INSTITUTE for RESEARCH on POVERTY
UNIVERSITY OF WISCONSIN–MADISON

Fast Focus

www.irp.wisc.edu

No. 17–2013

Katherine Magnuson's research focuses on the well-being and development of economically disadvantaged children and their families. In the first half of this brief Magnuson pulls together scholarship on the effects of poverty and inequality on children, especially from infancy to age five. Her scope goes beyond the social sciences to include new findings from neuroscience and developmental psychology that provide a new window into the mechanisms by which disadvantage may have lasting effects on children's cognition, behavior, and life chances. The second half of the brief looks at what evaluation research suggests as to what works to lessen poverty's negative influence on children. Magnuson examines two approaches, income support programs and early childhood interventions. Findings suggest that programs that "make work pay" by supplementing the income of low-wage parents of preschool-age children boost student achievement when they enter school. She suggests that the Child Tax Credit and the Supplemental Nutrition Assistance Program (SNAP) are two other income support programs that could reasonably be considered to have similarly positive effects on children because they too augment families' economic resources. Several early childhood interventions have also been shown to produce short-term and long-term benefits. Magnuson notes that the evidence supporting the effectiveness of high-quality, center-based early childhood education is strong, concluding that, in times of tight budgets when difficult funding decisions must be made, the research findings summarized in this brief imply that investing in policies and programs aimed at families with young children is a good use of restricted resources.

August 2013

Reducing the effects of poverty through early childhood interventions

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Studies suggest that growing up in a household that lacks adequate financial resources for basic family needs has long-term negative effects.[1] Research also suggests that even a few years of poverty can have negative consequences for a child's development.[2] What we are now learning from brain science and developmental psychology is that the negative effects of early childhood poverty, from prenatal to age 5, might be especially harmful and enduring. This is likely because a child's brain grows and changes rapidly during the first few years of life, making young children especially sensitive to environmental influences.[3] Early childhood may be critical also because that is when the family context dominates children's everyday lives, a context that differs dramatically by socioeconomic status.[4] For these reasons, in an era of tight budgets when difficult choices must be made about allocation of resources, these research findings imply that investing in policies and programs aimed at families with young children makes good sense.

In this research brief, I will present some stylized facts about childhood poverty. I will then discuss what we know from research about the lasting effects of child poverty, including how it affects academic achievement, before turning to what neuroscience and developmental psychology tell us about what makes early childhood especially critical to development, including how early experiences are built into our bodies. I will conclude by looking at what research evidence tells us about what works to mitigate poverty's harmful effects on young children by reviewing research evidence on a range of income support and early childhood education programs.

What is "poverty"?

"Poverty" can be defined in broad or narrow terms. The bigger view includes disadvantages that often accompany poverty, including living with a single parent, low levels of

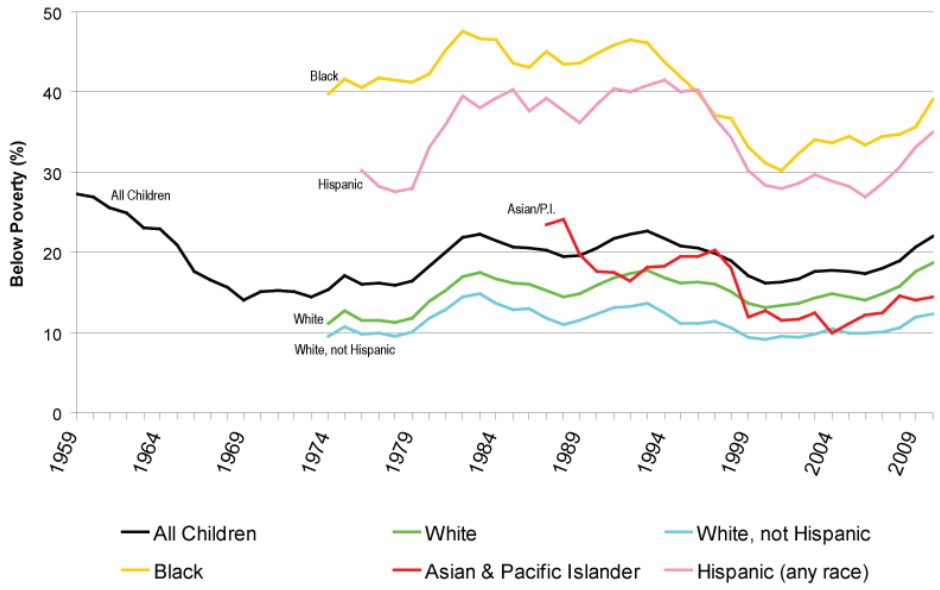

Figure 1: Children under age 18 living in poverty, 1959 to 2010.
Source: U.S. Census Bureau, Historical Poverty Tables, People, Table 3, "Poverty Status of People, by Age, Race, and Hispanic Origin: 1959 to 2011" [figure excludes 2011 data].

