Using Experimental Economics to Measure the Role of Parental Generosity and Food Control in Childhood Obesity

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Abstract

This research uses experimental economics to measure the effect of parental generosity and child response on childhood overweight and obesity. The 'Carrot-Stick' experiment, an adaptation of the standard dictator game in which the respondent (the child) can punish or reward the dictator (the parent) based on the dictator's generosity, served as basis of our examination. Two treatments are conducted, in which the child spends his or her earnings on non-food and food items. Our empirical analysis shows significant relationships between parental weight and their level of generosity regarding food items. We conclude that child response behavior, obesigenic factors in the household, and the child's tendency toward being overweight and obese are significantly related.

Key Words: Overweight, Obesity, Childhood, Family, Bargaining, 'Carrot-Stick,' Dictator, Experimental Economics

Introduction

Over the last 30 years, childhood obesity increased from 4% to 17% among children and adolescents between 6 and 11 years of age in the United States (Centers for Disease Control and Prevention/National Center for Health Statistics (CDC/NCHS) 2004a, 2004b, 2006; Institute of Medicine (IOM) 2004; Ogden et al. 2006).[2] Overweight children face higher risks for heart disease, sleep apnea, and social and psychological problems, including low self-esteem. Studies indicate childhood obesity tends to persist into adulthood, which increases the risk of a multitude of chronic disease health risks that are related with high costs to the individual and the society (Mokdad et al. 2000; Finkelstein, Fiebelkorn, and Wand 2004; CDC 2007a) . While family genetics do influence an individual's susceptibility toward childhood obesity, the rapid change in its prevalence is believed to be due primarily to changing environmental and behavioral factors (Hill 1998; French, Story, and Jeffery 2001; Friedman 2003 and 2004).

Previous research suggests that a child's exposure to various familial and environmental factors may be significantly affected by the parenting style (Agras and Mascola 2005; Rhee et al. 2006). Parental control can be executed with regard to feeding behavior, such as the frequency of or child's participation in family meals. Research shows that attitudes and behaviors towards food and eating are significantly influenced by behavioral factors in the family (Birch and Fisher 1995; Strauss and Knight 1999; Gable and Lutz 2000; Stang, Rehorst, and Golicic 2004; Patrick et al. 2005; Fiore et al. 2006). Families influence the timing, content, quantity, and location of meals, even when the children are school-aged (Birch and Fisher 1998; Faith et al. 2004; Stang,

[2] Overweight and obesity is categorized by the Body Mass Index (BMI), which is determined by the formula: weight (in kilograms)/height^2 (in meters). Among adults, overweight is classified by a BMI between 25.0 and 29.9, while a BMI greater than or equal to 30.0 defines obesity (Centers for Disease Control and Prevention (CDC) (2007a). Overweight in children is typically not referred to as "obesity", though these terms will be used interchangeably in this proposal. Overweight in children is defined as a body mass index that surpasses the 95th percentile of a fixed distribution for a child's age and gender. Children who are above the 85th percentile are considered at-risk of overweight (CDC (2007b).

Rehorst, and Golicic 2004). Families also model attitudes towards food by providing and encouraging the consumption of different foods based on a range of factors, including nutritional knowledge (Variyam, Shim, and Blaylock 2001; Davison and Birch 2002; Cooke et al. 2003; Davison, Francis, and Birch 2005; Wardle, Carnell, and Cooke 2005) .

In addition, parents also control environmental factors in the household (Agras and Mascola 2005; Gillman et al. 2000; Spear 2006). Several studies suggest that the weight status of children may be influenced by these environmental factors, such as TV-watching and playing video games (Dietz 1991; Storey et al. 2003). Researchers have found that as the hours of television children watch per day increase, so do the odds of becoming overweight, given that television viewing supplants the possibility of other more active activities (Strauss and Knight 1999; Agras and Mascola 2005; Salmon et al. 2005). Furthermore, many television shows targeted at children also feature advertising for high-calorie, high-sugar and energy-dense foods which is believed to be related to an increase in consumption of such products (see Strauss and Knight 1999 for a review). Eating meals in front of the television may also negate some of the positive aspects of family meal times in terms of health. For example, watching television during meals has been found to be related to lower fruit and vegetable consumption and higher fat consumption in adolescents and adults (Boutelle et al. 2003; Schroeter, House, and Lorence, 2007). Parents can play a role by limiting television and video games or other sedentary activities (Ritchie et al. 2005; Lindsay et al. 2006), however there is a need to determine the impact of parental control on television watching

Thus, one of the challenges in understanding childhood overweight and obesity is to further understand the impact of parenting on familial and environmental factors in the household. There is a need to determine whether parental generosity differs with regard to food

and non-food items. Furthermore, it is important to determine the child's response to giving patterns and whether the child's weight and parental weight status are related to differential giving patterns.

