Public Investments, Private Investments and Class Gaps in Child Development

Margot Jackson, Brown University
Daniel Schneider, UC Berkeley

PAA Extended Abstract
September 2018

INTRODUCTION

There are large and growing socioeconomic divides in children's well-being (Duncan and Brooks Gunn 1997; Reardon 2011). Recent research shows that these inequalities are likely to be in part the product of significant class gaps in "parental investments" of money and time in children (Duncan and Murnane, 2011). Parents with more income and education invest more resources and more developmentally targeted time toward their children, and these investments influence socioemotional, cognitive and academic development (Hao and Yeung 2015; Hernandez-Alava and Popli 2017; Kalil, Ryan and Corey 2012; Pensiero 2011; Reardon 2011). While some have called on high-SES parents to consciously change their approach to parenting and reduce private investments of money and time in children (Reeves 2017), actually achieving such a dramatic cultural change is a difficult path to reducing childhood inequalities.

Public investments in children and families have the potential to reduce class inequality in children's development both through direct positive effects on children and, potentially, by affecting parents' behavior and practices. By providing a baseline of resources, public investments may free low-income parents to reallocate expenditures from necessities to additional investment goods, including learning items, stimulating activities, and nutritious food (Milligan and Stabile 2009; Yeung, Linver and Brooks-Gunn 2002). Public investments may also allow parents to use time differently, whether because income and service support increases time at home, better permits a balance between work and childcare, or reduces stress (Corak 2013; Gennetian and Shafir 2015; Waldfogel 2016).

The combination of public investment and equalization in private investment by family socioeconomic status then has the potential to reduce class inequality in child development. Indeed, cross-national evidence reveals wider class gaps in child outcomes in the United States than in countries where public investments in children and families are larger (Bradbury et al. 2015; Corak, Curtis and Phipps 2011; Corak 2013; Waldfogel 2016). At the sub-national level, there is substantial state-level variation in public investments in U.S. children and families, with some states far below and some far above the national average (Billen et al. 2007; Harknett et al. 2003; Isaacs and Edelstein 2017).

However, our understanding of the state-level spending context within the United States is limited. In addition, there is very limited evidence on how public and private investments interact to reduce or increase inequality in child development. As policy discussions increasingly focus on states as the level at which policies are produced and administered, social scientists face the challenge of understanding how state policy contexts affect inequality in parenting practices and child development, and how changes in state policy provision can reduce inequality.

This paper will use newly assembled administrative data over a 25 year period, linked to individual-level data from the Child Development Supplement of the Panel Study of Income Dynamics, in order to examine two questions: (1) Does state-level public spending on children and families reduce class inequality in child development? and (2) How does private investment (parental investments of money on developmental goods, and parental investments of time in developmental care) mediate any such reduction?

BACKGROUND

In an era of high economic inequality and low intergenerational mobility (Piketty and Saez, 2014; Chetty et al., 2017), the institution of the family has received a great deal of attention as a contributor to intergenerational inequality. High-income and highly educated parents are better able to provide children with resources that are highly valued in educational and labor market institutions (Becker and Tomes 1979; Corak 2013; Hao and Yeung 2015). The strong correlation between parental SES and private developmental investments in children illustrates just how difficult it can be to separate inequality in outcomes from equality of opportunity.

At the same time, there is great interest in the possibility that public investments in children and families may increase equality of opportunity (Bradbury et al. 2015; Corak, Curtis and Phipps 2011; Corak 2013; Waldfogel 2016). In contrast to trends in private investment, public spending is progressive – it is considerably higher for low-income children than for higher income children (Vericker et al., 2012).

Direct Effects of Public Spending

Public investments in children may directly affect children's developmental opportunities, reducing class gaps by providing broader access to developmental resources inside and outside of the home. There are direct positive health and academic effects of a number of child and family-focused investments, including school spending, child tax programs, public preschool, the Nurse-Family Partnership, WIC and school nutrition programs (Jackson 2015; Johnson 2015; Yoshikawa et al. 2013). By directly augmenting resources outside of the home that may foster health and development and targeting that investment to children from low-SES families, public investments in education and health may reduce class gaps in children's development.

