

Welfare Receipt and Early Childhood Cognitive Scores

Colleen M. Heflin
University of Missouri-Columbia

Sharon Kukla Acevedo
University of Kentucky

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Address correspondence to: Colleen Heflin, Truman School of Public Affairs, University of Missouri-Columbia, 120 Middlebush Hall, Columbia MO 65211-6100; heflincm@missouri.edu. The research reported in this article was made possible by a grant from the Spencer Foundation. The views expressed are those of the authors and do not necessarily reflect the views of the Spencer Foundation.

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Childhood exposure to income poverty is associated with a host of negative characteristics in terms of education, labor market, and physical and mental health outcomes. Yet, past research indicates that family participation in programs such as TANF may be associated with *negative* child outcomes, such as reduced probability of graduation or fewer years of completed schooling. We examine the effects of TANF participation on children's early cognitive development using methods to address concerns about endogeneity and measurement error with panel data from the Fragile Families and Child Wellbeing Study. Our results indicate that participating in TANF is associated with positive cognitive development but that there may be a negative dosage effect reducing the positive returns of cash assistance for long-term recipients.

Keywords: early cognitive development, welfare participation, social spending

INTRODUCTION

In fiscal year 2004, federal, state and local annual expenditures totaled more than \$14 billion for cash aid for welfare, now officially known as the Temporary Assistance for Needy Families Program (TANF) (Moffitt 2007). Despite the substantial level of financial resources devoted to the TANF program, the long programmatic history of support for low-income households with children in the United States, and the abundance of both political and moral arguments in favor of cash transfers and their elimination, previous research does not provide an empirical basis from which to justify these cash transfers in terms of the benefit accrued to the child in the recipient family.

On the one hand, there is evidence that being exposed to income poverty as a child is associated with a host of negative characteristics in terms of education, labor market, and physical and mental health outcomes (Corcoran, 2001; McLoyd, 1998; Duncan and Brooks-Gunn, 1997). Given the substantial body of research indicating the positive association between income and children's outcomes, then all else equal, augmented income due to TANF participation should be positively associated with child outcomes, assuming the source of income is unimportant. Additionally, TANF has evolved into a program that provides more than cash assistance to recipients. Recipients may receive job training, social service referrals, transportation assistance, and child care assistance. Yet, past research indicates that family participation in programs such as TANF (formerly known as Aid to Families with Dependent Children (AFDC)) may be associated with *negative* child outcomes, such as reduced probability of graduation or fewer years of completed schooling (Ku and Plotnick, 2003).

We examine the effects of TANF participation on children's early cognitive development using panel data from the Fragile Families and Child Wellbeing Study. Much of the research in

this area evaluates longer term effects of AFDC, such as schooling outcomes. In contrast, we focus on cognitive development around three years of age to determine whether there are short-term impacts associated with TANF participation. Additionally, we correct for problematic income measures, which generally threatens to bias estimates of welfare participation. Our results indicate that participating in TANF is associated with positive cognitive development but that there may be a negative dosage effect reducing the positive returns of cash assistance for long-term recipients.

LITERATURE REVIEW

There is a well-established research tradition that links the effect of family income to child wellbeing over the life course (Smith, Brooks-Gunn, and Klebanov, 1997; Dahl and Lochner, 2005; Gao and Harris, 2000; Blau, 1999; Mayer, 1997). Whether the relationship between family income and child wellbeing is in fact causal is, however, an open question with obvious policy relevance. Evidence for an income effect seems to be strongest at the bottom of the income distribution (Smith et al., 1997; Duncan and Brooks-Gunn, 1997), suggesting that the relationship is not constant across the income distribution but that there is a threshold effect. Additional evidence suggests that the effect of income varies over the life course with the strongest effect on cognitive development for preschool age children (Duncan and Brooks-Gunn, 1997; Duncan, Yeung, Brooks-Gunn, and Smith, 1998). Finally, persistent poverty influences children's outcomes more than temporary spells of poverty. The longer children live in economically deprived environments, the worse their outcomes, in terms of educational attainment and mental health (Duncan, Brooks-Gunn, and Klebanov, 1994; McLoed and Shanahan, 1993; Guo and Harris, 2000; Smith et al., 1997).

Two critiques of this literature are common and they both lead to skepticism when drawing a causal connection between income and child outcomes since they are associated with biased outcomes. The first problem that emerges is one of measurement error in income. If income is reported with error in survey data, then attenuation bias will bias the coefficient on income towards zero. Several studies have found that when income is measured over several years instead of a single year, a tactic that likely reduces measurement error, the effects of income are greater (Korenman, Miller and Sjasstad, 1995; Blau, 1999; Mayer, 1997). These studies find that young children's PPVT scores are likely to improve by 12-26 percent of a standard deviation when parental income doubles. Dahl and Lochner (2005), in contrast, use an instrumental variables approach to correct for temporary changes in income. This approach, which is discussed in more detail below, finds a \$1,000 increase in income is associated with a 2.1 percent of a standard deviation improvement in math test scores and a 3.6 percent of a standard deviation improvement in reading test scores.

The second critique of prior literature is that the observed effect of income on child outcomes is not due to income per se, but instead due to unobserved omitted factors that are correlated with income. The endogeneity problem has received significant attention (Mayer, 1997, for example) due to the necessity of parsing out the potential effect of public policies, such as a cash transfer program, from other child or family characteristics that are not likely to change from participation in such a program. Prior research has addressed this problem by using fixed effect models, instrumental variable models, and including a wide array of characteristics of the home environment as controls. When the endogeneity problem is addressed, the effects of income decline significantly and often become statistically insignificant (Gao and Harris, 2000; Mayer, 1997).