In addition to ethnic minority groups, such as Hispanics and African-Americans, one of the most obesity-susceptible populations appears to be low-income families who tend to consume lower quality diets, consisting mainly of high-calorie foods (Drenowski 2003; Sigman-Grant 2003; Townsend et al. 2001; The Economist 2002; Sobol and Stunkard 1989; Jeffery, French, and Spry 1991; Gortmaker et al. 1993; Jeffery and French 1996; Galobardes, Morabia, and Bernstein 2000; Wang 2001; Cutler, Glaeser, and Shapiro 2003; Chou and Grossman 2004;Galuska et al. 1996; Flegal et al. 2002; Kumanyika and Grier 2003). However, not all low-income families have overweight children. Thus, families vary significantly in the choices they make regarding food purchases and healthful eating. There is a need for studies that explain *why* certain economic changes m and demographic characteristics lead to increased incidence of childhood obesity in some low-income families and not in others.

The goal of this research is to measure the economic behavioral decision-making process in low-income families. In particular, it will be investigated whether parental generosity around food is different from that related to non-food items. Using an experimental design allows to further explore behavioral dynamics between parent and child and to examine the degree to which the child may engage in negotiations in food and non-food situations. Such knowledge may help to explain the economic behavioral decision-making processes that influence families' ability to navigate obesigenic environments.

Background

Macro-level economic analysis of childhood obesity determined that mother's education, ethnic origin, family size, participation in food assistance programs, income, and other socioeconomic variables impact (Anderson, Butcher, and Levine 2003; Ruhm 2004). Only a small number of microeconomic studies have showed that relative changes in food prices, income, and time constraints change the family's diet composition, which may impact the prevalence of overweight and obesity (Drenowski 2003; Mancino and Kinsey 2004; Schroeter, Lusk, and Tyner Forthcoming). The complex choices parents make regarding the given quantity, quality, and variety of food available may impact children's weight outcomes. While adults regularly act as direct price takers in the market place, children do not engage in this role. Their food consumption depends upon economic behavior relationships within the household.

Parental control with regard to feeding behavior can be negative if parents limit children's abilities to self-regulate their food intake. Extreme control over what children eat can also "backfire" and actually cause children to desire the foods that parents are attempting to limit. This ultimately can lead to disruption of normal energy intake, overeating, and subsequent weight gain. Overly-permissive parenting or parenting that lacks in sufficient food oversight may also result in childhood overweight because these children do not learn to limit their intake of unhealthy food choices. The healthiest child weight outcome results from an authoritative parenting style, in which parents encourage healthy eating and give the children the ultimate food choice (Birch and Fisher 1998; Birch and Fisher 1995; Patrick and Nicklas 2005, Patrick et al. 2005; Rhee et al. 2006; Ritchie et al. 2005).

However, it is also important to acknowledge that the parent-child relationship is a dynamic relationship with influences coming from both parent and child (Kotchick and Forehand

2002). During day-to-day interactions, children and parents struggle with the power balance that is an inherent part of the relationship. Parent-child relationships are complex due to their very nature; they are often inconsistent, full of emotions, and complicated by factors such as gender, age, and personality. Children are active players in the daily lives of their families, and resistance and challenges to the rules are normal and acceptable (Grieshaber 1997). It can be argued that the parent-child relationship exists within a culture of negotiation (Du Bois-Reymond, Buchner, and Kruger 1993), and negotiations regarding food are but one of the many issues parents and children negotiate in their day to day lives. Families may vary in the degree to which food-related negotiations occur, and this variability may be related to weight-related outcomes, and reflected in the behavior of both parent and child in our experiments. Parent giving behavior is an important variable to consider, as well as child response. Both parent and child response may be indicative of economic behavioral decision-making processes, behaviors, and weight status within the household. Thus, in order to understand the family's decision making process, it is important not only to access the parent's decision behavior, but also the influence of the child on those decisions.