parental education, and a dangerous neighborhood living environment. The more restricted view narrows in on family financial support—money. My focus in this brief is on having little or no money, specifically the causal role of low family income in early childhood for subsequent outcomes during the school years and later in life, including adulthood.

A family of three was "poor" in 2012 according to the U.S. government if their annual pre-tax income was $19,090 or less, and a family of four was poor with income at or below $23,021. Using that threshold, the Census Bureau counted 16.1 million children, 21.9 percent of U.S. children, living in poor families. Among adults, 26.5 million people (13.7 percent) between the ages of 18 and 64, and 3.6 million people (8.7 percent) age 65 and older were in poverty. The child poverty rate was more than twice that of the adult poverty rate and three times that of the elderly poverty rate.[5]

Not surprisingly, child poverty rates vary dramatically over time and by race and ethnicity. As shown in Figure 1, which uses available data from 1959 to 2010, poverty among African American and Hispanic children is consistently higher than for white children. It is also noteworthy that poverty rates vary over time, with lower rates corresponding closely to economic cycles.[6]

Length of poverty spells

Annual poverty rates tell only part of the story. For example, they don't tell us for how long a given child lives in a poor household. Fortunately, most children who experience poverty are not poor for their entire childhood, but rather experience poverty for just a few years. This is illustrated in Table 1. Using data from the Panel Study of Income Dynamics, the table gauges length of poverty for children born between 1975 and 1987, by race and maternal characteristics at birth. The average number of years poor for the total sample, 1.81 years, masks considerable differences by race and maternal characteristics.

African American children and children whose mother was unmarried or did not have a high school degree when they were born all had the longest average number of years in poverty, at more than five years. For white children the average period was just under one year. About 75 percent of white children never experience childhood poverty, while about 30 percent of black children and children with low-educated mothers avoid poverty. A similar trend is apparent among poverty spells of at least five years—7 percent of white children and about 45 percent of black children and children with an unmarried or low-educated mother were poor for five years or more.

Table 1
Fifteen-Year Poverty Experiences of Children Born between 1975 and 1987

	Average Number of Years Poor	Never Poor	Poor for at Least 5 Years	Poor for at Least 8 Years
Total Sample	1.81	65%	15%	10%
African American	5.53	30%	46%	37%
White	0.93	75%	7%	4%
Unmarried Mother	5.39	24%	46%	33%
Mother Education < High School Degree	5.03	31%	44%	33%

Source: Panel Survey of Income Dynamics; calculations were conducted by Kathleen Ziol-Guest.
Notes: Figures in this table are based on weights that adjust for differential sampling and response rates.

Rising inequality

Consideration of poverty should include analysis of the increasing inequality of income, wealth, and opportunity in the United States. In their recent volume, *Whither Opportunity? Rising Inequality, Schools, and Children's Life Chances*, editors Greg Duncan and Richard Murnane note, "for the first three-quarters of the twentieth century, economic growth was a rising tide that lifted the boats of the rich and poor alike."[7] Since that time, however, the trend has reversed, with economic growth between 1977 and 2007 disproportionately benefiting a small percentage of wealthy American families. During that 30-year period, the family income of those at the 99th percentile increased by 90 percent, and the income of families at the 99.9th percentile more than tripled. Meanwhile, family income at the 20th percentile was 7 percent higher in 2007 compared to 1977.[8]

Economists point to many factors causing the stagnation of incomes in the bottom tiers, including technological change and outsourcing of jobs to lower-wage countries, which have lessened demand for low-educated U.S. workers. Growth in single-parent families, many of which are headed by low-educated women whose earnings potential is limited, also has contributed to less income growth among lower-income families.[9]

Why do we care about poverty and inequality?