One additional limitation of the literature on family income and child outcomes just reviewed is that it treats income as fungible and therefore ignores the source of income when making policy recommendations. In their examination of the effects of income poverty on young children's cognitive scores, Smith et al. (1997) maintain that income-transfer policies that would raise families' income-to-needs ratio from less than 1.0 to between 1.0 and 2.0 "would improve the cognitive ability and performance of children." In contrast, Blau (1999) argues against income transfers because the effects would be too small to substantially improve the developmental outcomes of low-income children. Neither study separated welfare income from earnings income and other sources to draw these conclusions. Yet, there is a significant body of evidence that the social policy program most likely to provide income support to families with children, TANF (and its forerunner AFDC), has a negative effect on child outcomes in the long run. We review this literature below.

While the literature on the effects of income on child outcomes tends to focus on early stages of the life course, with the exception of evaluations of specific welfare policies (Morris, Duncan and Huston, 2007), research on the effects of welfare participation on the children in the recipient household tend to focus on at later point in the life course - the transition to adulthood. Studies tend to focus on the links between welfare receipt and high school graduation (Bogges, 1998; Teachman, Paasch, Day, and Carver, 1997; Haveman and Wolfe, 1994; Haveman, Wolfe, and Spaulding, 1991, and McLanahan, 1985) or between welfare receipt and years of completed schooling (Ku and Plotnick, 2003; Peters and Mullis, 1997; Teachman et al., 1997; Duncan and Yeung, 1995; Knox and Bane, 1994; Haveman and Wolfe, 1994; Brooks-Gunn, Guo, and Furstenberg, 1993, and Hill and Duncan, 1987). These studies generally conclude that there is a negative effect of welfare receipt on children's educational attainment while controlling for

family income, although a few studies find no effect of welfare (Hill and Duncan, 1987; Knox and Bane, 1994; Teachman et al., 1997).

As with the literature on the effects of income on child outcomes, research on the effects of welfare participation on child outcomes also suffers from limitations due to measurement error in reports of welfare participation, in which there is a serious underreporting bias problem.

Additionally, endogeneity between welfare participation and the early adulthood outcome is an issue, a problem amplified by the often lengthy time lag between timing of welfare participation and early adulthood outcome of interest. To address these concerns, fixed effect models, instrumental variable models, and models that incorporate many controls for individual characteristics are all employed in this literature. Arguably the strongest paper in this area is by Ku and Plotnick (2003), who utilize fixed effect models and a 15 year average of income and welfare participation, and find a negative effect of welfare receipt on schooling outcomes at age 19.

In this paper, we examine the effects of welfare participation on child development, controlling for the effects of income. By bridging the literature showing a positive income effect and a negative welfare effect on child outcomes, we are addressing an important hole in the literature. Due to the tight temporal proximity between mother's welfare participation and the child's PPVT score, we have fewer endogeneity concerns than the literature which examined the effects of welfare in young adulthood. Since we examine the effects of welfare participation explicitly, our results have clearer policy implications than the literature on income effects on child outcomes. In order to address consistent concerns in both sets of literature regarding measurement error and endogeneity, we present results controlling for an extensive set of

background characteristics as well as indicate the robustness of our results to the inclusion of instrumental variables.

Another important contribution of this paper is that we estimate the effect of welfare on child outcomes on a cohort of new births in the late 1990s which are subject to cultural, economic, and policy conditions that are much more likely to reflect current conditions. In particular, the adoption of TANF in 1996 imposed important policy changes on the receipt of public assistance. It is likely that the effect of welfare on child outcomes is different under present policy conditions than prior to 1996. Taking this into consideration, previous studies provide estimates that are quite dated. The most recent of these schooling outcomes is measured in 1997 (Ku and Plotnick, 2003), although the families' welfare receipt was measured during the preceding 19 years. In contrast, the data used in this project were collected from 1998 onward, thereby providing current estimates of the effect of welfare on child outcomes.

CONCEPTUAL FRAMEWORK

Whether welfare participation improves early childhood cognitive development is an open question. An optimistic view of the role of social policy programs in the lives of the poor might lead one to predict that women who participate in TANF would have children with higher cognitive development scores than similar non-participating women. The most obvious mechanism for this hypothesis is the income effect - that individuals who participate in TANF have greater financial resources at their disposal than similar non-participating individuals. A pure economic model would suggest that shifting the budget constraint out would increase individual utility of the mother, all things being equal - even if the individual remained poor. An improvement in mother's income could easily translate into improved child outcomes through improvements in the home environment, material conditions, parenting skills and child care to

which the child is exposed. Due to data constraints, we treat income as fungible and therefore do not directly examine the impact of a \$100 from welfare versus other sources of income.¹ Our focus, instead, is on the possible behavioral aspects of welfare participation.

There are host of other possible mechanisms that could operate independently of the income effect. It is possible that participation in welfare connects the mother to needed social services. For example, domestic violence counseling, mental health referrals, and job referrals are services that some states offer as part of their TANF programs that may not have existed under AFDC and are often only available to participants of TANF. These services may improve family functioning or wellbeing in ways that are supportive of child development for participating households when compared to non-participating households, holding income constant. If participation in TANF connects mothers to the labor force, it is possible that children may benefit from daily routines organized around work schedules, connections with child care providers or improvements in parenting skills from increases in mothers' self-efficacy.

On the other hand, it is quite possible that behavior impacts of welfare participation may well exact a negative price on children's cognitive development, partly as a result of negative selection onto welfare and partly as a result of what are considered the negative effects of welfare participation for the mother. Proponents of the culture of poverty theory suggest that participation in federal entitlement programs erodes feelings of self-efficacy and results in dependency (Mead, 1986; Kane, 1987). Others suggest that recipients face public censure for participating in entitlement programs (Goodban, 1985; Piven and Cloward, 1993) and stigma has been shown to be detrimental to mental health (Williams, Yu, Jackson, and Anderson., 1997).

¹ The Fragile Family data only contain monthly reports of income at the 1 year follow up interview and 3 year follow-up interview. Since welfare income may fluctuate widely depending on reported earnings and income from other sources as well as duration in many states, we chose to not present results using this noisy measure. However, in results not shown, we find that welfare income is not related to child development in any of our models.

Additionally, some argue that women on welfare are pushed into the labor market instead of allowed to spend time parenting their children and that this is harmful to child development, particularly where children are placed in low quality child care and mother's stress increases as the result of juggling work and family demands. Thus, it is also possible that welfare participation could have a negative effect on children's early childhood development, holding income constant.