Following the seminal work of Becker (1976), family household economic behavior has been modeled but not in regard to childhood overweight and obesity. Despite the abundant availability of economic tools to understand individual and household economic behavior, there have been limited attempts to use them in relation to current childhood obesity problems in the United States. Household modeling has been used with secondary data (e.g., Mancino and Kinsey 2004). However, such studies' reliance on secondary data may be limiting our understanding of childhood obesity and the role of lower-income in its prevalence.

In his 2003 Nobel Laureate address, Vernon Smith points out that over the last 20 years, experimental economic methods have made great gains in understanding individual behavior, bargaining interaction between individuals, and market mechanisms (Smith 2003). Since then, a rising trend is to use experimental economic methods to understand household-level interaction. In addition, experiments are a means to obtain snapshots of behavior that are endemic to certain types of groups and individuals. For example, Henrich et al. (2001) use the ultimatum bargaining experiment across fifteen small-scale, culturally diverse societies, to determine how culture shapes individuals' ideas of fairness. However, this is mainly seen in the development economics literature (Ashraf 2005; Eckel et al. 2006) and not with regard to childhood obesity.

Previous research suggests that economic experiments allow us to measure and understand economic behavior which may influence food allocation in the household, such as familial time preference, risk preference, and generosity and negotiation norms (Eckel and Grossman 2002; Harrison, Lau, and Williams 2002; Holt and Laury 2002; Andreoni, Harbaugh, and Vesterlund 2003). Harbaugh, Krause, and Liday (2003) use economic experiments to determine how bargaining expectations develop in children. In these experiments, the ultimatum bargaining game is played between child pairs. They find that children do have developmental differences in their ultimatum bargaining expectations that are influenced by culture. This idea has yet to be examined in a parent-child context. Adapting this or a similar experiment to a parent-child context may provide insight into parent-child dynamics related to parenting styles.

Methods

In this study, we use economic experiments as a method to extract differences in economic behavior which underlie family decisions regarding nutrition and fitness. In order to understand the dynamics of the child's role in bargaining for food, we propose a bargaining

experiment in which the child has two different options to spend his or her earnings in the laboratory across two different treatments: one where his or her earnings may be spent on non-food and another where he or she may spend the earnings on food items.

The primary null hypotheses to be tested in this paper include the following:

H_{01}: There is no significant difference in parent giving based on the child's weight status for either the non-food or food treatments.

H_{02}: There is no significant difference in parent giving based on the parent's weight status for either the non-food or food treatments.

H_{03}: There is no significant difference in child response based on child overweight status in the food and non-food treatments.

H_{04}: There is no significant difference in child response based on family food behavior and environmental factors.

The research methods combine the use of an economic experiment, a survey, and physical fitness measurements (e.g., step test, skin-fold test, and heart rate measurement). The economic experiment is referred to as the "carrot and stick" experiment (Andreoni, Harbaugh, and Vesterlund 2003). This experiment uses an adaptation of the dictator game often used in economic experiments (Camerer 2003). The experiments begin as a standard dictator game. The parent is given an endowment of $5 worth of tokens or 20 tokens worth $.25 a piece. The parent's task is to determine how many of these tokens he or she will give to the child. The child's spending opportunity in this experiment follows general methods developed in previous economic experiments for children (Harbaugh, Krause, and Vesterlund 2002). The child has the option to spend these tokens in an experimental toy store in the first treatment of this experiment. Following Andreoni, Harbaugh, and Vesterlund (2003), the experiment deviates from the

standard dictator game after the child receives the tokens. The child counts the tokens that his or her parent sent. Then, the child has three options, they can 1) increase the number of tokens their parent has, 2) decrease the number of tokens their parent has, or 3) make no change to the number of tokens their parent has. If the child chooses options one or two, he or she must make a payment of one token to the experimental bank for his or her parents to either receive or lose any tokens. To measure the effect of food on parents giving behavior and children's control, the experiment is repeated one more time. This time, everything is the same, except that the child will spend the tokens he or she receives in a snack store. The snack store is stocked with food similar to that one would find in a vending machine or convenience store. Parental generosity and control around food may then be measured from treatment one to treatment two. While it is expected that many parents may change their giving from the first to second treatment, parents with greater (or less) control may change their giving behavior more (or less) from treatment one to treatment two. The power of the child's role in the bargaining relationship is measured by his or her tendency to make any change to his or her parent's giving decision.

