

Food Stamp Participation and Child Outcomes: The Effects of Federal Food Assistance Programs on Children's Health, Behavior, and Academic Performance

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Abstract: Among those who participate in federal food assistance programs, children comprise an overwhelming portion. While children represent only a quarter of the US population, they account for 40 percent of Americans in poverty and almost 70 percent of those on welfare. Unfortunately, this puts children at a disproportionate risk for an abundance of adverse outcomes – ranging from minor health problems to childhood obesity, negative behavioral, psychosocial, and academic outcomes – which are likely to affect the poor and food insecure population. Because such adverse effects exist among the low-income and food insecure populations, and because these are the populations most likely to enroll in federal food assistance programs such as the Supplemental Nutritional Assistance Program (SNAP), formerly known as the Food Stamp Program (FSP) – of which children comprise a disproportionate percentage – the relationship between food stamp program participation, and children's health, academic, and psychosocial outcomes is of much interest for policymakers who aim to reduce these negative effects among such a vulnerable demographic. Using 2007 data from Transition to Adulthood (TA) and the Child Development Supplement (CDS), as well as supplementary data from the Panel Study of Income Dynamics (PSID), a nationally representative longitudinal study, the effect of food stamp participation on obesity, body weight, academic achievement, and psychosocial outcomes is analyzed for children and young adults aged 10 to 23 years. The findings will generate policy implications for potential modifications of SNAP which will reduce the negative health, academic, and behavioral problems potentially associated with food stamp program participation among children.

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Introduction

In the early months of 2010, First Lady Michelle Obama formally announced her initiative to end the “plague of childhood obesity” in America (Ferran 2010). Obama’s campaign to end child obesity would extend the involvement of the federal government in a four-pronged approach: getting parents more educated in nutrition and healthy living, improving the schools’ food quality, making healthy foods more affordable and accessible, and emphasizing the importance of physical education (Ferran 2010). Again in October 2010 obesity – and food stamps in particular – made national headlines as Mayor Michael Bloomberg of New York City prohibited food stamps from being used to purchase soda and other sugared drinks in an attempt to reduce obesity and other negative health consequences among food stamp participants (Hartocollis 2010).

As demonstrated with Obama’s “Let’s Move” initiative and Bloomberg’s proposed food stamp changes, the federal government plays a large role in the health and nutrition of children. With one in three children overweight or obese, the nation is spending over \$150 billion per year treating obesity-related medical issues (Ferran 2010). Not only are the financial costs daunting to society, but the potential burdens for future populations are immense; the higher rates of obesity and poor health among children are likely to create adverse outcomes for these same children later in life, negatively affecting their health, job productivity, and overall quality of life. These progressive policy recommendations from renowned public figures indicate the interest toward changing food and nutrition programs and monitoring program effectiveness in order to improve the health of its participants.

The Supplemental Nutrition Assistance Program (SNAP), formerly known as the Food Stamp Program (FSP), is not only the most well-known but also the largest federally funded

nutrition program in the United States. In the average month in 2008, over 40 million individuals were eligible for SNAP benefits, and 27 million participated (Leftin 2010). Eligibility requirements for the food assistance programs necessitate that families and individuals fall within 130% of the federal income poverty level. As a result, many participating and eligible individuals struggle financially and may suffer from food insufficiency and hunger. Additionally, while children represent only 27 percent of the total US population, they account for 40 percent of Americans living in poverty and 69 percent or 9.7 million people on welfare, a disproportionately large share (Casey et al. 2001).

This relationship between food insecurity and low-income, combined with the low-income eligibility requirement to receive food stamps, indicates that most SNAP participants are part of the low-income, food-insecure population. Food insecure populations, similar to low-income populations, are at risk of a plethora of negative outcomes. Food issues and hunger are often more severe among households with children, putting children at risk for the adverse effects experienced among both low-income populations and food insecure households (“Food Security” 2009). Among households with children, 3 million have experienced low food security some time during 2007 (“Food Security” 2009). Because negative effects often exist disproportionately among the low-income and food insecure populations, and because children comprise a disproportionately large share of such populations, the relationship between food stamp participation and children’s health, behavior, and academic outcomes is of much interest for policymakers who aim to reduce these potential negative effects.

Using data from the 2007 Panel Study of Income Dynamics (PSID) and its supplements the Child Development Supplement (CDS) and the Transition to Adulthood (TA), this paper will examine the links between food stamp participation and resulting child health, academic, and

behavioral outcomes. Food stamp enrollment is measured by participation and yearly benefit allotment in the prior year, 2006. Health status is measured using self-reported or parent-reported overall health and Body Mass Index (BMI). Academic achievement is determined with standardized reading and math scores (general math and reading scores for CDS, and SAT math and reading scores for TA). Psychosocial outcomes are measured using a variety of behavior and symptom checklists which monitor both aggressive and self-esteem issues.

First, this paper details the background of the SNAP program, its participation rates, and recent policy changes. Section II reviews the relevant literature, discussing recent research on food stamps and the expected outcomes: health; academic achievement; and psychosocial and behavioral outcomes. Section III introduces the data sets and explains the construction of the dependent variables, food stamp measures, and control variables used in this study. A results section follows. The paper concludes with a summary of the results and draws policy implications and recommendations.

Background

The Food Stamp Program (FSP) was established with the Food Stamp Act of 1964 with the objectives of strengthening the agricultural economy and providing improved nutrition to low-income households. The FSP is supported by the United States Department of Agriculture (USDA) and administrated by a division of the USDA, the Food and Nutrition Service (FNS). As time went on, however, the program had increasing problems, such as a widening gap between participation and eligibility due to stigma and ignorance; poor food choices for participants partly due to limited access to healthful food and sufficient benefits; and limited nutritional education.

The Food and Nutrition Act of 2008 changed the name of the FSP to the Supplemental

Nutrition Assistance Program (SNAP)¹ and addressed the program insufficiencies. Participation rates among the eligible households have increased through the implementation of simplified administrative services, increased benefit amount, and expanded eligibility. Furthermore, the Electronic Benefit Transfer (EBT) card, which looks and performs like a debit card, was adopted to eliminate the stigma of purchasing goods with food stamps. In addition, the program emphasized participant health by providing more regulated nutrition education programs. Lastly, the bill provided over \$20 million in funding to test initiatives incentivizing the purchase of healthful foods.

Nationwide participation in FSP has experienced increased growth rates after tapering off in the early and mid 1980s. The program served approximately 27 million people per month in 2008 (Leftin 2010). Households with children make up over 50 percent of the program benefit recipients. Although participation rates for all eligible children have stabilized between 2005 and 2008 at 86 percent, rates increased 16 points. Participations rates for all eligible children have increased by 16 percentages points, stabilizing between 2005 and 2008 at 86 percent. This indicates that since 2001, an escalating number of children are participating in the FSP (Leftin 2010).

The changes to the FSP over food stamps, allotment, and purchase choice are controversial topics which has created much debate. On the one hand, some citizens and food stamp recipients argue against rigid provision requirements restricting their already-limited purchases. On the other hand, policymakers want to decrease adverse effects of poor nutritional food choices on food stamp recipients and their dependent family members. Not only are the effects impacting recipients' health in terms of obesity and overweight, but also their

¹ Despite the recent name change to the Supplemental Nutrition Assistance Program (SNAP), the majority of data and literature review was collected prior to the 2008 name change. For the purpose of consistency, this study will refer to food stamps and the Food Stamp Program.

psychological health and quality of life. Children are particularly influenced since negative food choices can impact them for the rest of their life by affecting not only their health but also their behavior and education and in turn, their labor market outcomes and overall quality of life.