Although we have focused on the welfare participation decision as a dichotomy, there also may be a dosage effect in that the cognitive development effects may be a function not just of the decision to participate, but also on the duration of benefits received through TANF. In other words, a few months of welfare may have only a negligible effect on cognitive development, while many months or years of welfare usage may have a larger effect on child outcomes. Households may choose to participate for fewer or more months than other households based on income and preferences for transfer program benefits. In order to explore the possibility of a dosage effect, we will examine models which incorporate the number of months on welfare since the birth of the focal child.

DATA, MEASURES, AND METHODS

Data

We analyze data from the Fragile Families and Child Wellbeing Study, a panel survey designed to gather detailed data about the policy and environmental conditions affecting unwed parents. The study follows a cohort of nearly 5000 children born in 20 U.S. cities with populations greater than 200,000 between 1998 and 2000, including an oversample of births to unwed parents. The first interview, referred to here as the baseline, consists of interviews with both mothers and fathers in the hospital when the child is born. Data are available from two

follow-up interviews with mothers—one that occurs approximately one year after the birth and another that occurs approximately three years after the birth. The base year interviews were collected between February, 1998 and September, 2000, the one-year follow-up interviews were collected between June, 1999 and March, 2002, and the three-year follow-up interviews were conducted between April, 2001 and December, 2003. The data are representative of non-marital births in U.S. cities with populations greater than 200,000. Twenty cities were selected using a three-stage stratified random sampling scheme based on policy environments and labor market conditions. First, cities were sampled, then hospitals within cities, and finally, births within hospitals. Forty four percent of the respondents were African-American, 39 percent were ages 20-24 and 56 percent had at least a high school education (McLanahan, Garfinkel, Reichman, Teitler, Carlson, and Audigier, 2003).

The Fragile Families Survey is an ideal data source for this project. It provides rich data on the economic, social and health characteristics of mothers and fathers and the wellbeing of their children in terms of cognitive development. Most prior studies in this area used data from the Panel Study of Income Dynamics (PSID). However, until the recent addition of the Child Development Supplement in 1997, very little information about child wellbeing was collected in the PSID. In contrast, Fragile Families has a much richer panel beginning at birth.

Measures

The analysis incorporates a comprehensive set of factors known to be related to early childhood development including characteristics of the focal child, the child's mother, the child's father, the home environment, and family dynamics. Table 1 lists descriptive statistics for the overall sample and also compares the characteristics according to whether or not the mother received TANF at some point since the focal child's birth. For each characteristic, the table

indicates whether the mean difference for the group that received welfare is statistically different from the group that did not receive welfare.

PPVT: Our outcome of interest is the Peabody Picture Vocabulary Test (PPVT). Empirical research demonstrates that PPVT scores, which measure receptive language ability, are related to academic achievement (Altepetter and Handal, 1985; Smith, Smith, and Dobbs, 1991; Bing and Bing, 1984; Naglieri and Pfeiffer, 1983). Further, early childhood PPVT scores continue to predict academic outcomes for several years after initial assessment (Beitchman, Wilson, Brownlie, Walters, and Lancee, 1996). The PPVT is nationally normed with a mean of 100 and standard deviation of 15. Fragile Families administers the PPVT at the child's home as part of the three year follow-up interview. The average age at the time the PPVT is administered is 27.6 months with a range from 17 to 47 months. In order to control for the natural effects of maturation on PPVT scores, age standardized PPVT scores are used in the models. Overall, the sample mean of 86.73 is nearly one standard deviation lower than the national mean. As Table 1 indicates, children who live in families that received welfare score significantly lower than children in families that did not receive cash assistance.

Welfare: Welfare use is measured twice in the survey, once when the child is roughly one year of age and again when the child is around 36 months. Mothers are asked if they received welfare in the previous twelve months and for how many months she received the benefit. We create a dummy variable to indicate if the mother participated in TANF at any point since the birth of the focal child. We also create a measure of the cumulative number of months the mother participated in TANF programs since the birth of the child. Approximately 35 percent of families received welfare at any point since the focal child's birth. Of these families, the average duration on welfare is 20.42 months.

Child Characteristics: PPVT scores have been found to vary by child characteristics (Phillips, Brooks-Gunn, Duncan, Klebanov, and Crane, 1998). Sex of the child is controlled with a dummy variable indicating the child is female. We create a series of variables to indicate whether the child is white, black, Hispanic, or another race not included in these categories. Children are coded as “other” if the mother and father do not report the same race. The models include variables that capture whether the focal child is the mother’s first baby and the number of other children at home when the child is three. Controls for the focal child’s health are also entered, such as low birth weight (5 lbs. 8 oz. or less), health status of the child, anxious behavior at three years of age, and the child’s age when the mother went back to work. Children in households that participate in TANF are significantly more likely to be black and in poor health than in non-TANF households. Additionally, children in TANF households have higher average levels of anxiety, more siblings, and are older when their mothers began working.

Parental Characteristics: Fragile Families is one of only a handful of datasets that includes a measure of the mother’s cognitive ability. Interviewers administered the PPVT to mothers during the year three in-home interview. As with the children’s PPVT scores, the mother’s scores are lower than the national average, with a mean of 90.44 and SD of 11.86. Similar to the children’s PPVT scores, the mothers in the TANF sample score significantly lower than the non-TANF mothers. We capture race of the mother and father using the same four indicator variables as in the case of the child; white is the omitted category. There are higher percentages of black mothers and fathers in the sample that received cash assistance. We include indicators for mother’s education level, employment, self-reported health status, age at the focal child’s birth, and annual household income. As expected, there are significantly higher percentages of female headed households in the TANF sample. TANF households are, on

average, younger, have lower levels of education, lower incomes, and report worse health status than the mothers in the non-TANF households. The 36 month in-home interview provides several measures for mother's mental health, allowing us to enter controls for levels of maternal depression, stress, anxiety, and drug and alcohol use. The TANF mothers have statistically worse mental health outcomes than non-TANF participating mothers. There are no statistical differences in drug and alcohol use between the two groups of women.