After the parents and their child complete the economic experiments, the parent fills out a questionnaire that consists of three different parts. The first section includes a series of questions designed to measure attitudes and behaviors known to be related to childhood overweight and obesity. This section includes questions related to food habits (e.g., consumption of soft drinks at meals, importance of family meal times), environment (e.g., presence of television and video games in the home, distance of home from nearest park), nutritional knowledge (e.g., does the parent read food labels?), food purchasing behavior (measures roles of price, health concerns, child preferences, taste on food purchasing decisions), household food security (e.g., is having enough money to buy food ever a problem?), and physical activity (e.g. how often do you play

outside with the child?). The nutritional knowledge questions are based on those in the United States Department of Agriculture's Continuing Survey of Food Intakes by Individuals (CSFII 1994-1996, 1998) and the Diet and Health Knowledge Survey (DHKS 1994-1996) (Agricultural Research Service 2007). The second part of the survey measures parental feeding behavior and it is based on the Caregiver Feeding Styles Questionnaire (Patrick et al. 2005). This instrument was originally designed for use with preschool aged children, and will be adapted for use with school aged children for the purposes of this study. The third part of the survey includes questions designed to collect basic demographic and socioeconomic variables (e.g., age, ethnicity, annual income, etc.).

The final task the subjects complete is a physical fitness assessment. At the end of the economic experiments and questionnaire, the physical weight and height of all of the family participants is measured using a standard medical scale. In addition, a skin-fold test and three minute step test is measured by using a tool that gently squeezes various areas of the body (such as arm, thigh, back, and stomach) to calculate the amount of fat stored beneath the skin. Fitness levels are estimated using a 3-minute step test. During this test, the subjects are asked to wear a heart rate monitor while stepping up and down a step box to a beat set by a metronome. Heart rate and blood pressure are measured before, immediately after, and 3 minutes after the test. Blood pressure is measured similar to how it is measured in a physician's office.

Data

Data was collected from 39 low-income families with children between the ages of 6 and 10 in Laramie, Wyoming from May to December 2006.[3] The primary feeding parent and one child were asked to come to the laboratory.[4] Each family was guaranteed a $10 show-up fee for their participation. They each participated in three economics experiments (a time preference experiment, risk preference experiment, and the current 'carrot-stick' experiment) and their expected earning from all of the activities ranged from $70 to $150.

The physical and demographic characteristics of the experiment participants are displayed in Table 1. On average, the parents in the study were obese (Body Mass Index greater or equal to 30) with a mean Body Mass Index (BMI) of 32.52. The highest BMI was 46. Only five of 37 parents permitting a BMI measurement had a BMI below 25. In other words, 86% of the sample was overweight or obese. Eight parent participants had BMI measurements between 40 and 46. Measurements of the child subjects' weight percentiles show the mean child weight percentile is 66.91. On average, the children in this study were normal weight or underweight or fell below the 85^{th} percentile. However, 15 of the 37 children measured were at least in the 85^{th} weight percentile. In addition, consistent with other studies of low-income populations, a number of children were underweight or approaching underweight (e.g., BMI<15). A plot of the child weight percentile data is presented in Figure 1. One will observe that there is break in the distribution of children's weights across the child weight percentiles in the mid-percentile ranges. Children in this sample tend to either have a weight status approaching overweight or underweight. The average primary feeder in this study had an hourly wage of $6.52 or approximately $12,500 per year before taxes. Thirty six percent of the primary feeding parents

[3] Low-income is defined as within 185% of the poverty line.
[4] The primary feeding parent is the parent involved the most in the child's meal and snack preparation. In families where the role of child feeding is shared, either parent was allowed to be in the study.

were single. 15% of households had an additional non-parent member, such as a grantparent, aunt or uncle. Finally, the average education level of the primary feeder was 12.84 years or approximately a high school diploma.