Literature Review

Health Status and Body Weight

Families living in low-income neighborhoods – with comparatively higher rates of social and emotional stresses and a lack of open space, recreational facilities, full-service grocery stores, quality school districts – may be particularly susceptible to lifestyle and environment factors which affect health and obesity. Healthy foods like fruits, vegetables and dairy products are not available, or are available but only at a much higher price which cannot be afforded by lower-income families with a restricted budget (Parker 2005). Low-income families may be affected by poverty and may be more inclined to participate in the FSP because of low wages, job loss, illness, unemployment, and other factors which leave households with insufficient funds to obtain an adequate supply of food. Social and emotional stresses of poverty also may be potential causes for obesity among children. As expected, rates of hunger and FSP participation are higher for households below the poverty line (Parker 2005). Naturally it would follow that there would be similar health problems, such as obesity and overweight, among this FSP participating population.

Powell et al. (2007) found that low poverty neighborhoods were likely to have fewer supermarkets per household as compared to high-poverty areas. Research has also indicated that more chain grocery stores, which generally supply a more healthful variety of foods, are located among non-poor areas. Shopping at supermarkets versus independent, non-chain stores is associated with more healthful dietary choices, more vegetable intake, and lower rates of obesity.

But for households living in urban or rural areas, transportation to out-of-town supermarkets, higher cost of nutritious food, and inadequate storage of the food are factors which prevent the less fortunate from accessing supermarkets and the healthier foods provided there. Therefore, low-income households face inexorably higher food prices as a consequence of the lack of supermarket availability, and consequently may resort to less nutritious, less expensive foods which alter their lifestyle and dietary patterns (Powell et al. 2007).

With restricted food choice and limited financial resources, households – especially those with children – make modifications in their diets to stave off hunger. Often nutritional value suffers as a result. Families first reduce the quality of their diets, and sometimes even the quantity of food consumed. These dietary and lifestyle changes have serious effects on a person's health. Children in such situations will be more prone to suffer from weight loss, dizziness, fatigue, headache, ear infection, cold, impaired growth, and delayed cognitive development. These minor health problems are subsequently associated with more adverse health outcomes, including childhood obesity and behavioral, emotional, and academic problems (Casey et al. 2001). Among children, deteriorated health systems make them prone to sickness, hospitalization, learning disabilities, and social anxieties (Parker 2005).

One specific health measure that is of particular interest in the analysis of the FSP is obesity. Obesity affects 30 percent of adults, 16 percent of children and adolescents age 6-19, and 10 percent of children between the ages of 2 and 5 years, according to the National Health and Nutrition Examination Survey (NHANES) of 2005. Higher rates of overweight and obesity are associated with more low income individuals and families (Parker 2005). Among low-income preschool-aged children, the prevalence of obesity increased from 12.4 percent in 1998 to over 14.5 percent in 2008 (Sharma et al. 2010). Data from 2006 show that 10.9 percent of

adolescents and children aged 2 through 19 years were obese, 15.5 percent were overweight, and 30.1 percent were at risk of being overweight (Ogden et al. 2008).²

While researchers have examined a rise in food stamp participation (especially among children), it is notable that the obesity rates for low-income populations have also been increasing at a comparatively higher rate than the overall population. Using data from the 1997 CDS and PSID, Curtin found that even though their attempt is to increase nutritional intake, food stamps (dollar amount per year) may actually contribute to overweight in children ages 6 to 12 if they provide too much food, the wrong kinds of food, or cause overconsumption of calories. Results indicate that children from poor families and children from high-income families were less likely (-.83 and -.56 respectively) to be overweight than children from working class families. Such information indicates that perhaps those most in-need of food assistance are not receiving benefits while the lower-middle class are incentivized to overeat with the addition of food stamp benefits. Also, when participating in any one of the food assistance programs – the FSP (.11), National School Lunch Program (.69), and/or the School Breakfast Program (.61) – children are more likely to have an increased BMI (Curtin). Meaning that children who participate in the FSP have increased BMIs due to overconsumption, eating foods with poor nutritional value, or not eating a beneficial variety of foods.

Interestingly enough, gender difference in the weights of FSP child participants were highlighted in two major studies: Jones et al. 2003, and Gibson 2003. Jones et al. (2003) found gender differences in the prevalence of overweight among boys and girls. Girls who participated in FSP and lived in food secure households were more likely to be overweight (29.2 percent compared to food insecure households at 23 percent). Girls in food insecure households also had

² Obese is categorized as at or above the 97th percentile of the BMI growth charts. Overweight is at or above the 95th percentile. And at risk of being overweight is at or above the 85th percentile of BMI. Each BMI is adjusted for the age of the child.

decreased likelihood of being overweight if they participated in any of the programs (Jones et al. 2003). No such relationship existed among young boys.

Gibson's 2003 study of the relationship between FSP participation and the weight of children identified the most significant differences between adolescents by gender. For girls ages 14 to 22, the difference in the overweight percentages of the total population and the FSP participation population were significantly varied with 15.6 percent and 22.7 percent respectively. For the boys, the difference was not as significant with only 17.1 percent and 22.7 percent to general population and FSP population (Gibson 2003). Furthermore, Gibson predicted that a girl who had not participated in FSP for the previous five years had a probability of 14.5 percent for being overweight. However, for the boys, the predicted relationship was negative (Gibson 2003).

Academic Achievement

Theories postulate that malnutrition also has an impact on motivational behavior which in turn affects academic performance and cognitive development. Students suffering from severe malnutrition and hunger tend to be apathetic, withdrawn, passive, anxious, unmotivated, and suffer from other behavior problems. Consequently, such characteristics inhibit children in areas of cognitive development and academic ability (Alaimo et al. 2001). Hungry children were significantly more likely to have received special education services. And though just barely significant, hungry children were also more likely to repeat a grade (Kleinman et al. 1998). In regards to academic attendance, hungry and at-risk for hunger children were more likely to be absent from school than not-hungry children, with higher rates of tardiness than not-hungry children, two factors which may contribute to their poor academic performance and proneness to fail (Murphy et al. 1998).

Cognitive reasoning was assessed using a series of math and reading scores from standardized exams. Alaimo (2001), using the Wechsler Intelligence Scale for Children-Revised (WISC-R) and Wide Range Achievement Test-Revised (WRAT-R), found that for both younger children and teenagers reading and arithmetic scores were roughly 1.3 to 2.5 points lower for food-insufficient children than for food-sufficient children. Moreover, food-insufficient children were more than twice as likely to repeat a grade and miss more school days.