Indirect Effects of Public Spending: Parental Behavior

Beyond direct effects of public investment on class gaps in child development, it is possible that private investments mediate the relationship between public investment and inequality in child development. There are pronounced socioeconomic differences in parents' involvement with educational activities (Cheadle 2009; Lareau 2002; Pensiero 2011; Roksa and Potter 2011) and in children's cognitive development and learning (Reardon 2011). These gaps in investments of money (Kornrich 2016; Kornrich and Furstenberg 2013) and time (Alintas 2016; Bassok et al. 2016; Kalil et al. 2016; Ramey and Ramey 2010; Reardon 2011) appear to be widening over recent decades. The weight of evidence suggests that the resources and content of time available to children strongly predict their development. Large class gaps in cognitive development exist well before the start of formal schooling, pointing to the importance of parental input and the home environment for children's cognitive and non-cognitive development (Duncan and Magnuson 2011; Hernandez-Alava and Popli 2017; Waldfogel and Washbrook 2011). While

much of this research is observational, Price (2010) and Villena-Roldan and Rios-Aguilar (2012) instrument for parental time and also find positive effects on child cognitive test scores. Additionally, indirect, but quite convincing evidence for the importance of home settings on class gaps in achievement is also found in the seasonal learning literature that shows that class gaps in achievement widen most over the summer months (Downey, von Hippel, and Broh, 2004; Alexander, Entwisle, and Olsen, 2007).

Some of what we currently consider to be direct effects of programs on inequality in child development may therefore work through family processes that have not yet been examined. Prior research has not modeled how public investment may alter parental behaviors and thereby influence inequality in private investment, or how public and private investments may then work together as substitutes or complements to affect inequality in child development. Child and family spending by the public sector may ultimately affect children's development by affecting *parents' behavior and practices*. Parental behavior could mediate the relationship between public sector investments and children's development via two pathways – family resources and family processes and time use.

Family resources.
By providing a baseline of resources, some forms of public investments may free low-income parents to reallocate expenditures from necessities to additional investment goods, including learning items, stimulating activities, and nutritious food (Milligan and Stabile 2009; Yeung, Linver and Brooks-Gunn 2002). There is some evidence for increases in child-related expenditures in response to income transfers. A small body of regional and ethnographic evidence suggests that EITC recipients prioritize consumption spending on short-term needs broadly (Romich and Weisner 2000; Smeeding, Phillips and O'Connor 2000) as well as investments in children specifically. Children exposed to increases in income support benefits in the U.K., for example, experience increased expenditures on books and nutritious food alongside reductions in material hardship (Gregg, Waldfogel and Washbrook 2006). Some qualitative work also demonstrates changes in the content of child-centered spending in response to increased income (Farrell and O'Connor 2003; Halpern-Meekin et al. 2015). The small body of existing research suggests an important influence of income support programs on both decreasing material hardship and increasing child-centered expenditures. Yet we still lack systematic evidence, especially in the U.S., on the ways in which public investments are related to private investments, or on how child and family spending affect class inequality in children's outcomes via private investments. If public investments reduce the class gap in parental behavior by enabling low-SES parents to invest more money in developmental goods, and more time on developmental care, then parental investments may explain part of the effects of public spending on class inequality in child outcomes (because class variation is less pronounced in those states).

It is also possible, however, that higher-income parents may change consumption in response to public spending, meaning that the combination of public and private investments increases class inequality (Cascio and Schanzenbach 2013). Though much public spending relevant to children and families is means-tested, some public investments (e.g., education spending) could disproportionately increase resources among families with higher socioeconomic status (SES). If higher-SES families forego sending their children to private school when education spending is higher, for example, and if high-SES parents then increase expenditures on other investments in

their children (e.g., organized activities or lessons), then higher public education spending may be associated with larger class inequality in parental expenditures. This may be offset, however, by progressive education spending within states that allocates a greater share of spending to low-SES districts.

Family stress and time use.
Public investments may allow parents to use time differently, whether because income and service support increases time at home, better permits a balance between work and childcare, or reduces stress (Corak 2013; Gennetian and Shafir 2015; Waldfogel 2016). Models of family stress suggest that resource constraints affect parents' nonmonetary capacities, including psychological well-being and "cognitive load" (Gennetian and Shafir 2015). Poverty, economic hardship and lack of education are associated with poorer maternal mental health (McLoyd 1998; Meadows, McLanahan and Brooks-Gunn 2008; Mirowsky and Ross 2003). Income, education and maternal stress and mental health are also strongly associated with parent-child relationships, including the content of time use with children and the warmth or harshness of behaviors (Brooks-Gunn and Markman 2005; Conger et al. 1994; Yeung, Linver and Brooks-Gunn 2002). In turn, maternal depression and parental inputs in the form of developmentally focused time and activities are strongly associated with children's development (Hernandez-Alava and Popli 2017; Kalil, Ryan and Corey 2012; National Research Council and Institute of Medicine 2009).