Results

The mean parent offer is displayed in Figure 2. In the first treatment, the mean of the parent offer was 56.28% (σ = 22.18 %) of the $5 endowment. This drops to 33.21% (σ = 22.20%) of the $5 endowment in the food treatment, which signifies a significant change across the nonfood and food treatments of the experiment (t-statistic=7.15, p<0.001). In addition, the frequency of the parent offers changed (χ^2 =102.2, p=0.0479). The child response, *R*, is measured as the absolute value of the percent of the endowment, *e*, that the child pays to have returned to or taken from the parent, *r*. In the non-food treatment, children responded by giving or taking an average of 13.16% (σ =21.95%) of the endowment. In the food treatment, the children's mean response was to take or give 16.32% (σ =25.41%) of the endowment. There are no significant differences in the average child response from the non-food to food treatments, but there are significant differences in the frequency of responses (χ^2 =52.75, p=0.0001). In both treatments, the majority children showed agreement with their parent or did not respond.

Given the general results of the experiment, several hypotheses of interest were tested. First, the null hypothesis was tested that there is no difference between the change in parent giving based on the child's overweight status (i.e., the child is in the 85th or higher weight percentile). Then, we tested the null hypothesis that there is no difference on parental giving behavior based on the parent's weight status for either the non-food or food treatments. Summary statistics of the parent's offers across treatments and weight groups are presented in

Table 2. The Wilcoxon statistic test was used to test the difference in distributions of parental giving behavior for overweight (85^{th} weight percentile or greater) versus normal and lower weight children (less than 85^{th} weight percentile). The null hypothesis that there is a difference in parental offers based on the child's weight category for the non-food or food treatments is not rejected. We do, however, find there is a significant difference using a Wilcoxon test in offer distributions by parent overweight status in the food treatment. Healthy parents with BMIs below 25 gave an average of 24.3% of the endowment to their children to spend on snack food. Overweight and obese parents (BMI greater than 25), on the other hand, gave an average of 35.2% of the endowment to their children to spend on snack food. The distribution in these offers was significantly different ($p<0.10$). None of the healthy parents gave their child more than 50% of the endowment to spend on the food.

The third hypothesis focuses on the child's response in the food treatment. To test the third null hypothesis, that child response is independent of weight status, chi-square and Wilcoxon statistics test for distributional differences between responses from overweight and obese children and all other children. The tests are conducted using both the original, r, and absolute value of the child's response (i.e., $|r|$). Initial, non-parametric tests do not reject the null hypothesis.

This third hypothesis is tested again in conjunction with the fourth hypothesis using ordinary least squares regression to control for other environmental and behavioral family characteristics which may influence child response. Two different models are estimated. The coefficient definitions are displayed in Table 3 and the coefficient parameter estimates are displayed in Table 4. The $|r|$ measurement is the dependent variable in the first model and r is the

dependent variable in the second model. Both the R-square and F-statistic are more robust in the first than the second model.

The absolute value of the child's second response in the food treatment is the dependent variable in Model 1. The explanatory variables include measurements from the experiment, survey questions about family food and fitness behavior, and the parent's demographic behavior. The child's second response, $|r|$, is the absolute value of the child's response in the food treatment or $|r|$. For example, if the child had 20% of the endowment taken from their parents, then $|r|=20$. Likewise, if the child had 20% of the endowment given to their parents, then $|r|=20$.

First, the coefficient estimation results indicate there are number of relationships between child's response and the experimental, familial, and demographic variables. The coefficient estimation indicates there is a significant, positive relationship between the child's ability to eat as much as s/he wants to and their tendency to respond to their parent in the carrot-stick game. Similarly, children who live in households where television in viewed during meal time were more likely to respond to their parent. The coefficient associated with parental control is highly significant and negative. Its value indicates that children whose parents believe they have control over the child's food consumption responded with nearly 55% fewer tokens than those were the parents did not report control. Parents tended to ranked price and taste as important factors in the actual food purchase decision.

Second, it is important to consider the parent's offer and how it influenced the child's giving behavior. There is a significant and positive relationship between the parent's offer and the child's giving behavior. A 10% increase in the parent's offer will lead the child to increase their response by 0.33% in magnitude. This is a relatively small effect compared to the

coefficients associated with the role of more general, family behavior and environmental variables.

Third, we consider general demographic characteristics of the primary feeding parent. If the parent was unemployed (this excluded "stay-at-home" parents), the child increased the size of their response by 27% on average. There were 3 unemployed primary feeders in the study and the children gave them 0 to 80% of the endowment in response to their offers. There were five Hispanic families in the study, and no significant difference in child response in the Hispanic families compared to non-Hispanic families was found.