While hunger and food-insufficiency seemingly worsens a student's academic performance, regular and active participation in the FSP counters the negative effects of hunger and malnutrition on academic achievement. Alaimo et al. (2001) found that the effects of nutrition programs, such as the FSP, have small yet significant benefits in a child's cognition, school attendance, and academic achievement. For grade-schooled children, beginning FSP participation during the four-year period between kindergarten and third grade was associated with an approximate 3-point improvement in reading and mathematics scores as compared with stopping FSP participation during this time period (Frongillo 2006). These findings indicate that FSP participation may impact academic learning through improving the quality and quantity of nutrient and dietary intake, thus having positive outcomes on the child's health and academic ability.

Psychosocial and Behavioral Outcomes

Studies have integrated mental health into the relationship between children and child health and nutrition. Comparison of mean *Pediatric Symptom Checklist (PSC)*³ scores shows twice the overall level of psychosocial dysfunction in hungry children as compared to not hungry children (18.0 points for hungry children; 13.4 for at-risk children; and 8.4 for not hungry

³ The Pediatric Symptom Checklist (PSC) is a parent-completed questionnaire which screens children from ages 6 to 11 for a range of psychosocial dysfunction and scales affirmative responses.

children) which supports the hypothesis that malnourished children have increased anxiety attention deficits, lower levels of social responsiveness, and increased school absence compared to well-fed children (Kleinman et al. 1998). Hungry children (21 percent) were much more likely to be classified as dysfunctional by the PSC than at-risk (6 percent) or not hungry (3 percent) children. Consequently, for the more than 14 million children living in food-insecure households, FSP participation may have a lifelong impact determining if they complete high school, whether they continue their education, and their overall quality of life.

Murphy et al. (1998) used the PSC as a psychosocial index for children in four schools in Baltimore and Philadelphia. With the PSC, it was concluded that PSC scores were highly associated with hunger status, and were nearly three times higher for hungry children than for not-hungry children. Using the Child Behavior Checklist (CBCL),⁴ Murphy et al. (1998) found that rates of impairment were twice as high in hungry and at-risk-for-hunger children than not-hungry children. Children classified as hungry had significantly higher Conners Teacher Rating Scale-39 (CTRS-39) Hyperactivity Index scores than children categorized as at-risk for hunger or not hungry (Murphy et al. 1998). The mean total Children's Global Assessment Scale (CGAS)⁵ score was the highest for hungry children, indicating that interviewer CGAS scores were positively related to hunger status (Murphy et al. 1998).

As compared to their food-sufficient peers, food insufficient teenagers and children were more likely to have psychosocial difficulties – with food insufficient teenagers twice as likely to have seen a psychologist, almost 3 times as likely to have been suspended, and 4 times as likely

⁴ The Child Behavior Checklist (CBCL) is a 118-item parent-completed checklist which rates the child based on various behavioral and emotional problems. It is used as a standardized measure of evaluating behavioral and emotional problems, both internalizing and externalizing, in children aged 2 to 18.

⁵ The Children's Global Assessment Scale (CGAS) is a rating scale which measures child psychological, social and school functioning. It is deemed as a valid and reliable scale for rating children aged 6 to 17 for general functioning on a health-illness scale.

to have no friends (Alaimo 2001). Even with mother's distress, housing status, and stressful life events controlled, severe child hunger showed a higher reported relationship to anxiety and depression among school-aged children (Weinreb et al. 2002).

Although food stamp participation and food insufficiency do not have a definitive relationship, for many studies there is a strong relationship between food insufficiency and FSP participation. Therefore, it would be interesting to analyze the relationship strictly between mental health and behavior and FSP participation.

In a recent 2008 study of all FSP participants, food insufficiency was found to be significantly associated with an increase in emotional distress (Heflin and Ziliak 2008). For a food stamp participant receiving benefits one standard deviation above the mean, the effect of food insufficiency on emotional distress is approximately three times greater than for those who are not enrolled in the FSP. Heflin and Ziliak (2008) found that though food insecurity is detrimental to both mental and emotional health, FSP participation decreases these negative health effects. Overall results indicate that for the general population the negative effects of FSP participation on mental health outweigh the positive effects, and these results are intensified for households with food insufficiency (Heflin and Ziliak 2008).

Data and Methods

Data Sources

This study used 2007 data on children and young adults ages 10 to 23 years old from the Child Development Supplement and Transition to Adulthood. These individual-level data are supplemented by family-level data from the 2007 Panel Study of Income Dynamics. PSID is a rich, nationally representative longitudinal data set begun in 1968, which includes economic, demographic, sociological, and psychological measures.

CDS is a supplement to PSID which interviews the children, caregivers, and teachers of the child family members of the PSID family unit. The CDS gathered information on developmental outcomes including physical health, cognitive abilities, emotional well-being, and social relationships. In 1997, PSID parents of children ages 0 to 12 were interviewed (CDS-I) and the children were followed up in 2002/03 (CDS-II) and in 2007 (CDS-III). Out of the 2,705 families selected for the CDS-I, 2,394 families (88%) participated, providing information on 3,563 children. In 2002-2003, CDS re-contacted families in CDS-I who remained active in the PSID panel as of 2001. CDS-II successfully re-interviewed 2,908 children/adolescents aged 5-18 years, and CDS-III interviewed over 1,600 children (1,608).

In 2005, TA was collected, interviewing children ages 18 and older, who completed high school, and whose families were still active in PSID. The TA was designed as a link between the CDS and the PSID: expanding upon the children interviewed as young adolescents in the CDS-II, and complementing the information that would be collected as the individuals were interviewed as part of the PSID. In 2005, the TA collected data on young adult development and outcomes (N=745), filling the gap between the detailed information about development from early childhood and adolescence (CDS) and adulthood (PSID). Those adolescents were followed in 2007 (N=1,115).

Dependent Variables

Dependent variables include health, academic, and psychosocial variables from the CDS and TA. *Health variables* include self-rated for TA adolescents or PCG-rated for CDS children overall health status (excellent, good, fair or poor) and Body Mass Index. The outcome of interest is child body weight adjusted for height. The child's weight was measured by the interviewers in both CDS data waves, while the child's height was reported by the child's

primary care giver in the first data wave and measured in an in-person assessment interview in the second data wave.

Academic achievement is generally approximated by math (calculation and applied problems scores) and reading scores (passage comprehension and letter word scores). With the data available in the CDS and the TA, no uniform standardized test was reported across all ages. However, self-rated skill understanding and SAT scores were used for the CDS and TA respectively. For the CDS population, academic achievement is simply a scale of their self-rated general math skill, ranging from 1 (not at all good) to 7 (very good). A similar scale was created for the general reading skill ranging from 1 to 7. For the TA population, the math and critical reading SAT scores were used. The best scores for critical reading and mathematics (scaled from 1 to 800) were used to determine academic achievement of the adolescent population.

Restrictions of this variable include the fact that the national survey does not include a national standardized test which is conducted among all ages and regions. Therefore, the self-rated and teacher-rated general math and reading skill were the most accurate and available variables, despite their lack of standardization. The same limitation existed among the TA population.

Psychosocial variables for the CDS include: Behavior Problems Inventory (BPI); Positive Behavior Scale (PBS); Pearlin Self-Efficacy Scale; Rosenberg Self-Esteem Scale. Psychosocial variables among the TA include emotional, social, and psychological well-being. The CDS and TA did not share the exact same psychosocial tests; however overall each population has at least one measure for gathering their behavioral, social, and psychological well-being.

