle, high school). Surveys for future research should also include more meaningful questions regarding income and food security such as annual income or receipt of food subsidy or assistance such as free or reduced lunch.

Fruit and vegetable consumption has been shown to have health benefits beyond weight reduction or obesity prevention. The importance of the consuming adequate amounts of fruits and vegetables needs to be communicated to caregivers. In addition, social and environmental supports such as community, school, or home gardens might support parents' intentions toward increasing fruit and vegetable consumption for themselves and their family. The influence of various media channels also influence the social environment and should also be considered.

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