Environmental Factors: Because early childhood development is sensitive to environmental factors, we include both individual-level and census tract-level controls. Taking advantage of the extensive home environment data available in Fragile Families, we include a scale item that measures the amount of cognitively stimulating materials in the home, and include controls for the number of hours the child is in child care each week, the hours of television the child watches each week, and the level of food insufficiency in the household. On average, there are fewer stimulating materials, more television watching, more food insufficiency, and the children spend less time in day care in the TANF households. We also include tract-level Census 2000 data for the tracts where Fragile Families mothers lived at the time of the second follow-up interview. Specifically, we include the percent of female population of childbearing age (15-49), the percent of family households with kids less than age 18 headed by females, the percent of the population over age 25 with a bachelor's degree or higher, median monthly gross rent, and percent of families below the poverty line in 1999. In the census tracts of the TANF households, there are higher percentages of female-headed households, more females living below poverty, and a smaller percentage of the 25 and older population holding high school degrees. Gross median monthly rent is also statistically lower.

Family Dynamics: We use several measures that tap the family dynamics affecting the child. A series of variables describe the father's involvement with the child at age three – birth parents are married, birth parents are cohabiting, birth parents are not cohabitating but father sees the child regularly, and the father is not involved with the child. We also know whether the mother is involved with a man who is not the child's birth father and how many times the family moved during the child's third year. There are significantly fewer marriages, more cohabiting, and more family moves in the TANF sample. Finally, following the work of Berger, Paxson, and Waldfogel (2005), we create parenting scales that measure the mother's use of neglect and punishment in regard to child. Table 1 lists marginal differences between the groups on the parenting scales.

Model

We represent the relationship between mother's welfare participation and children's PPVT score at age three with the following model:

$$(1) Y = \alpha + W\gamma_1 + C\gamma_2 + M\gamma_3 + F\gamma_4 + E\gamma_5 + \varepsilon$$

Where Y= the child's standardized PPVT score; W is a vector of variables capturing the connection to welfare. C is a vector of child-specific characteristics, such as age in months, gender, and health; M includes mother-specific characteristics, including demographic characteristics, income, cognitive ability, physical and mental health, and education; F is a vector of variables that capture family dynamics, such as the relationship status of the biological parents, size of the family, and the amount of time the child spends in child care. Finally, E is a vector of environmental factors that capture the home environment, such as cognitive stimulation, and social characteristics of the census tract of the residence at the time of the 3 year

follow-up interview. We adjust the standard errors for intra-cluster correlations within cities for all the analysis.

Previous studies assumed that there is no measurement error in reports of TANF receipt or total family income. However, there is ample evidence to suggest that measurement error is a serious issue (Bollinger and David, 1997; Goudreau, Oberheu, and Vaughn, 1984; Dahl and Lochner, 2005; Mernandez and Pudney, 2007). Additionally, there is reason to worry about the validity of the income and TANF reports collected from the Fragile Families Study. The survey did not consistently ask questions about family income across all three waves (Bendheim-Thoman Center for Research on Child Wellbeing, 2005) and there are a substantial number of missing values on household income measures (McLanahan et al., 2003). The second and third follow-up surveys asked participants to recall the number of months they received TANF benefits in the past year. This variable is potentially problematic because participants may consciously (due to the social stigma of participation) or unconsciously misreport the number of months on TANF. Therefore, we estimate a series of models in which we attempt to address measurement error through the use of instrumental variable models.

Our instruments for TANF participation and the number of months on TANF since the birth of the focal child include characteristics of both the census tract and state conditions. For the census tract we consider the percent of households on public assistance, the percent of civilian labor force that is unemployed, and median household income as potential instruments. Additionally, we employ characteristics of the state economic and policy environment such as the percent food secure, the number of TANF recipients, the number of Food Stamp recipients, the average TANF and Food Stamp benefit level, the unemployment rate, the poverty rate, the

state minimum wage, state Earned Income Tax rate and if the state senate has a democratic majority.

We use the marginal tax rate as an instrument for income following the work of Dahl and Lochner (2005). First, we predict income using a set of fixed characteristics of the mother (age, race, education level at child's birth, mother's PPVT score, if the focal child's maternal grandmother was foreign born and if the mother lived with both parents at age 15).

$$(2) \quad \hat{Y} = \pi_0 + \pi_1 age + \pi_2 age^2 + \pi_3 race + \pi_4 education + \pi_5 mppvt + \pi_6 nativity + \pi_7 twoparents$$

Second, we enter predicted income into NBER's TAXSIM program to calculate predicted EITC, federal adjusted gross income, and other tax payments. We roughly estimate after-tax gross income by summing predicted EITC and federal adjusted gross income. We use this predicted after-tax income measure as our instrument for actual income. Thus, income is just identified and our TANF variables are over-identified in our models.

In order to compare our results with prior work in this area, we first present OLS models that do not correct for measurement error. Then, we improve upon prior work by estimating two-staged least squares models that correct for measurement error in the self reports of income and TANF participation. Results from both models are discussed below.

RESULTS

Table 2 presents coefficients and standard errors of the prime variables of interest from the OLS regression models and the instrumental variable models. Model 1 controls for receipt of TANF since the birth of the child and Model 2 controls for the number of months on welfare since the child's birth. Results for the full model, which includes variables capturing mothers' characteristics, children's characteristics, family dynamics and environmental controls, may be found in Table A1 of the appendix.

Results from Model 1 indicate that welfare participation has a positive effect on child development. Children of mothers who participate in welfare at some point since their birth have standardized PPVT scores that are, on average, 1.9 points higher than children of mothers who do not participate in welfare. This coefficient represents 12 percent of a standard deviation change in PPVT scores. This effect is found after controlling for mother's PPVT score (which is highly significant) and the household income (which is not statistically significant) as well as other relevant variables discussed above. In terms of our conceptual model, support is found for the hypothesis that welfare participation is beneficial for early childhood development.