BPI was originally developed by James Peterson and Nicholas Zill from the Achenbach Behavior Problems Checklist to measure the incidence and severity of child behavior problems.

BPI was used in CDS primary caregiver interview, and is based on responses by the primary caregiver for children 3 years and older as to whether a set of 30 problem behaviors was often (=3), sometimes (=2), or never true (=1) of the child.⁶ Behaviors included whether the child was high strung, fearful, paranoid, destructive, withdrawn, etc. BPI scores were constructed for two subscales (internalizing and externalizing score). Internalizing Behaviors Scale included 13 items and Externalizing Behaviors Scale included 15 items. By taking the mean of the summed 27 items, total BPI score was constructed. While total BPI score ranges from 0 to 30, internal ranges from 0 to 14 and external ranges from 0 to 17. While originally higher scores imply a greater level of behavior problem, scores are inversed so that higher scores imply fewer behavior problems.

PBS, originally developed for the New Chance Evaluation, measures childhood emotional and social competence. The original scale consisted of 25 items for children ages 33 years and older evaluated on a 10-point scale.⁷ The scale used in the CDS consists of 10 items on a scale from 1 (“not at all like your child”) to 5 (“totally like your child”) where 2, 3, and 4 are somewhere in between. Statements included in the PBS were whether the child: is cheerful; gets along well with other people; can get over being upset quickly; is admired and well-liked; is self-relief; etc.

The Pearlin Self-Efficacy Scale assesses the extent to which people see themselves as having control over their lives. It consists of the original 7 Pearlin items answered on a 4-point response scale (“Strongly Agree”, “Agree”, “Disagree”, “Strongly Disagree”). Factors for the Pearlin Scale include: can’t solve problems; pushed around; do anything set mind to; feel

⁶ Items were recoded so that a score of “1” became “0” and a score of “2” or “3” became “1”. Cases were only included if they had valid data on all of the variables contributing to the BPI Index.

⁷ The original measure was scaled from 1 to 10, ranging from “not at all like my child” to “very much like my child”.

helpless; can't change important things; etc. Items are averaged to produce an overall score measured by a seven-item scale, and the final scale ranges from 1 to 4.

The response of primary caregivers to 10 self-esteem items comprises the Rosenberg Self-Esteem Scale. Using a response scale of 1 ("Strongly Disagree") to 4 ("Strongly Agree"), participants were asked statements regarded self-esteem and self-worth – whether they felt they were a person of worth, had good qualities, were satisfied with self, had a positive attitude, etc.⁸ The scale was constructed as a mean score, where a higher score designates higher self-esteem.

Among the TA population, the emotional, social, and psychological well-being variables were each individually scaled from 1.00 to 6.00. Well-being scales were adapted from MacArthur MIDUS Youth and measured dimensions of the Subjective Well-Being among adolescents. The three dimensions selected – social, psychological, and emotional – were administered to youth ages 12 years and older. The three measures were adapted as mean scores as long as the respondent provided response on seventy-five percent of the items in each subscale. Examples of items on the subscales include: depression, self-esteem, worry, risky behavior, thrill seeking, anti-social behavior, acts of violence, drug and alcohol abuse.

Independent Variables

Food stamps were measured using two variables: *value and enrollment* are the independent variables of interest. Food stamp enrollment is a dummy variable of whether or not the family participated in the Food Stamp Program in 2006. Food stamp value is the dollar value of benefits received during the year of 2006 from the Food Stamp Program, ranging from 0 to 4500. Both enrollment and value variables were collected from the 2007 PSID and related to the family's food stamp participation for the previous year.

Control variables include both child and family characteristics. Child characteristics

⁸ Some items were reversed prior to scoring, so that a higher score designated higher self-esteem.

include the child's age, age squared, gender, and race/ethnicity (white, black, Hispanic, other). Family characteristics, gathered from the 2007 PSID, include mother's education (some high school, high school, some college, college, and more college), the number of people in the family unit, and poverty rate (family income adjusted for federal poverty level, which already accounts for the family size).

Methods

Regression models were constructed with the outcome (health, academic, or behavior) as a factor of the independent variables of interest (food stamp enrollment and food stamp value received), gender, race, age, education of the mother, and poverty rate. Ordinary Least Squares models were estimated for the continuous dependent variables (BMI, Math skill, Reading skill, SAT/ACT, SAT Math score, SAT Reading score, BPI, Psychological Well-Being, Social Well-Being, and Emotional Well-Being). Probit models were estimated for the dichotomous outcome variables. STATA version 11.1 was used for data management and analysis.

Results

Summary Statistics

Of the 1,268 children and 1,115 adolescents included in the sample, approximately 23% lived in households with a poverty rate below 130%, making the family preliminarily eligible for enrollment in the Food Stamp Program (Table 1). Over 32% of the child and adolescent sample had mothers with a high school education, which became the reference group for the mother's education variable within the regressions models. One-fifth of the child and adolescent sample had enrolled in the FSP in 2006, and the average yearly benefit allotment in 2006 was approximately \$88 per family (Table 1).

As also indicated in Table 1, younger children had an average BMI of 23.5 points while older children in the TA had an average BMI of 25.3 points. Average CDS and TA samples had self-rated health scores of .632 and .658 respectively, indicating overall ‘very good’ or ‘excellent’ health. Academically, the children in the CDS sample had higher Reading skill (5.12) compared to Math skill (4.74), but both scores had averages indicative of ‘very good’ skill. Similarly, roughly 73% of TA adolescents participated in the SAT or ACT exams, and students scored above-average on both the Reading and Math sections (out of a possible 800, averages were 576.9 and 574.9, respectively). Children in the CDS had average or above-average behavior and psychosocial measures, as indicated by the Positive Behavior Scale, Inversed BPI Scores, Pearlin Self-efficacy scale, and Rosenberg Self-esteem scale (Table 1). Adolescents in the TA also had, on average, high Emotional (5.03) and Psychological Well-Being scores (5.14). However, the Social Well-Being score was significantly lower at an average on only 3.45 out of 6.00 (Table 1).

Health Status and Body Weight

Table 2 presents OLS Models for BMI among children and adolescents of the CDS and TA samples. As shown, value of food stamps received had a positive relationship for BMI at the 10 percent significance level for the CDS children. As the value of food stamps received per year increased by \$100, BMI for the child is expected to increase .126 points (Table 2). Black children had a higher BMI of .002 points compared to their white counterparts. BMI was also correlated with the child’s age, increasing 1.916 BMI points as the child’s age increased one year (Table 2). The final significant independent variable was mother’s education, which was significant at the 10 and 5 percent significance levels for mothers who had completed some of high school and mothers who had completed more than their Bachelor’s college degree relative

to mothers with a high school education (Table 2). The children of mothers who did not graduate from high school as compared to children with mothers who earned a high school education, had .96 point higher BMI scores. For mothers with more than a college level education, their children had 1.11 points *lower* BMI compared to children with mothers who had a high school education.

Health variables for older children and adolescents yielded no significant results with the independent food stamp variables, as shown by Table 2. The relationship between the health variables and the food stamp variables were synonymous for both self-rated health and BMI: a positive relationship existed if the children enrolled in the food stamp program, and a negative relationship existed as the value of food stamps received increased. Therefore, BMI increased with enrollment and decreased as the value of food stamps received increased – making the child healthier as value allotment increased (Table 2).