Social scientists studying the differences between low-income students and their more affluent peers find differences in scores on standardized reading and math tests (see Figures 2 and 3) and levels of problem behavior (see Figures 4 and 5), as reported by teachers shortly after children enter school. By quintile, children in the top tier (Quintile 5), who have parents with the highest incomes, do better than the others. The other four quintiles follow in order by parental income, with those with the lowest-income parents at the bottom in terms of academic skills and behavioral problems (problems include aggressive or externalizing behaviors and anxious or internalizing behaviors), although academic disparities are much more pronounced than problematic behavior.

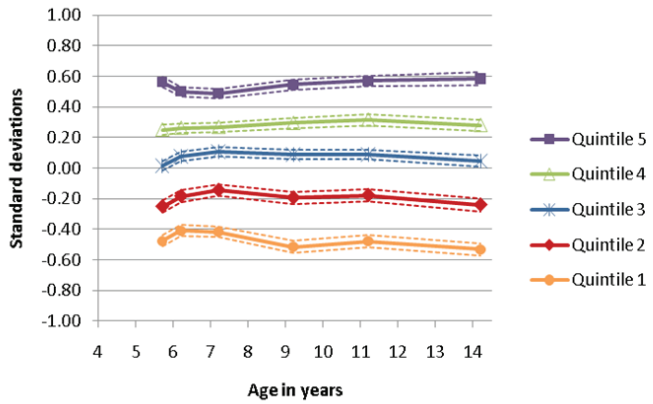

Figure 2. Students' standardized reading scores, by parental income.

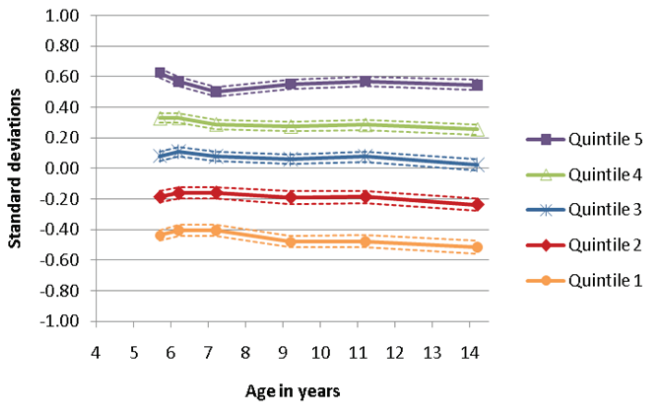

Figure 3. Students' standardized math test scores, by parental income.

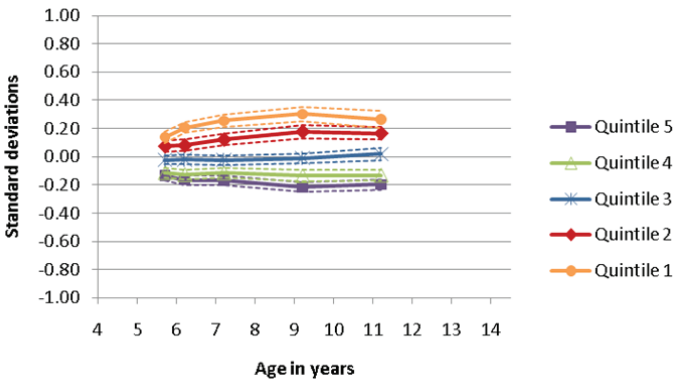

Figure 4. Students' aggressive behaviors, by parental income.

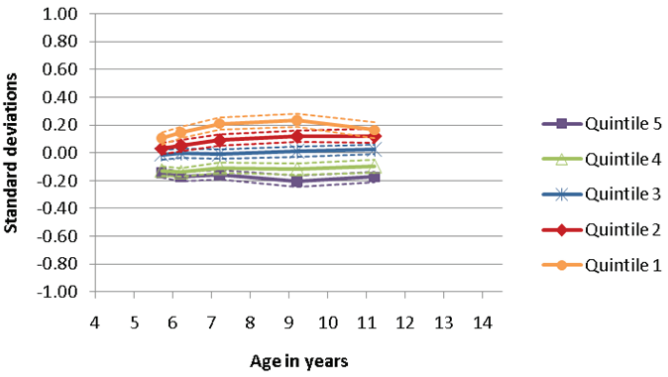

Figure 5. Students' withdrawn behaviors, by parental income.