Results from Model 2 indicate that once we control for the length of time on welfare, the dummy variable indicating TANF participation is no longer predictive of child development. The point estimate on welfare participation retains the positive sign but decreases in magnitude and precision, becoming statistically insignificant. In addition, we find no relationship between the number of months on TANF since the child's birth and the child's PPVT score. This result on TANF duration is inconsistent with the hypothesis of a dosage effect for welfare participation.

It is noteworthy that total household income is statistically insignificant in both OLS models shown in Table 2. This result is consistent with work both by Mayer (1997) and Guo and Harris (2000) discussed above. A finding of no relationship between family income and childhood cognitive development may be a good indicator that we have included an appropriate set of covariates that fully capture the mechanisms through which income might affect cognitive development. Alternatively, it is possible that measurement error in our measure of income is adding sufficient noise to the model to suppress the income coefficient. We consider this second possibility next.

In order to consider the possibility of measurement error in both income and welfare, we estimate a series of instrumental variable models. For welfare, our instruments are reduced form predictors for welfare participation such as the generosity of the state TANF benefit, poverty rate, and state political climate. For total family income, our instrument is the predicted after-tax income described above. First stage results (not shown) indicate that our measure of predicted gross income is a good predictor of total household income. Out of the instrument set predicting welfare treatment and dosage, the percent of the census tract that is on public assistance is positively related to participation and duration while the average state benefit level and the unemployment rate are negatively related.

Turning now to the Model 1 instrumental variable results correcting for measurement error, we find that welfare participation of the mother is once again positively associated with an increase in children's PPVT score. Mothers who participate in TANF at some point before the 2nd follow-up interview have children with standardized PPVT scores that are 17.34 points higher than non-participating mothers. To put this magnitude in perspective, 17.34 points represents more than a full standard deviation increase in PPVT score. This is again consistent with the hypothesis that welfare participation is beneficial for child development.

In Model 2, we control for the dosage effect of TANF participation by adding a variable indicating the number of months the mother has received TANF since the birth of the child. Now, the large positive coefficient on participation in TANF increases further to 48.44, representing a three standard deviation increase in the child standardized PPVT score at age three over non-TANF participating mothers. This unlikely large effect size is attenuated by the negative sign on the length of participation variable, indicating that children of mother's who stay on TANF longer may receive fewer benefits than women with shorter durations. Among

TANF participants, the median duration is 17 months and the mean duration is 20 months. At 43 months the negative duration effect offsets the positive participation effect, suggesting that long-term receipt of TANF is still associated with negative child outcomes. About 5 percent of this sample report welfare receipt of 43 months or greater. Presumably this proportion would only increase as the observation window increased.

One check on the reasonableness of our correction for measurement error is that the coefficient on income increases in size and becomes statistically significant in our instrumental variable models. In terms of magnitude, a \$10,000 increase in annual family income is associated with a 1.3-1.9 increase in children's standardized PPVT score or about 10 percent of a standard deviation. Furthermore, our results are consistent with results from experimental studies indicating that preschool aged children benefit from participation in programs that promote work attachment and provide some levels of income support (Morris, Duncan and Huston, 2007).

In summary, we find consistent evidence that welfare participation is associated with gains in early childhood development and some evidence of a negative dosage effect. The size of the gains varies depending on assumptions made regarding the presence of measurement error as well as the confidence placed in our identification strategy. It is important to be mindful that these gains are observed after controlling for child characteristics, mother's characteristics, family dynamics and the environment - all factors that could be causal pathways through which welfare participation might impact early childhood development. For example, many studies have examined the effects of various welfare policies such as work requirements on early childhood development. We include mother's employment status in the model, as well as the child's age when the mother returned to work and the number of hours in child care. Thus, any

observed gains in the children's PPVT score are net of the changes in observed characteristics related to welfare participation.

POLICY IMPLICATIONS

In this paper, we explore the effects of welfare participation on one measure of early childhood achievement, the PPVT score. Using comprehensive and longitudinal data from the Fragile Families and Child Wellbeing Study, we test a model of the effects of welfare participation on early childhood development. In Table 2, results from the OLS models demonstrate that modest improvements in child achievement are associated with TANF participation. In models controlling for measurement error, however, estimates of the positive effect associated with welfare participation become sizable. Finally, evidence regarding the existence of a dosage effect for welfare participation is inconclusive in our OLS model but results from instrumental variable models are consistent with the finding of a negative relationship between duration of receipt and early childhood outcomes.

In light of the past research demonstrating either no effect or a negative effect of welfare participation on young adult outcomes there are two possible ways to reconcile our findings. The first is that the policy and the economic environment matters. Since the Welfare Reform Act of 1996 limited the number of months federal dollars that could be used for cash assistance, the negative attributes associated with the transmission of a "welfare culture" may have abated. Additionally, since more services are now available to women on welfare in many states, there even may be positive attributes associated with welfare participation. An alternative explanation is that welfare participation, when received during early childhood, has always had a positive effect on childhood achievement but that something happens throughout the course of childhood

to diminish or reverse that effect by early adulthood, the time in the life course examined by prior studies. We are unable to discern which explanation is the most plausible at this point.

We want to note a few limitations of this paper. First, because the data have only one measure of the outcome variable, we are limited to estimating cross-sectional models only. Ideally, we would like to be able to control for time invariant unmeasured heterogeneity through fixed effect models but this is not possible. Instead, we use the mother's PPVT score and a comprehensive list of control variables as a control for endogeneity and selection on to welfare. Mother's PPVT score does appear to work well for Blacks and Whites, but there is some room to question its validity for Hispanic mothers. Additionally, we recognize that measurement error may be present in our income and welfare variables. While we use instruments that are strong on theoretical grounds or that worked in other contexts, many of the reduced form predictors of welfare participation are not statistically significant in our first stage models.