As indicated in Table 3, the parent-reported health of the CDS children used a probit regression and did not yield any significant values for the independent FSP variables of interest; although, both enrollment in the food stamp program and value of food stamps received had negative effects on the health of the child, as expected. Similarly, for adolescents in the TA sample, enrollment in the FSP and benefit allotment amount were not significant variables. However, participation in the FSP seemed to increase the adolescent's self-rated health score while value of food stamps received decreased their self-rated health score (Table 3).

Academic Achievement

As shown in Table 4, OLS Models for Math and Reading Skill for the CDS population yielded no significance for the food stamp independent variables of interest. Instead, significant variables were gender, race, and mother's education (Table 4). Among the older child population, academic variables were more significantly correlated with the FSP variables.

Enrolling in the FSP decreased the adolescents' chances of completing the SAT or ACT exam by 13% (Table 4). The SAT Math score decreased by a score of over 90 points if the child participated in the FSP and interestingly enough, the SAT Math score had a positive relationship with the value of food stamps at a 1 percent significance level (Table 4). This relationship indicates that adolescents participating in the FSP have potential stresses and food insecurity issues which initially prohibit their SAT scores, but as they receive more benefits and are able to eat nutritiously and properly, their scores are able to increase, though only marginally.

Psychosocial and Behavioral Outcomes

As shown in Table 5, BPI External score had a negative relationship with food stamp enrollment at the 1 percent significance level (Table 5). If the child participated in the food stamp program, they were increasingly more likely to have external, aggressive behavioral problems. External BPI score varies from internal scores because external scoring demarcates aggressive behavior while internal scores indicated withdrawn or sad behavior.⁹ Interestingly enough, the value of food stamps had a positive, though not a statistically significant, relationship with the BPI external score (Table 5). It is unique that the two food stamp variables have opposite relationships with the same dependent variable. This, perhaps, indicates that the enrollment and value of food stamps work in differing ways for certain outcomes.

The Rosenberg Self-Esteem Scale had a similar pattern with differing coefficients for value and enrollment in the food stamp program. As indicated in the probit models shown in Table 6, receiving food stamps had a statistically significant negative relationship with the scale at the 5 percent significance level, meaning that enrollment in the food stamp program related to a decrease in a child's opinions of self-worth and value.

⁹ The Behavior Problems Index score was inverted so that a higher score indicated an absence of behavioral problems.

Of the three well-being indexes for the adolescent-aged population – emotional, psychological, and social – only the emotional subscale yielded significant results among the FSP independent variables. Both enrolling in FSP and the value of benefits received negatively impact the adolescent's emotional well-being, but only value of food stamps received was statistically significant (Table 5). Social and psychological subscales among this population were not statistically significant (Table 5).

Conclusions

Using 2007 data from Transition to Adulthood (TA) and the Child Development Supplement (CDS), as well as supplementary data from the Panel Study of Income Dynamics (PSID), it was found that for younger and older child populations, food stamp enrollment and value have an overwhelmingly negative effect on children. Among younger children, BMI increased, behavior problems worsened, and self-esteem decreased with relation to the FSP. Such relationships indicate that children who are food stamp participants are less healthy and suffer from increased psychosocial and behavioral problems. Developmentally, these characteristics may inhibit them further as they mature into adolescence and adulthood. This perhaps indicates that the food stamp program has a more significant and more drastic impact on younger children as they enter a stage of growth and maturity.

For older children and adolescents, effects of the food stamp program were not quite so significant. Though emotional well-being and SAT scores were significantly negatively affected, these were the only two variables significantly impacted by the FSP variables. No health variables were significantly related to the FSP variables, indicating that perhaps older children's eating habits and lifestyle choices are determined by a plethora of other factors and may already be well-established by the time they reach adolescence, thus unaffected by FSP participation or

allotment amount.

Correcting the ills of the food stamp program could lower BMI among younger children, thus lowering the rates of childhood obesity and any negatively related health conditions. Such modifications to the FSP could also result in higher test scores, increased academic achievement, and more positive behaviors (Parker 2005). However, before policy recommendations are implemented, the exact relationship between the food stamp programs and overweight must be determined and as such, more extensive studies should be conducted.

Limitations

Future research should consider modifying the independent variables to gain a more accurate and consistent gauge of the child's family data. Parent education and income variables should be modified in order to gain a more accurate picture of the family socioeconomic status. It also may be interesting to include the family's food security status. Within the PSID, however, this data was only available in 1997 and could not be included because the family's food security status may have changed significantly in the years between the collection of the food security status information in 1997 and the collection of FSP data in 2007. Parents' health, weight, and diet may also need to be taken into account, because parent health often impacts child health either genetically or through learned lifestyle habits. This study was limited because these variables were not consistently available for all observations.

Also, not all variables were consistent between the CDS and TA due to difference in the PSID questionnaire. Age, age squared, and the Hispanic variables would need to be creatively constructed for the TA regressions in order to have more consistency between the two sets. Additionally, there were large differences in the academic performance variables between the CDS and the TA. For instance, the TA regressions used SAT scores, and though relatively

standardized, there are many limitations to the SAT in terms of the accuracy in measuring aptitude and cognitive ability. Considering not all students take the exam, the cost involved with the exam, the score trends among certain schools and regions, and the controversy over whether the exam is something that can be practiced rather than something that measures scholastic aptitude are all concerns which draw skepticism to the academic achievement variable for the TA population.

Lastly, there may be statewide factors which affect the diet and lifestyle and food stamp availability of the children. Though administered federally by the USDA, individual states also have some authority in making decisions regarding the FSP. Because the PSID consists of nationally representative data, it is not be able to capture such statewide differences in policy, availability, and accessibility of the FSP. Perhaps performing state-by-state or regional regressions would provide more insight into making more effective policy changes tailored to specific areas and regions.

Whereas the Food Stamp Program can impact the lifestyle, health, and academic performance of children, modifications should be considered in order to account for nutritional choices and their effect on participants. Constrained resources, food insufficiency, and resulting participation in food assistance programs have an association with children's behavioral and academic functioning (Murphy et al. 1998). This examination of the behavioral, academic and health effects of food stamp participation on children substantiates prior research findings. With enormous financial ties between the Food Stamp Program, health, academic performance, and psychosocial dysfunction, more research on these relationships are needed. Successful public policy changes to federal food assistance programs can reduce the negative impacts of hunger and public assistance participation experienced by low-income families, especially among the

most vulnerable in this population: children.