Notes: Children in Quintile 5 have parents with the highest incomes (in other words, they are in the top 20 percent of the income distribution); children in the other quintiles have parents who earn progressively less, down to children in Quintile 1, whose parents are in the lowest 20 percent of parental income.

Externalizing behaviors are defined as aggressive behaviors and internalizing behaviors are those associated with symptoms of depression and anxiety. The SES gaps in behavior outcomes (as reported by teachers) depicted in Figures 4 and 5, though significant, are considerably smaller than those in achievement outcomes, depicted in Figures 2 and 3.

Source: Figures 2–5 are from K. Magnuson, J. Waldfogel, and E. Washbrook, "SES Gradients in Skills During the School Years," From Parents to Children: The Intergenerational Transmission of Advantage, J. Ermisch, M. Jäntti, T. M. Smeeding, eds. (New York: Russell Sage Foundation, 2012). Used with permission.

Researchers also find that the differences persist throughout childhood and that children from poor families often complete less schooling, work less, and earn less as adults.[10]

Estimating the magnitude of childhood poverty's long-term effects is difficult. There are increasingly good theoretical models, aspects of which have been confirmed, which tell us that growing up poor has enduring negative effects. Empirically, however, it is more difficult to connect cause and effect between family poverty and child well-being. For example, other parental characteristics, such as education, parenting style, and marital status, influence children's development, as do neighborhood characteristics.[11] Susan Mayer reviewed research on the effect of parental income on children's outcomes from 2000 to 2010, and notes, "When we ask about the relationship between poverty and child outcomes it is not completely clear whether we are asking about the low income of poor families or the complex set of circumstances that results in low income." Mayer notes that studies on educational attainment usually find that an increase in parental income modestly boosts children's educational attainment.[12]

More work needs to be done. A simplified explanatory model, which takes into account the influence of neighborhoods, schools, and peers, maps out two main pathways: stimulation and stress. Stimulation includes nutritious foods, educational materials and opportunities, cognitive stimulation in the home, type and quality of child care, and quality of schools and neighborhoods. Stress includes maternal (or other main caregiver) mental health and parenting that affects children. Combined, the stimulation and prolonged and elevated stress responses children experience may affect their brain and physiological development, which in turn may influence achievement, behavior, and health in childhood and adulthood.[13]

What makes early childhood so critical to development?

Although researchers are still exploring the causal mechanisms by which childhood poverty in general, and especially low parental income in and of itself, has negative effects that last through adulthood, emerging research in neuroscience and developmental psychology suggests that early childhood poverty may be especially damaging. Two main factors make the first five years of life especially critical to development: the rapid development of young children's brains leaves them particularly vulnerable to environmental conditions, and their family life dominates their day-to-day existence.

Noting that studies of socioeconomic disparities in child development until recently all but excluded neuroscience, Kimberly Noble and colleagues conducted a study of 60 children of diverse socioeconomic status (SES) to determine whether differences could be observed across SES in several neural regions that support skills such as language, memory, social-emotional processing, and cognitive control. They find "highly significant SES differences in regional brain volume in the hippocampus and the amygdala," and in other neural regions. They conclude, "Likely mechanisms include differences in the home linguistic environment and exposure to stress, which may serve as targets for intervention at a time of high neural plasticity."[14] The correlational nature of the association, however, precludes making causal interpretations of the data and suggests that more work needs to be done in this area.

What works to lessen poverty's effects on children?

In this brief I examine two approaches that attempt to mitigate poverty's negative influence on children. The first are income support programs, which increase family income in an effort to increase economic resources and reduce parental stress; the second are early childhood interventions, which target children directly and aim to improve their developmental outcomes. There have been a number of programs aimed at "making work pay" that supplement low-wage working parents' income and that have been evaluated by researchers in terms of their effects on the school achievement of recipients' children. Findings of studies of select programs are briefly outlined below.