Finally, we consider the parent and child BMIs and their relation to child giving behavior. There was not a significant relationship between parent BMI and child response behavior in the model. There is however, a significant relationship between the child overweight and obesity status and the child's response. The response of children who are overweight and obese increased in magnitude by 15% compared to children in less than the 85^{th} weight percentile.

The second model uses the raw or literal measure of child response as the dependent variable, *r*. Fewer explanatory variables are significant in this model, but they add more insight into the meaning of the variables in the first model. The three significant survey measures from the first model—Child Eats, Television, and Control—are also significant in the second model. The Child Eats coefficient indicates children in households where the parent reported the child eats as much has the child wants gave 11% more tokens to their parent for every incremental increase in the parent's response toward "Always." Children in households where the television is watched during meals gave 9% more tokens to their parent for every incremental increase in the parent's response toward "Always." In contrast, the children of parents who reported they (the parents) have control over food consumption gave 40% fewer tokens. Finally, the

Unemployed coefficient is also significant in this model. Its value is similar to its value in the other model. Like the other variables, the value is slightly higher.

Conclusions

This research offers a unique approach to integrating economic experiments into household behavior and environmental dynamics. The non-parametric regression analysis may offer a new way to measure parent-child dynamics and obesigenic factors in the household. The non-parametric tests resulted in three main findings: 1) parents' giving behavior differs between food and non-food situations, 2) children's responses change along with changes in parental generosity from non-food to food situations, and 3) the parent's food giving behavior relates to the parent's own weight status.

The first finding met our expectations, as we anticipated some change in parent giving due to the nature and expense of food and non-food items. The second finding was less than we had expected as only the distribution of responses changed from non-food to food treatments. The mean responses were not significantly different. At first, the third finding seemed somewhat unexpected. However, parents with a BMI<25 are considered healthy. They themselves have to make healthy food choices to maintain this health status and are also more aware of the healthfulness of the food choices their children face. They were less willing to give their children greater proportions of the endowment to spend on the snack food being sold in our study.

The results from the regression analysis indicate the behavior displayed in the carrot-stick game may be indicative of broader familial interactions and child health conditions. The insignificance of the Pleasure variable indicates the children do not have absolute domain over all food decisions—additional analysis shows other factors such as price and taste are more

important to the feeding parent in the food purchase decision. However, the significance of the Child Eats, Television, and Control do represent important food-related household behaviors. This may indicate the children that were more likely to respond in the carrot-stick game play a more important role in household decisions than other children. This may be healthy regarding many aspects of the household resource allocation process. However, in the case of food, this may also have significant, unhealthy consequences if it results in poorer nutrition leading to higher probability overweight and obesity. The significance of the child's overweight status (e.g., in the 85^{th} weight percentile or greater) may indicate that children who play too much of a role in decisions, especially those regarding food, are more susceptible to overweight. This may reflect a more permissive parenting style which has previously been shown to lead to greater incidence of child overweight and obesity in the household (Birch and Fisher 1998; Patrick et al. 2005).

There are potential policy implications for nutrition education based on this research. These results may indicate that some children are more involved in the household food-related decisions in more obesigenic households. If this is the case, and this involvement leads to adverse child health outcomes, then parents need to be more aware of the roles they need to play in the food purchase and allocation process. However, lack of parent control in food allocation may reflect a number of different constraints including time, energy, and education. To the extent that it reflects a lack of nutritional knowledge and awareness, more education is needed to ensure that parents are able to make healthy food and environment choices. To the extent that this reflects time and energy constraints, children need to have as much nutritional knowledge as possible to make healthy food choices on their own. Single working mothers may lack the time and energy to make the many decisions around food to maintain their child's diet. In this case, it is important that the children are also aware of nutritious and healthy choices.

The results of this study are preliminary in that this uses pilot data from a soon-to-be initiated, larger study. The relatively low number of observations limits the analytical and modeling possibilities for the data. Future research may include a number of adaptations, including multiple rounds of play around the food and non-food items.