References

- Alaimo, Katherine, Christine M. Olson, and Edward A. Frongillo, Jr. (2001). "Food Insufficiency and American School-Aged Children's Cognitive, Academic, and Psychosocial Development." *Pediatrics* 108: 44-53.
- Alaimo, Katherine, Christine M. Olson, and Edward A. Frongillo, Jr. (2001). "Low Family Income and Food Insufficiency in Relation to Overweight in US Children." *Archives of Pediatrics and Adolescent Medicine* 155: 1161-1166.
- Casey, Patrick H., Kitty Szeto, Shelly Lensing, Margaret Bogle, and Judy Weber. (2001). "Children in Food-Insufficient Low-Income Families: Prevalence, Health, and Nutrition Status." *Archives of Pediatrics and Adolescent Medicine* 155: 508-513.
- Cook, John T., Deborah A. Frank, Carol Berkowitz, Maureen M. Black, Patrick H. Casey, Diana B. Cutts, Alan F. Meyers, Nieves Zaldivar, Anne Skalicky, Suzette Levenson, Tim Heeren, and Mark Nord. (2003). "Food Insecurity Is Associated with Adverse Health Outcomes among Human Infants and Toddlers." *The Journal of Nutrition*: 1432-1437.
- Curtin, Sally. "Do Food Programs Make Children Overweight?" Maryland Family Policy Impact Seminar.
- Devaney, Barbara, and Thomas Fraker. (1989). "The Effect of Food Stamps on Food Expenditures: An Assessment of Findings From the Nationwide Food Consumption Survey." *American Agricultural Economics Association*: 99-104.
- Drewnowski, Adam, and SE Specter. (2004). "Poverty and obesity: the role of energy density and energy costs." *The American Journal of Clinical Nutrition* 79: 6-16.
- Ferran, Lee, "Michelle Obama: 'Let's Move' Initiative Battles Childhood Obesity," *ABC News*, February 9, 2010, accessed March 27, 2011, <http://abcnews.go.com/GMA/Health/michelle-obama-childhood-obesity-initiative/>.
- "Food Security Among Children." Office of Research and Analysis. Food and Nutrition Service. USDA. 8 July 2009. Accessed 3 April 2011 <http://www.fns.usda.gov/fns/ech/090809.pdf>.
- Frongillo, Edward A., Diana F. Jyoti, and Sonya J. Jones. (2006). "Food Stamp Program Participation is Associated with Better Academic Learning among School Children." *The Journal of Nutrition*: 1077-1080.
- Gibson, Diane. (2004). "Long-Term Food Stamp Program Participation is Differentially Related to Overweight in Young Girls and Boys." *The Journal of Nutrition*: 372-379.
- Gibson, Diane. (2006). "Long-Term Food Stamp Program Participation Is Positively Related to Simultaneous Overweight in Young Daughters and Obesity in Mothers." *The Journal of Nutrition*: 1081-1085.

- Heflin, Colleen M., and James P. Ziliak. (2008). "Food Insufficiency, Food Stamp Participation, and Mental Health." *Social Science Quarterly* 89: 706-724.
- Hellmich, Nanci, "Michelle Obama to launch initiative fighting child obesity," *USA Today*, January 20, 2010, accessed March 27, 2011, <http://www.usatoday.com/news/health/weightloss/2010-01-20-michelle-obama>.
- Hofferth, Sandra L. (2005). "Do Food Programs Make Children Overweight?" *Maryland Family Policy Impact Seminar*. University of Maryland, College of Health and Human Performance. Accessed on 2010 September 22. http://www.sph.umd.edu/fmssc/fis/_docs/Food_Programs_Brief.pdf.
- Jones, Sonya J., Lisa Jahns, Barbara A. Laraia, and Betsy Haughton. (2003). "Lower Risk of Overweight in School-aged Food Insecure Girls Who Participate in Food Assistance." *Archives of Pediatrics and Adolescent Medicine* 157: 780-784.
- Kleinman, Ronald E., J. Michael Murphy, Michelle Little, Maria Pagano, Cheryl A. Wehler, Kenneth Regal, and Michael S. Jellinek. (1998). "Hunger in Children in the United States: Potential Behavioral and Emotional Correlates." *Pediatrics* 101: 1-6.
- Lee, Bong Joo, and Lucy Mackey-Bilaver. (2007). "Effects of WIC and Food Stamp Program participation on child outcomes." *Children and Youth Services Review* 29: 501 - 517.
- Leftin, Joshua. "Trends in Supplemental Nutrition Assistance Program Participation Rates: 2001 to 2008." *Current Perspectives on SNAP Participation*. Food and Nutrition Service, U.S. Department of Agriculture, June 2010.
- Mei, Zuguo, Kelley S. Scanlon, Laurence M. Grummer-Strawn, David S. Freedman, Ray Yip, and Frederick L. Trowbridge. (1998). "Increasing Prevalence of Overweight Among US Low income Preschool Children: The Centers for Disease Control and Prevention Pediatric Nutrition Surveillance, 1983 to 1995." *Pediatrics* 101: 1-6.
- Murphy, J. Michael, Cheryl A. Wehler, Maria E. Pagano, Michelle Little, Ronald E. Kleinman, and Michael S. Jellinek. (1998). "Relationship Between Hunger and Psychosocial Functioning in Low-Income American Children." *Journal of the American Academy of Child and Adolescent Psychiatry* 37: 163-170.
- "Obesity fight begins at home: Michelle Obama," *AFP*, March 24, 2011, accessed March 27, 2011, <http://www.google.com/hostednews/afp/article/>.
- Ogden, Cynthia L., Margaret D. Carroll, Katherine M. Flegal. (2008). "High Body Mass Index for Age Among US Children and Adolescents, 2003-2006." *Journal of the American Medical Association* 299 (20): 2401-2405.
- Parker, Lynn. (October 2005). "Obesity, Food Insecurity and the Federal Child Nutrition Programs: Understanding the Linkages." Food Research and Action Center. Accessed on

2010 September 18. http://www.frac.org/pdf/obesity05_paper.pdf.

Powell, Lisa M., Sandy Slater, Donka Mirtcheva, Yanjun Bao, and Frank J. Chaloupka. (2007). "Food store availability and neighborhood characteristics in the United States." *Preventive Medicine* 44: 189-195.

Rector, Robert. (27 June 2001). "Reforming Food Stamps to Promote Work and Reduce Poverty and Dependence." Testimony on Welfare, The Heritage Foundation. Accessed on 14 September 2010. <http://www.heritage.org/research/testimony/reforming-food-stamps-to-promote-work>.

Sharma, AJ, LM Grummer-Strawn, K. Dalenius, D. Galuska, M. Anandappa, E. Borland, H. Mackintosh, and R. Smith. (2010). "Obesity Prevalence Among Low-Income, Preschool Aged Children – United States, 1998 - 2008." *The Journal of the American Medical Association* 303: 28-30.

Weinreb, Linda, Cheryl Wehler, Jennifer Perloff, Richard Scott, David Hosmer, Linda Sagor, and Craig Gundersen. (2002). "Hunger: Its Impact on Children's Health and Mental Health." *Pediatrics* 110: 1-9.