Public investments then have the potential to reduce family stress and foster more engaged parenting, particularly among low-income parents. Most research on the effects of public investments on family processes focuses on the effects of income support programs such as child tax benefits or benefits for working families, demonstrating positive effects of programs or reforms to programs on maternal depression (Milligan and Stabile 2011). However, it is plausible that income support spending will also affect parental engagement more broadly. In addition, other forms of spending may reduce family stress. Medicaid and other public health spending, for example, has dramatically increased access to health care and information for low-income children and families (e.g., Schwartz 2013), which may be associated with parents' practices at home. There is currently very little evidence on how comprehensive public child and family investments affect parental behaviors related to children's development, and whether any effects are especially pronounced among families with low socioeconomic status.

Research Questions
Drawing on this prior literature, we take up two key research questions. First, we ask if class gaps in child development are narrower in context of greater public investment. Second, if state-level public spending on children and families reduces class inequality in child development, we ask if private investments mediate any such reduction.

DATA AND MEASURES

We examine how state-level public spending on children affects class gaps in child health and development and gauge the extent to which theses associations are mediated by effects on parental investments of time and money. To do so, we assemble a new unique state-level comprehensive database of public spending on children and merge this data at the state-year

level to the longitudinal data in the Panel Survey of Income Dynamics which contains detailed measures of child outcomes, household socio-economic status, and parental investment.

State-by-State Spending

Much existing research establishes variation in the amount and effects of public investments at the country level. A cross-national approach, while valuable, may confound the effects of public spending with unobserved country characteristics that influence spending, family characteristics and children's development. We focus on the smaller area of the state, given substantial spending variation (shown in Figure 2) that puts some states far below and some far above the national average (Harknett et al. 2003; Isaacs and Edelstein 2017), and because of the greater feasibility of measuring detailed variation across states vs. countries.

We will use a newly assembled state-by-state database of public spending from federal, state and local sources between the period of 1992-2015, that draws on data from the U.S. Census State and Local Government Finance Survey (SLGFS), federal agency web sites, and the State Funding for Children Database compiled by the Rockefeller Institute of Government (1998-2008) and Urban Institute extensions for 2009-2015.[1] The majority of public spending on children and families falls into the categories of education (pre-K; K-12), health (Medicaid; non-Medicaid public health spending) and income support/social services (Temporary Assistance for Needy Families (TANF), the Supplemental Nutrition Assistance Program (SNAP), child care assistance, child welfare, child support enforcement, and earned income tax credits (EITC)). Accordingly, the data include *comprehensive* spending information in four categories: education (total K-12 spending), health (Medicaid and non-Medicaid public health spending), income support (cash/near cash that goes to families and supports spending on basic needs: Temporary Assistance for Needy Families (TANF), SNAP, child support enforcement, earned income tax credits (EITC)) and other spending (child care assistance, child welfare and housing). Most existing research analyzes the effects of a particular state or federal policy—essential for policy design, but lacking a comprehensive portrait of public goods. State spending is correlated across domains, with spending on income assistance likely correlated with spending on in-kind benefits such as health and education, and children and families most often access bundles of services.

Table 1 succinctly summarizes our main study variables and the data sources from which they are derived. Our data include state-level indicators describing the amount and content of spending: (1) *Amount per child* and (2) *Generosity of benefits*.

Child Outcomes

To measure child outcomes and parental investment, we will link the state database to individual-level, geocoded data from the Child Development Supplement (CDS) and Transition to Adulthood (TA) studies of the Panel Study of Income Dynamics (PSID). The PSID is a nationally representative, longitudinal study of families that began in 1968 and provides data on more than 65,000 individuals. Beginning in 1997, respondents from the main PSID sample were selected to participate in the CDS if they had at least one child under age 13, yielding 3,563 children ages 0-12. Mean age in 1997 is six years. In 2002 and 2007, follow-up waves were conducted with response rates of 90%. Beginning in 2005, the TA supplement followed youth

[1] These data are being assembled by the authors in collaboration with researchers at the Urban Institute, as part of a larger project funded by the Russell Sage Foundation.

from the original 1997 CDS sample into young adulthood (in the transition years before they become core PSID adults themselves), collecting six waves of data through 2015. Together, the main PSID with the CDS and TA supplements afford the opportunity to measure child expenditures for all main PSID families during our study period of 1992-2015, and to additionally measure outcomes among several thousand youth from the beginning of the school years into young adulthood.

At all waves of the PSID CDS, reading (language/literacy) and mathematics assessments measure academic achievement in a way that permit comparison across ages. We will also measure socioemotional development via assessments focused on age-appropriate social skills (e.g., cooperation, assertion, responsibility, and self-control) and problem behaviors (e.g., internalizing and externalizing behaviors). Because the PSID Transition to Adulthood Study follows CDS youth into early adulthood, we will also be able to measure longer-term academic outcomes and college-going behaviors among CDS youth, including high school graduation, college attendance and completion.