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Table 1. Summary Statistics of Key Physical and Demographic Variables

Variable	N	Minimum	Maximum	Mean	Standard Deviation
Parent BMI	37	21	46	32.52	7.25
Child Weight Percentile	37	9.50	99.60	66.91	31.34
Parent's Average Hourly Wage	35	0	20	6.52	5.76
Single Parent	39	0	1	0.36	0.49
Married Parent	39	0	1	0.54	0.51
Households with Non-parent Adults	39	0	1	0.15	0.37
Parent's Years of Education	37	8	16	12.84	2.25

Table 2. Parent Offers for the Non-Food and Food Treatments

Variable	N	Minimum	Maximum	Mean Offer	Standard Deviation
Parents' Offers for Non-Food					
Parents with BMI greater than 25	32	25	100	56.41	22.66
Parents with BMI less than or equal to 5	7	30	100	55.72	21.49
Parents with Children in 85th Percentile or greater	23	25	100	54.78	22.13
Parents with Children in less than 85th Percentile	16	35	100	58.44	22.78
Parents' Offers for Food					
Parents with BMI greater than 25	32	10	100	35.2	23.4
Parents with BMI less than or equal to 5	7	10	50	24.29	13.36
Parents with Children in 85th Percentile or greater	23	15	100	32.61	23.35
Parents with Children in less than 85th Percentile	16	10	100	34.06	21.15

Figure 1. Plot of Number of Children across Child Weight Percentiles

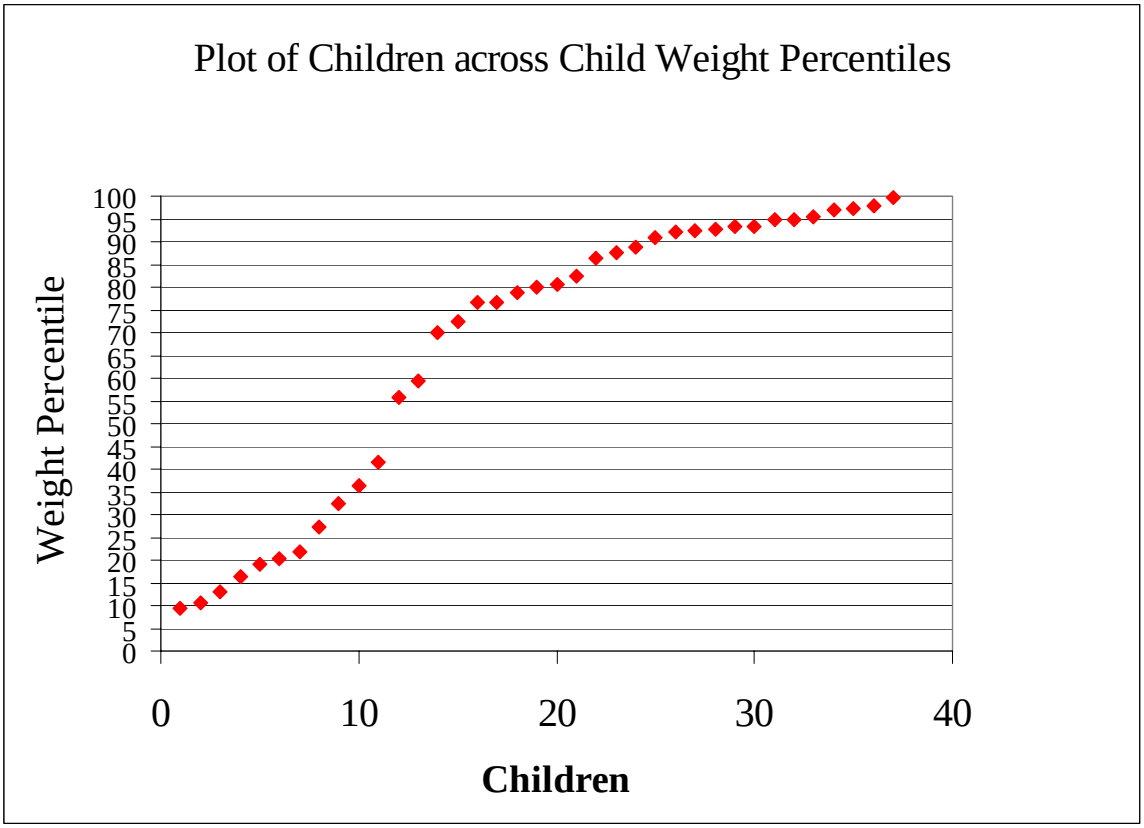

Figure 2. Plot of Parent Offer and Child Response Behavior across Non-food and Food Treatments