Income support programs

A group of studies that analyzed whether increased parental income boosts student achievement gives us some answers as to what works to mitigate the disadvantages associated with poverty. In one such study, Pamela Morris, Greg Duncan, and Christopher Rodrigues evaluated the effects of two types of programs: welfare-to-work programs, which sought to move mothers into the labor market without changing their economic well-being; and income support programs, which operated under the premise that employment should also increase economic resources. At the time of random assignment, children's ages ranged from 2 to 5. Student achievement was tested three years after program participation, when all of the children were in school. Morris and colleagues found that the young children (ages 2 to 3 and 4 to 5) of mothers who were in a program that supplemented their earnings had higher levels of student achievement (as indicated by tests and teacher reports) than the children of mothers in welfare-to-work programs that did not make work pay by supplementing mothers' incomes, who showed no improvement in student achievement.[15]

Earned Income Tax Credit

The Earned Income Tax Credit or EITC is the nation's largest cash or near-cash antipoverty program.[16] It provides benefits to families whose earnings fall below a threshold, in the form of a refundable federal income tax credit. Some states supplement the federal program. The federal program was expanded in the mid-1990s to increase support to the working poor, particularly families with two or more children. By

1997, the maximum EITC had increased to $4,450, making it $3,000 higher than its 1975 level. President Clinton promised that full-time work at minimum wage would be enough to raise a family's income above the poverty line when it was supplemented with the EITC and any food stamps the family was eligible for.[17]

A study by Gordon Dahl and Lance Lochner looked at the effect of the credit's expansion on children's test scores employing an instrumental variables strategy to estimate the effect of income on children's math and reading test scores using evidence from the EITC. They found significant increases among children whose families qualified for the credit—6 percent of a standard deviation in both math and reading test scores, with larger estimated effects for younger children, for children from more disadvantaged families, and for boys.[18]

Casino revenues to American Indian families

Randall Akee and colleagues examined whether an increase in family income from casino earnings affects the outcomes of youth. The approach was an attempt to directly overcome the usual household income endogeneity problem, because the income transfers were based on membership in the American Indian tribe, but without regard to employment status, income, or other household characteristics. Their analysis used data from the Great Smoky Mountains Study of Youth, a longitudinal study of child mental health in rural North Carolina; both American Indian and non-Indian children were sampled. Halfway through the data collection, a casino opened on the Eastern Cherokee reservation. Every six months a portion of the profits from the casino is distributed to all adult tribal members on an equalized, per capita basis. The average annual disbursement per person has been about $4,000. Because no choice is involved (eligibility is determined by preexisting American Indian status), Akee and colleagues were able to observe the treatment effect on an entire distribution of household incomes and types.[19]

Their analysis found that the income disbursements had positive effects on a number of important outcomes. The youth were more likely to have graduated from high school by age 19 as compared to the children whose family did not receive the cash transfers. By age 21, the youth receiving casino revenues from the poorest households had completed an additional year of schooling. Akee and colleagues examined mechanisms that may have produced the improved child outcomes in households with higher incomes. They explored two such possible mechanisms: parental quality and parental time. They found that parents in treatment households did not reduce their working time, but that the parents did increase their supervision of their children, and that children reported better relationships with their parents over time.[20]

Can we generalize success to other programs?

Given the success of a range of programs reviewed here that seek to improve child development and achievement through increases in parental income, it would be reasonable to generalize those findings to other, similar programs that increase family economic security. The Child Tax Credit and the Supplemental Nutrition Assistance Program (SNAP) are two such programs that could reasonably be considered to have similarly positive effects on children because they increase families' economic resources in similar ways.

Conditional cash transfers

The aforementioned studies have all found positive effects, to varying degrees, of income transfers on child achievement in both the short- and long-term. There have also been studies, one of which I will describe here, wherein cash transfers were found not to have a positive effect. James Riccio and colleagues at MDRC evaluated Opportunity NYC–Family Rewards, an experimental, privately funded, conditional cash transfer program that was conducted from 2007 through 2009 in six of New York City's highest-poverty communities. Family Rewards tied cash rewards to pre-specified activities and outcomes in children's education, parents' employment, and families' preventive health care. The MDRC evaluation was a randomized control trial that involved about 4,800 families and 11,000 children, divided into a treatment group (about 2,400 families) that could receive cash incentives if they met the required conditions, and a control group (about 2,400 families) that was not eligible for the cash transfers.[21]

Eligible families had to have a child in the fourth, seventh, or ninth grade (these grades were selected because they are considered critical transition points in education). All children in a participating family who were school age or younger were eligible for the program. Riccio and colleagues found in their evaluation that Family Rewards increased family income by about $3,000 a year, resulting in reductions in poverty and extreme poverty; about 11 percent of participating families were lifted out of poverty by the transfers. They found few main effects in child school achievement and attendance comparing the group that received incentives to those that did not. They did, however, find a small boost in achievement and attendance among a subgroup of high school students in the treatment group who were better academically prepared when they started high school.[22] It is important to note that these findings are preliminary (the available impact findings mostly reflect program effects during its launch year or not long thereafter), and it is not clear what the Family Rewards findings mean relative to those from other studies.