Table 1. Summary Statistics

	CDS		TA	
	Mean	(Std. Dev.)	Mean	(Std. Dev.)
BMI	23.5	(6.16)		
Self-rated health	0.632	(0.482)		
Obesity	0.139	(0.346)		
Math skill	4.74	(1.42)		
Reading skill	5.12	(1.47)		
Positive Behavior Scale	0.675	(0.468)		
BPI Total Score	7.93	(6.61)		
BPI External Score	11.8	(4.18)		
BPI Internal Score	11.17	(3.19)		
Pearlin Self-efficacy	0.648	(0.478)		
Rosenberg Self-esteem	0.517	(0.499)		
BMI			25.3	(5.41)
Self-rated health			0.658	(0.475)
SAT/ACT			0.722	(0.448)
SAT Reading Score			576.9	(116.6)▼
SAT Math Score			574.9	(127.3)▼
Emotional Well-Being			5.03	(0.913)
Social Well-Being			3.45	(1.21)
Psychological Well-Being			5.14	(0.906)
Whether food stamps, 2006	0.206	(0.405)		
Value of food stamps, 2006	88.4	(285.1)		
<i>Poverty rate – below 130%</i>	0.229	(0.420)		
Poverty rate – 131-260%	0.149	(0.357)		
Poverty rate – 261-510%	0.181	(0.385)		
Poverty rate – above 510%	0.440	(0.497)		
Some high school mother	0.182	(0.386)		
<i>High school mother</i>	0.326	(0.469)		
Some college mother	0.293	(0.455)		
College mother	0.135	(0.342)		
More than college mother	0.065	(0.246)		
N	1,268	1,115		

Note: Sample size for SAT scores (math and reading) is 198 observations.

▼ = Sample size is 198 observations

Table 2. OLS Models for BMI

	CDS	TA
	Body Mass Index	Body Mass Index
	Coefficient Estimates (Std. Error)	Coefficient Estimates (Std. Error)
Received food stamps in 2006	0.069 (0.637)	0.667 (0.668)
Value of food stamps in 2006	0.0013 (0.0007)*	-0.00028 (0.0029)
Male	0.280 (0.328)	-0.465 (0.355)
Black	1.326 (0.4205)***	2.15 (0.393)***
Hispanic	-0.172 (0.7599)	
Other race	-0.688 (0.858)	0.201 (0.126)
Child age	1.92 (1.049)*	
Child age squared	-0.424 (0.0359)	
Some high school mother	0.958 (0.510)*	-0.078 (0.533)
Some college mother	-0.354 (0.423)	-0.198 (0.446)
More than college mother	-1.11 (0.540)**	-0.929 (0.548)*
Poverty rate – 131-260%	0.670 (0.572)	-0.538 (0.583)
Poverty rate – 261-510%	-0.212 (0.627)	0.505 (0.596)
Poverty rate – above 511%	-0.134 (0.727)	0.015 (0.871)
R ²	0.1081	0.0572
N	1,268	1,115

Note: ***, **, * identify level of significance at $p \leq .01$, $p \leq .05$, or $p \leq .1$, respectively.

Table 3. Probit Models for Obesity and Self-Rated Health

	CDS		TA
	Obesity	Self-Rated Health	Self-Rated Health
	Marginal Effects (Std. Error)	Marginal Effects (Std. Error)	Marginal Effects (Std. Error)
Received food stamps in 2006	0.045 (0.169)	-0.213 (0.141)	0.0636 (0.1625)
Value of food stamps in 2006	0.000046 (0.00018)	-0.00004 (0.00015)	-0.0007 (0.0007)
Male	-0.0135 (0.0888)	-0.181 (0.074)**	-0.0692 (0.087)
Black	0.121 (0.112)	0.141 (0.094)	0.163 (0.096)*
Hispanic	0.154 (0.193)	-0.110 (0.167)	
Other race	-0.186 (0.250)	-0.03295 (0.190)	-0.017 (0.0297)
Child age	0.0715 (0.283)	-0.769 (0.2399)***	
Child age squared	-0.0026 (0.0097)	0.0248 (0.0082)***	
Some high school mother	0.184 (0.132)	-0.0423 (0.112)	-0.190 (0.130)
Some college mother	-0.0043 (0.115)	0.102 (0.094)	-0.016 (0.109)
More than college mother	-0.143 (0.152)	0.348 (0.124)***	0.157 (0.136)
Poverty rate – 131-260%	0.196 (0.153)	-0.111 (0.126)	0.0098 (0.142)
Poverty rate – 261-510%	0.103 (0.172)	-0.018 (0.1396)	-0.013 (0.145)
Poverty rate – above 511%	-0.134 (0.727)	0.153 (0.164)	0.125 (0.161)
Pseudo R ²	0.0097	0.0352	0.0125
N	1,268	1,268	1,115

Note: ***, **, * identify level of significance at $p \leq .01$, $p \leq .05$, or $p \leq .1$, respectively.

Table 4. OLS Models for Math Skill, Reading Skill, and SAT Scores

	CDS			TA	
	Math skill	Reading skill	SAT/ACT	SAT Math	SAT Reading
	Coefficient Estimates (Std. Error)	Coefficient Estimates (Std. Error)	Coefficient Estimates (Std. Error)	Coefficient Estimates (Std. Error)	Coefficient Estimates (Std. Error)
Received food stamps in 2006	-0.249 (0.151)	0.171 (0.159)	-0.133 (0.0588)**	-91.62 (51.76)*	-25.95 (53.83)
Value of food stamps in 2006	-0.00009 (0.00016)	-0.000048 (0.00017)	-0.000061 (0.00024)	0.405 (0.167)**	0.218 (0.169)
Male	-0.341 (0.078)***	0.337 (0.082)***	0.056 (0.030)*	-21.06 (17.85)	19.23 (18.99)
Black	0.0576 (0.09999)	0.284 (0.105)***	0.0081 (0.0328)	-79.29 (21.91)***	-6.86 (6.66)**
Hispanic	-0.1739 (0.181)	-0.073 (0.190)			
Other race	0.124 (0.204)	0.0995 (0.215)	0.00648 (0.0106)	-8.199 (6.59)	-8.199 (6.59)
Child age	-0.279 (0.249)	-0.272 (0.262)			
Child age squared	0.0069 (0.0085)	0.0078 (0.0089)			
Some high school mother	0.0046 (0.121)	-0.301 (0.128)	-0.0382 (0.049)	20.98 (43.91)	64.699 (49.06)
Some college mother	0.104 (0.101)	0.165 (0.106)	0.108 (0.0367)***	20.98 (43.91)*	36.50 (26.11)
More than college mother	0.197 (0.128)	0.3499 (0.135)*	0.176 (0.044)***	46.01 (24.25)**	38.18 (26.63)
Poverty rate – 131-260%	-0.0975 (0.136)	0.118 (0.143)	0.00387 (0.0515)	53.12 (24.89)***	23.91 (40.72)
Poverty rate – 261-510%	0.0073 (0.149)	0.009 (0.157)	0.0959 (0.052)*	108.30 (37.43)**	23.10 (36.11)
Poverty rate – above 511%	0.267 (0.173)	0.0355 (0.182)	0.19 (0.056)***	78.37 (32.99)**	23.06 (36.23)
R ²	0.0553	0.0422	0.1215	0.2114	0.1005
N	1,268	1,268	1,115	198	198

Note: ***, **, * identify level of significance at $p \leq .01$, $p \leq .05$, or $p \leq .1$, respectively.