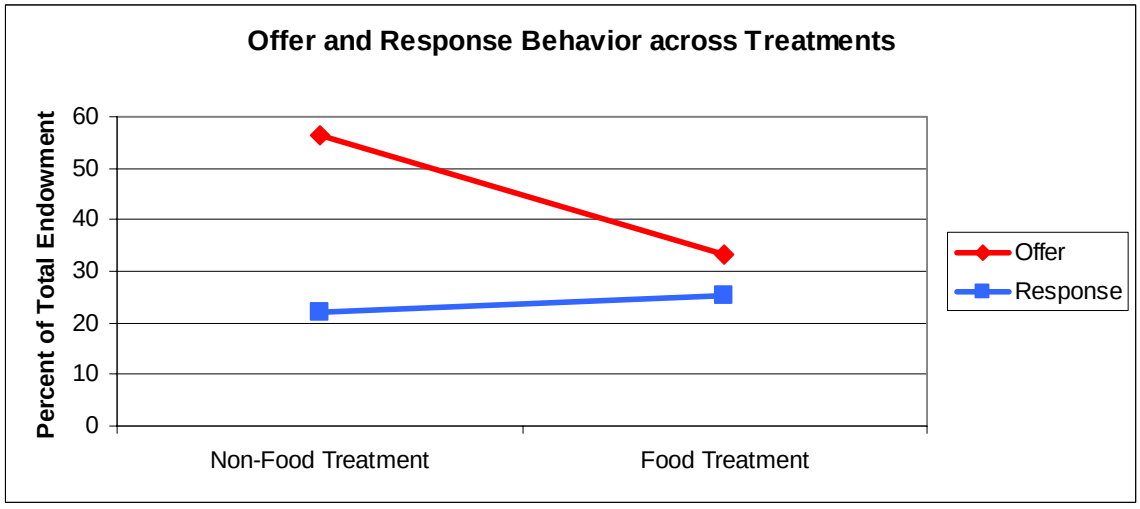

Table 3. Definition of Explanatory Variables used in Regression Analysis

Variable	Definition	Mean	Standard Deviation
Child Eats	The child eats as much as s/he wants (1=Never…5=Always)	4.03	1.04
Television	The family eats their meals with the television on (1=Never…5=Always)	2.47	1.18
Control	The parent feels he or she has control over the child's food consumption (1=Yes, 0=No)	0.95	1.18
Pleasure	The child's pleasure is a factor in the food purchase decisions (1=Never…5=Always)	3.44	0.79
Second Offer	The percent of the endowment the parent offered the child in the food treatment	33.21	22.20
Hispanic	The family is Hispanic (1=Yes, 0=No)	0.13	0.34
Unemployed	The primary feeding parent is unemployed (1=Yes, 0=No)	0.08	0.27
Parent BMI	The measure of the primary feeding parent's Body Mass Index	32.52	7.25
COWO	The child is overweight or obese (1=Yes, 0=No)	0.41	0.49

Table 4. Ordinary Least Squares Regression Results

Variable	Model 1:$\|r\|$ is Dependent Variable Coefficient Estimate (Standard Error)	Model 2:r is Dependent Variable Coefficient Estimate (Standard Error)
Intercept	3.5593	-37.5974
	(27.657)	(32.6148)
Child Eats	9.4157**	11.1639**
	(3.686)	(4.3468)
Television	6.1911*	8.9401**
	(3.1306)	(3.6918)
Control	-54.9805***	-39.0839**
	(14.7125)	(17.3499)
Pleasure	2.3246	2.5947
	(4.2275)	(4.9853)
Second Offer	0.3034*	0.2929
	(0.1529)	(0.1803)
Hispanic	12.2842	6.3943
	(10.3036)	(12.1507)
Unemployed	27.1757*	30.8950**
	(12.1956)	(14.3818)
Parent BMI	-0.5224	-.2052
	(0.5024)	(0.5924)
COWO	15.3396*	9.0547
	(7.1705)	(8.4559)
R-Square	0.6117	0.5448
F-Statistic	4.55***	3.46***

*** indicates greater than 99% significant
** indicates greater than 95% significant
* indicates greater than 90% significant