There are several policy implications resulting from this paper. First, in contrast to past research indicating that welfare participation has a negative effect on young adult outcomes, we find evidence to suggest that there may be a positive effect at an early point in the life course - early childhood. One explanation for this finding is that perhaps TANF is much harder to negotiate than the old AFDC system and mothers who are able to do so may possess positive qualities which are transferred to their children and show up in the children's PPVT score. This positive selection hypothesis cannot be evaluated with these data but the hypothesis would need to rely upon differences in the non-cognitive abilities of mothers since mother's PPVT score would presumably pick up cognitive abilities.

The positive effect of TANF participation on child achievement is an important finding because childhood is the part of the life course at which Americans face the highest risk of

poverty. Given the evidence of the harmful effects of poverty on child development, the ability to mitigate the effects through existing social programs should be of considerable interest to policy-makers, particularly since early childhood PPVT scores continue to predict academic outcomes for several years after initial assessment (Beitchman, Wilson, Brownlie, Walters, and Lancee, 1996). Because children from poor families have more limited opportunities for language development in the home and tend to enter school developmentally under-prepared (Walker, Greenwood, Hart, and Carta 1994), many poor children enter the primary educational system already on a track leading to future school difficulties and substandard academic performance. Thus, the possibility that social spending via TANF buffers the effects of poverty on children in terms of their cognitive development is significant and deserves further attention.

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Table 1. Selected summary statistics. Standard deviations in parenthesis.

| | Full Sample | Participating in TANF | Not Participating in TANF | Sig. |
|--|------------------|-----------------------|---------------------------|------|
| <u>PPVT</u> | | | | |
| Mother's PPVT score | 90.54 (11.86) | 85.84 (10.23) | 93.11 (11.90) | *** |
| Child's PPVT score | 86.73 (16.29) | 83.29 (14.64) | 88.61 (16.83) | *** |
| <u>Welfare</u> | | | | |
| Percent received TANF since child's birth | | 35.39 (47.84) | --- | *** |
| # months on TANF since child's birth | 7.23 (13.17) | 20.42 (14.85) | --- | *** |
| <u>Child Characteristics</u> | | | | |
| Percent Female | 46.63 (49.90) | 45.88 (49.88) | 47.05 (49.94) | |
| Percent White | 17.69 (38.18) | 6.08 (23.92) | 24.06 (42.77) | *** |
| Percent Black | 53.44 (49.90) | 71.96 (44.96) | 43.29 (49.57) | *** |
| Percent Hispanic | 14.09 (34.80) | 11.57 (32.02) | 15.47 (36.18) | ** |
| Percent Other | 14.78 (35.50) | 10.39 (30.55) | 17.19 (37.75) | *** |
| Percent firstborn | 38.10 (48.58) | 36.27 (48.13) | 39.10 (48.82) | |
| Percent with low birth weight | 9.37 (29.15) | 10.59 (30.80) | 8.70 (28.20) | |
| Percent in poor health | 1.87 (13.56) | 2.94 (16.91) | 1.29 (11.29) | ** |
| Child anxiety | 3.49 (2.44) | 4.10 (2.46) | 3.15 (2.36) | *** |
| Number of siblings | 1.44 (1.35) | 1.68 (1.51) | 1.31 (1.23) | *** |
| Child's age (months) when mother began working | 4.16 (5.71) | 4.67 (6.93) | 3.88 (4.90) | *** |
| <u>Mother Characteristics</u> | | | | |
| Percent female head | 27.00 (44.41) | 40.78 (49.19) | 19.44 (39.60) | *** |
| Percent White | 23.11 (42.17) | 9.80 (29.77) | 30.40 (46.02) | *** |
| Percent Black | 55.59 (49.70) | 74.31 (43.73) | 45.33 (49.81) | *** |
| Percent Hispanic | 18.18 (38.58) | 14.51 (35.25) | 20.19 (40.17) | *** |
| Percent Other | 3.12 (17.40) | 1.37 (11.65) | 4.08 (19.80) | *** |
| Percent less than high school | 26.86 (44.34) | 44.31 (49.72) | 17.29 (37.84) | *** |
| Percent high school diploma/GED | 32.34 (46.79) | 34.71 (47.65) | 31.04 (46.29) | |
| Percent more than high school diploma | 43.30 (49.57) | 24.90 (43.29) | 53.38 (49.91) | *** |

| | | | | |
|--|------------------------|------------------------|------------------------|-----|
| Percent employed | 73.21 (44.30) | 60.20 (49.00) | 80.34 (39.76) | *** |
| Total household income | \$31,684 (\$33,925) | \$13,752 (\$13,955) | \$41,506 (\$37,451) | *** |
| Age at child's birth | 24.69 (5.84) | 22.74 (5.12) | 25.76 (5.93) | *** |
| Percent in poor health | 11.59 (32.02) | 16.47 (37.13) | 8.92 (28.51) | *** |
| Depression Scale | 1.27 (2.18) | 1.67 (2.36) | 1.05 (2.04) | *** |
| Stress Scale | 12.22 (7.77) | 13.91 (7.82) | 11.30 (7.60) | *** |
| Anxiety Scale | 1.20 (2.90) | 1.50 (3.21) | 1.04 (2.71) | *** |
| Alcohol Score | 0.02 (0.29) | 0.02 (0.33) | 0.01 (0.26) | |
| Drug Score | 0.04 (0.41) | 0.04 (0.45) | 0.04 (0.39) | |
| <u>Father Characteristics</u> | | | | |
| Percent White | 19.57 (39.69) | 6.47 (24.62) | 26.75 (44.29) | *** |
| Percent Black | 59.06 (49.19) | 77.45 (41.83) | 48.98 (50.02) | *** |
| Percent Hispanic | 18.53 (38.87) | 14.51 (35.25) | 20.73 (40.56) | *** |
| Percent Other | 2.85 (16.63) | 1.57 (12.44) | 3.54 (18.50) | ** |
| <u>Family Dynamics</u> | | | | |
| Percent mother married to father | 32.57 (46.50) | 10.78 (31.05) | 42.96 (49.53) | *** |
| Percent mother cohabiting with father | 24.43 (42.98) | 27.06 (44.47) | 22.99 (42.10) | *** |
| Percent father involved with child | 29.63 (45.68) | 40.39 (49.12) | 23.74 (42.57) | *** |
| Percent father not involved with child | 15.75 (36.44) | 23.53 (42.46) | 11.49 (31.91) | *** |
| Percent mother dating other man | 7.22 (25.87) | 10.20 (30.29) | 5.59 (22.98) | *** |
| Number in family | 4.39 (1.57) | 4.49 (1.68) | 4.34 (1.50) | * |
| Number of household moves | 0.61 (0.87) | 0.77 (1.00) | 0.53 (0.78) | *** |
| Number of weekly hours spent in child care | 19.01 (18.64) | 16.38 (18.77) | 20.45 (18.41) | *** |
| <u>Parenting Style</u> | | | | |
| Neglectful | 0.46 (2.30) | 0.61 (2.74) | 0.38 (2.02) | * |
| Use of physical punishment | 0.17 (0.38) | 0.21 (0.41) | 0.15 (0.36) | * |
| <u>Environmental Factors</u> | | | | |
| Lack of stimulating materials | 0.84 (1.13) | 1.13 (1.36) | 0.68 (0.95) | *** |
| Percent female age 15-49 | 51.09 (6.03) | 50.68 (5.57) | 51.32 (6.26) | * |
| Percent female headed households | 22.31 (13.81) | 28.67 (13.43) | 18.82 (12.74) | *** |