Table 5. OLS Models for Behavioral Problem Index, Psychological, Social, and Emotional Well-Being

	CDS			TA		
	Behavioral Problem Index, Total	Behavioral Problem Index, Internal	Behavioral Problem Index, External	Psychological Well-Being	Social Well-Being	Emotional Well-Being
	Coefficient Estimates (Std. Error)	Coefficient Estimates (Std. Error)	Coefficient Estimates (Std. Error)	Coefficient Estimates (Std. Error)	Coefficient Estimates (Std. Error)	Coefficient Estimates (Std. Error)
Received food stamps in 2006	-0.919 (0.697)	-0.236 (0.334)	-0.738 (0.445)***	0.02182 (0.113)	-0.014 (0.149)	-0.0278 (0.111)
Value of food stamps in 2006	0.0002 (0.00076)	0.0002 (0.00036)	0.000024 (0.00048)	-0.00031 (0.00049)	-0.00036 (0.0006)	-0.00087 (0.00048)**
Male	0.278 (0.359)	-0.017 (0.172)	0.329 (0.229)	0.0397 (0.059)	-0.0522 (0.079)	0.109 (0.059)*
Black	0.794 (0.460)*	0.729 (0.22)***	0.102 (0.294)	0.272 (0.0662)***	0.063 (0.0874)	0.121 (0.065)*
Hispanic	0.942 (0.832)	0.308 (0.398)	0.731 (0.53)			
Other race	0.218 (0.939)	0.506 (0.4497)	-0.254 (0.6000)	-0.022 (0.0212)	-0.0513 (0.0279)*	-0.0161 (0.0207)
Child age	2.835 (1.15)**	1.55 (0.5498)***	1.438 (0.733)**			
Child age squared	-0.097 (0.039)**	-0.054 (0.0190)***	-0.0478 (0.025)*			
Some high school mother	-1.108 (0.558)**	-0.493 (0.267)*	-0.642 (0.357)*	-0.0161 (0.0898)	0.0275 (0.119)	-0.0185 (0.088)
Some college mother	0.423 (0.463)	0.254 (0.222)	0.197 (0.296)	0.0789 (0.0753)	0.199 (0.0993)**	0.076 (0.074)
More than college mother	0.739 (0.591)	0.303 (0.280)	0.473 (0.378)	0.0755 (0.0927)	0.179 (0.122)	0.0579 (0.0914)
Poverty rate – 131-260%	0.262 (0.626)	0.359 (0.2996)	-0.0945 (0.399)	0.0907 (0.098)	-0.0085 (0.129)	-0.0993 (0.097)
Poverty rate – 261-510%	0.889 (0.686)	0.572 (0.329)*	0.346 (0.438)	0.150 (0.1008)	0.123 (0.133)	0.0712 (0.0995)
Poverty rate – above 511%	1.28 (0.795)	0.742 (0.381)*	0.583 (0.508)	0.159 (0.1107)	0.467 (0.146)***	0.1506 (0.109)
R ²	0.0370	0.0382	0.0357	0.0265	0.0499	0.0275
N	1,268	1,268	1,268	1,115	1,115	1,115

Note: ***, **, * identify level of significance at $p \leq .01$, $p \leq .05$, or $p \leq .1$, respectively.

Table 6. Probit Models for Positive Behavior Scale, Pearlin Self-Efficacy Scale, and Rosenberg Self-Esteem Index

	CDS		
	Positive Behavior Scale	Pearlin Self-Efficacy Scale	Rosenberg Self-Esteem Index
	Marginal Effects (Std. Error)	Marginal Effects (Std. Error)	Marginal Effects (Std. Error)
Received food stamps in 2006	-0.068 (0.144)	-0.0565 (0.164)	-0.343 (0.165)**
Value of food stamps in 2006	-0.00015 (0.00015)	0.00019 (0.00019)	0.000261 (0.00019)
Male	0.217 (0.074)***	0.00389 (0.085)	0.0327 (0.084)
Black	0.228 (0.096)**	0.304 (0.108)**	0.217 (0.106)**
Hispanic	0.130 (0.17)	0.0616 (0.197)	-0.357 (0.205)*
Other race	0.150 (0.196)	-0.049 (0.225)	-0.267 (0.226)
Child age	0.170 (0.235)	-0.738 (0.272)	-0.488 (0.264)*
Child age squared	-0.0067 (0.008)	0.0239 (0.0093)***	0.0159 (0.009)*
Some high school mother	0.0096 (0.115)	-0.0243 (0.131)	-0.2615 (0.131)**
Some college mother	-0.009 (0.096)	0.178 (0.107)*	0.412 (0.105)***
More than college mother	0.0041 (0.122)	0.384 (0.142)***	0.450 (0.136)***
Poverty rate – 131-260%	-0.065 (0.129)	0.186 (0.146)	0.113 (0.146)
Poverty rate – 261-510%	-0.0684 (0.143)	0.227 (0.159)	0.088 (0.158)
Poverty rate – above 511%	-0.0199 (0.165)	0.371 (0.186)**	0.256 (0.183)
Pseudo R ²	0.0116	0.0310	0.0686
N	1,268	1,268	1,268

Note: ***, **, * identify level of significance at $p \leq .01$, $p \leq .05$, or $p \leq .1$, respectively.

Source: Child Development Supplement (CDS) 2007, Transition to Adulthood (TA) 2007, Panel Study of Income Dynamics (PSID) 2007.

Appendix: Variable definition

Variable Name	Variable Description	Data Source
Body Mass Index	Weight divided by height	CDS, TA
Self-rated health	Overall health and safety: excellent, very good, good, fair or poor	CDS, TA
General math rate	Math skill: not good at all, okay, very good	CDS
General reading rate	Reading skill: not good at all, okay, very good	CDS
Positive Behavior Scale	Parent completed version of the Positive Behavior Scale. Responded to ten questions on child's social competence and compliance. 5-point scale ranging from "not at all like my child" to "totally like my child." Responses were averaged.	CDS
Behavior Problems Index, total score	Constructed using the average scores from the external and internal scores. Values ranged from 30 to 90.	CDS
Behavior Problems Index, external score	External score value ranged from 16 to 48.	CDS
Behavior Problems Index, internal score	Internal score value ranged from 13 to 39.	CDS
Pearlin Self-Efficacy Scale	Mean scores ranged from 1.00 to 4.00.	CDS
Rosenberg Self-Esteem Scale	Mean scores ranged from 1.00 to 4.00.	CDS
SAT Math	SAT score for math, best score if the SAT test was taken more than once	TA
SAT Reading	SAT score for critical reading, best score if the SAT test was taken more than once	TA
SAT/ACT	Take the SAT college entrance exam, the ACT exam, or both	TA
Psychological Well-Being	Subscale of the Languishing/Flourishing Scale. Average of responses to 6 questions, values ranged from 1 to 6.	TA
Emotional Well-Being	Subscale of the Languishing/Flourishing Scale. Average of responses to 6 questions, values ranged from 1 to 6.	TA
Social Well-Being	Subscale of the Languishing/Flourishing Scale. Average of responses to 6 questions, values ranged from 1 to 6.	TA
Received food stamps	Whether or not enrolled in the Food Stamp Program in previous year (2006)	PSID
Value of food stamps	Value of food stamps or benefits received this year (2006)	PSID
Gender	Male or female	CDS, TA
Race	White, African American, Hispanic, other	CDS, TA
Age	Child age	CDS
Age, squared	Child age, squared	CDS
Mother's education Some high school, mother	Some high school, completed high school, some college, completed college, post-graduate education	PSID
Poverty rate	Less than 130% of the poverty rate, 131-260% of poverty rate, 261-510% of the poverty rate, greater than 511% of the poverty rate	PSID
Number of people in family unit	Number of people living in the family unit at the time of the interview	PSID