Early childhood education

In addition to evaluating how boosting family income benefits children, researchers looking for effective ways to reduce poverty's effects on children have been honing in on early childhood as an especially promising period for intervention, due to the potential lifelong implications of early brain development and the proven efficacy of early childhood interventions. Consistent robust evidence shows short-run and long-run benefits from several early childhood (ages 3 to 5) education program models. The evidence supporting the

effectiveness of high-quality, center-based early childhood education is strong. Model demonstration programs such as Perry Preschool and Abecedarian have been shown to increase long-term school attainment and earnings. In addition, evidence suggests that the Perry program reduces crime and the risk of adult poverty.[23]

To conclude I would like to quote what my colleagues Greg Duncan, Jens Ludwig, and I said in an essay on this topic in which we review the evidence on early childhood interventions: "All in all, we conclude that investing in selected early childhood interventions appears likely to be a very cost-effective way to reduce poverty over the long-term and that current public investments in such programs appear to have helped in this regard."[24]■

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[1]See, for example, K. Magnuson and E. Votruba-Drzal, "Enduring Influences of Childhood Poverty," in *Changing Poverty, Changing Policies*, eds. S. Danziger and M. Cancian (New York: Russell Sage Foundation, 2009); S. E. Mayer, "Revisiting an Old Question: How Much Does Parental Income Affect Child Outcomes?" *Focus* 27(2, Winter 2010): 21–26; G. J. Duncan, K. Magnuson, A. Kalil, and K. Ziol-Guest, "The Importance of Early Childhood Poverty," *Social Indicators Research* 108(2012): 87–98.

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[8]Duncan and Murnane, "Introduction," *Whither Opportunity?*

[9]See M. Cancian and S. Danziger, eds., *Changing Poverty, Changing Policies* (New York: Russell Sage Foundation, 2009).

[10]Duncan and colleagues, "The Importance of Early Childhood Poverty."

[11]Mayer, "Revisiting an Old Question: How Much Does Parental Income Affect Child Outcomes?"

[12]Mayer, "Revisiting an Old Question: How Much Does Parental Income Affect Child Outcomes?"

[13]K. G. Noble, S. M. Houston, E. Kan, and E. R. Sowell, "Neural Correlates of Socioeconomic Status in the Developing Human Brain," *Developmental Science* 15(4, 2012): 516–527; p. 516; Magnuson and Votruba-Drzal, "Enduring Influences of Childhood Poverty"; Duncan, Ludwig, and Magnuson, "Child Development."

[14]Noble and colleagues, "Neural Correlates of Socioeconomic Status in the Developing Human Brain." The hippocampus regulates stress reactivity and is required for long-term memory, and the amygdala is the primary processor of memory and emotional reaction.

[15]P. Morris, G. Duncan, and C. Rodrigues, "Does Money Really Matter? Estimating Impacts of Family Income on Young Children's Achievement with Data from Random-Assignment Experiments," working paper, Northwestern University, Evanston, IL, 2006.

[16]J. K. Scholz, R. Moffitt, and B. Cowan, "Trends in Income Support," (pp. 203–241) in *Changing Poverty, Changing Policies*, eds. M. Cancian and S. Danziger (New York: Russell Sage Foundation, 2009).

[17]See J. K. Scholz, "Taxation and Poverty: 1960–2006," *Focus* 25 (1, Spring–Summer 2007).

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[23]Duncan, Ludwig, and Magnuson, "Child Development."

[24]Duncan, Ludwig, and Magnuson, "Child Development," p. 28.

Fast Focus is a single-topic brief put out several times a year and distributed electronically (only) by the

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Fast Focus is free of charge, although contributions to the UW Foundation–IRP General Fund sent to the above address in support of *Fast Focus* are encouraged and appreciated.

Edited by Deborah Johnson.

This publication was supported by Grant Number AE00102 from the U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation (ASPE), and awarded by the Substance Abuse and Mental Health Services Administration (SAMHSA). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of ASPE or SAMHSA.