| | | | | |
|--|------------------------|------------------------|------------------------|-----|
| Percent 25+ population with high school degree | 71.68 (14.66) | 65.80 (13.44) | 74.90 (14.30) | *** |
| Median monthly gross rent 1999 | \$586.21 (\$226.47) | \$520.67 (\$188.63) | \$622.12 (\$237.27) | *** |
| Percent of females below poverty level in 1999 | 18.77 (14.52) | 25.13 (14.76) | 15.29 (13.14) | *** |
| Food insufficiency scale | 1.09 (2.30) | 1.47 (2.60) | 0.88 (2.09) | *** |
| Hours of TV watched per week | 24.04 (15.88) | 27.63 (17.89) | 22.07 (14.29) | *** |
| N | 1441 | 510 | 931 | |
| NOTE: All variables are measured at wave 3 unless noted otherwise. | | | | |

| Table 2. Ordinary Least Squares and Instrumental Variable Model Results for Child's PPVT Score | | | | |
|--|--------------------|------------------|----------------------|-----------------------|
| | OLS Results | | IV Results | |
| | <i>Model 1</i> | <i>Model 2</i> | <i>Model 1</i> | <i>Model 2</i> |
| <u>Welfare</u> | | | | |
| If received since birth of child | 1.925** (0.979) | 1.266 (1.294) | 17.342*** (8.514) | 48.448*** (22.719) |
| # months on TANF since birth | | 0.035 (0.032) | | - 1.116** (0.566) |
| <u>Annual Household Income(\$00s)</u> | 0.001 (0.002) | 0.001 (0.002) | 0.013** (0.005) | 0.019** (0.008) |
| N | 1441 | 1441 | 1441 | 1441 |
| *** Denotes significance at .01 level; ** Denotes significance at .05 level; * Denotes significance at the .10 level | | | | |

Table A1. The Effect of Welfare on Child Development – Full Results.

| | OLS Regression Results | | IV Model Results | |
|--------------------------------------|------------------------|----------------------|----------------------|---------------------|
| | Model 1 | Model 2 | Model 1 | Model 2 |
| <u>Mother Characteristics</u> | | | | |
| Female head | 1.530 (1.396) | 1.507 (1.411) | -0.386 (2.665) | 0.824 (1.863) |
| Black | -0.918 (3.465) | -0.843 (3.517) | -0.165 (5.823) | -1.842 (3.829) |
| Hispanic | 1.739 (3.057) | 1.872 (3.057) | 8.449* (4.358) | 3.416 (3.332) |
| Other | 0.952 (3.042) | 1.073 (3.009) | 5.317 (4.159) | 1.201 (3.393) |
| High school diploma/GED | -3.782*** (1.221) | -3.836*** (1.200) | -2.916** (1.377) | -2.255 (1.346) |
| More than high school diploma | -2.210 (1.627) | -2.266 (1.605) | -2.551* (1.477) | -1.476 (1.564) |
| Employed | 2.591 (1.681) | 2.539 (1.696) | 3.620 (2.434) | 4.101* (2.102) |
| Income (\$00's) | 0.001 (0.002) | 0.001 (0.002) | 0.019** (0.008) | 0.014*** (0.005) |
| Age at child's birth | 0.137 (0.111) | 0.140 (0.112) | 0.249 (0.214) | 0.134 (0.159) |
| Poor health | -1.338 (0.930) | -1.386 (0.915) | -4.312** (1.820) | -2.191* (1.273) |
| Depression | 0.162 (0.185) | 0.164 (0.183) | -0.008 (0.334) | 0.036 (0.232) |
| Stress | -0.016 (0.066) | -0.015 (0.066) | 0.010 (0.094) | -0.012 (0.070) |
| Anxiety | -0.017 (0.149) | -0.017 (0.149) | 0.048 (0.211) | 0.029 (0.163) |
| Alcohol use score | -0.812 (1.055) | -0.770 (1.030) | 0.123 (0.814) | -1.053 (1.206) |
| Drug use score | -2.034* (1.163) | -2.007* (1.159) | -0.443 (1.420) | -1.535 (1.060) |
| Mother's PPVT score | 0.372*** (0.043) | 0.371*** (0.043) | 0.353*** (0.066) | 0.374*** (0.058) |
| <u>Child Characteristics</u> | | | | |
| Female | 1.257 (0.930) | 1.273 (0.941) | 1.757 (1.335) | 1.241 (1.035) |
| Black | -0.983 (5.411) | -1.054 (5.435) | -3.585 (8.542) | -1.483 (6.346) |
| Hispanic | -9.312 (7.157) | -9.598 (7.113) | -22.051** (9.305) | -11.858 (7.791) |
| Other | -2.145 (3.976) | -2.268 (3.967) | -7.731 (6.080) | -3.432 (4.863) |
| Firstborn | 0.616 (1.025) | 0.615 (1.027) | -0.400 (1.519) | 0.013 (1.063) |
| Low birth weight | -3.679** (1.773) | -3.713** (1.772) | -3.655 (2.718) | -2.963 (2.114) |
| Poor health | 3.378 (2.543) | 3.481 (2.516) | 4.828 (4.978) | 1.939 (3.622) |
| Child anxiety | -0.090 (0.129) | -0.089 (0.129) | -0.090 (0.206) | -0.098 (0.144) |

| | | | | |
|--|----------------------|----------------------|----------------------|----------------------|
| <u>Father Characteristics</u> | | | | |
| Black | -3.156 (3.708) | -3.152 (3.708) | -1.231 (5.430) | -1.685 (4.662) |
| Hispanic | 1.198 (4.273) | 1.321 (4.267) | 9.574 (6.217) | 4.263 (5.177) |
| Other | 0.281 (4.935) | 0.297 (4.923) | 2.656 (5.227) | 1.596 (5.258) |
| <u>Parenting Style</u> | | | | |
| Neglectful | 0.169 (0.201) | 0.171 (0.205) | 0.224 (0.409) | 0.163 (0.272) |
| Use of physical punishment | -1.794 (1.099) | -1.802 (1.090) | -1.677 (1.257) | -1.523 (0.994) |
| <u>Family Dynamics</u> | | | | |
| Mother cohabiting with father | -2.572*** (0.754) | -2.555*** (0.746) | -2.984* (1.512) | -2.947** (1.249) |
| Non-residential father involved with child | -1.698 (1.755) | -1.675 (1.761) | -1.855 (2.522) | -1.932 (2.021) |
| Non-residential father not involved with child | -3.681** (1.737) | -3.690** (1.742) | -5.882 (3.460) | -4.544 (2.672) |
| Mother dating other man | -3.132* (1.668) | -3.105* (1.674) | -2.532 (2.838) | -3.350 (1.966) |
| Number in family | -0.184 (0.321) | -0.195 (0.325) | -0.549 (0.630) | -0.203 (0.390) |
| Number of siblings | -0.255 (0.429) | -0.245 (0.435) | -0.249 (0.788) | -0.412 (0.448) |
| Number of moves at age 3 | -0.428 (0.342) | -0.415 (0.339) | -0.441 (0.641) | -0.661 (0.496) |
| Child's age when mother began work | 0.106 (0.083) | 0.107 (0.083) | 0.107 (0.144) | 0.081 (0.111) |
| Number of hours child in child care | 0.039* (0.022) | 0.038 (0.023) | 0.037 (0.047) | 0.042 (0.035) |
| <u>Environmental Factors</u> | | | | |
| Lack of stimulating materials | -0.850* (0.412) | -0.847* (0.411) | -1.057** (0.489) | -1.023** (0.382) |
| Percent female age 15-49 | 3.046 (8.861) | 3.097 (8.829) | 18.828 (13.986) | 12.238 (10.071) |
| Percent female headed households | -11.497* (5.690) | -11.535* (5.690) | -21.412* (11.708) | -16.587** (7.493) |
| Percent 25+ population with high school degree | 13.620** (5.691) | 13.649** (5.671) | 15.719** (6.571) | 14.110** (6.032) |
| Median monthly gross rent 1999 | -0.000 (0.003) | -0.000 (0.003) | -0.009* (0.005) | -0.006* (0.004) |
| Percent of females below poverty level in 1999 | 12.978* (6.846) | 13.223* (6.790) | 14.156 (9.383) | 8.634 (7.072) |
| Food insufficiency scale | -0.143 (0.230) | -0.139 (0.231) | 0.226 (0.308) | 0.016 (0.232) |
| Hours of TV watched per week | 0.011 (0.026) | 0.010 (0.026) | -0.033 (0.032) | -0.003 (0.025) |
| N | 1441 | 1441 | 1441 | 1441 |
| *** Denotes significance at .01 level; ** Denotes significance at .05 level; * Denotes significance at the .10 level | | | | |

Table B1. First Stage Instrumental Variables Estimates.

| | Income | TANF Participation | TANF Duration |
|--|-----------------------|-----------------------|----------------------|
| Adjusted Gross Income (\$00) | 0.003*** (0.001) | -0.000** (0.000) | -0.000** (0.000) |
| <u>Census Tract Characteristics</u> | | | |
| Percent of households on public assistance | -203.945 (192.775) | 0.747** (0.321) | 25.189*** (9.149) |
| Percent of 16+ labor force employed | 27.680 (166.087) | 0.191 (0.276) | -0.353 (7.882) |
| Median household income in 1999 | 0.007*** (0.001) | 0.000 (0.000) | 0.000 (0.000) |
| <u>State Characteristics</u> | | | |
| Food security | -11.702 (10.295) | 0.006 (0.017) | -0.602 (0.489) |
| Unemployment rate | -14.131* (8.161) | -0.025* (0.014) | -0.245 (0.387) |
| TANF recipients | -0.000** (0.000) | -0.000 (0.000) | -0.000 (0.000) |
| Food Stamp program recipients | 0.000*** (0.000) | 0.000 (0.000) | 0.000 (0.000) |
| TANF + Food Stamp benefit | -0.255** (0.119) | -0.000** (0.000) | -0.011** (0.006) |
| Poverty rate | -18.607** (9.474) | -0.025 (0.016) | -0.123 (0.450) |
| Democratic Senate | 151.168 (139.985) | 0.075 (0.233) | -9.298 (6.643) |
| EITC benefit | -56.151 (81.154) | -0.186 (0.135) | 0.482 (3.851) |
| Minimum wage | -35.753 (43.303) | 0.052 (0.072) | 3.100 (2.055) |
| N | 1441 | 1441 | 1441 |
| *** Denotes significance at .01 level; ** Denotes significance at .05 level; * Denotes significance at the .10 level | | | |