Social Class

We will measure parental income rank (both national and state ranks) and parental education as the focal indicators of social class/socioeconomic status. To construct the state ranks, we will combine linearly interpolated US Census data between 1990 and 2000 with annual ACS data and use the state identifiers in the PSID to place households into their state-specific ranks.

Private Investments: Child Expenditures

We primarily focus on three types of financial investments in children, measured annually: (1) Books, supplies and equipment; (2) Tuition, room and board, and tutoring; and (3) Other school-related expenses. We will create per-child expenditures by dividing expenses by the number of children in the household, and will adjust expenditure and income measures to 2015 dollars. We will also measure general expenditures not specific to the child, including total spending on food for use at home in an average week; and out of pocket spending on medical care in the last year. We will also explore additional available measures in CDS years that provide expenditure data on the focal child, including spending in the last year on lessons; organized programs (sports or extracurricular); school supplies; food; and non-reimbursable medical expenses for the child.

Private Investments: Parenting

To measure parenting practices and family stress, we will also use data from the PSID-CDS. Measures of *parent-child interaction* include time spent reading to/with children; telling stories; singing songs; playing games; or helping with projects. Measures of *harsh parenting* include items from the Conflict Tactics Scale regarding psychological harsh parenting, as well as corporal punishment. Measures of parents' engagement in children's schooling include participation in school and class events. Finally, measures of *family stress* include maternal depression (using a 12-item version of the Center for Epidemiologic Studies Depression Scale (CES-D), a valid and reliable measure of depressive symptoms) and maternal parenting stress, as measured by the Parenting Stress Index. The Parenting Stress Index is derived from four questions, including (1) "CHILD does things that really bother me," (2) "CHILD seems harder to care for than most", (3) "I often feel angry with CHILD," and (4) "I find myself giving up more of my life to meet CHILD's needs than I ever expected.

Other Measures

We will also measure public transfer receipt (at the household or family level), child race/ethnicity, child gender, family structure, household size, and parental employment. We will also include control variables for several state-level variables beyond spending amounts/generosity on the programs described above, including unemployment rates; minimum wage; and poverty rate. In addition, we will measure the presence of state-level paid parental leave policies, paid sick policies, and reporting time laws. We will also include a set of time-varying demographic controls including the percent foreign-born and race/ethnic composition of the state. These measures are readily available or can be calculated from publically available micro-data and have been used as state-level controls for the business climate and demographic profile in published research on state spending programs (e.g., Strully et al. 2010).

APPROACH

Describing the Association between Public Investments and Class Gaps in Child Outcomes

We will begin by describing state and temporal variation in public investments across the domains of health, education and income support. We will summarize trends in public spending, both comprehensively and in each key domain between 1992 and 2015. We will describe total spending trends, and well as trends in spending generosity and targeting during this period.

Next, we will turn to the first research question—rigorously describing the association among public investment and class inequality in children's development, measured by the relationship between socioeconomic status and child outcomes, beginning with the following regression:

$$Y_{ist} = \beta_0 + \beta_1 SES_{ist} + \beta_2 Spend_{s,t-1} + \beta_3 SES_{ist} XSpend_{s,t-1} + \beta_4 X + \mu_s + \theta_t + \varepsilon_{ist} \quad (1)$$

where, for each child *i* in state *s* in year *t*, we will model child outcomes as a function of *SES* (parental income rank/education); state spending (*Spend*—measured both comprehensively and in each domain) in the year prior to that the survey wave (we will test alternative time lags, including cumulative spending over the child's lifetime); the interaction between SES and state spending; and the individual and state-level controls (*X)* described above. We will include state and year fixed effects to control for state differences correlated with spending and family characteristics (e.g., labor market structure, level of economic need), and year-fixed effects to control for time trends shared across states (e.g., recession effects). For example, variation across states in the strength of the labor market and the demographic composition of the population could produce a positive relationship between spending and economic need that does not reflect true variation in states' investment in children and families. Including state fixed effects will help to control for these fixed differences across states. In addition, increased economic need during periods of economic downtown is correlated with increases in spending, particularly from federal sources, in order to support state/local governments working to provide assistance to families (Edelstein et al. 2016). Increased spending during recessions may also be correlated with worse child outcomes, despite the generally positive relationship between spending on health, income and education and children's development (Isaacs and Edelstein 2017). Including year fixed effects will help to separate the effects of spending and government

investment from the effects of economic need. In all analyses we will include appropriate sampling weights and use multiple imputation to handle missing data.

Unpacking Associations via Parental Investments

We next extend the basic model in equation (1) to examine the second research question: if state-level public spending on children and families reduces class inequality in child development, do private investments mediate any such reduction? We first focus on models predicting parental expenditures and family time use/stress to examine whether class gaps in parental investments of money on developmental goods and parental investments of time in developmental care are narrower in contexts of higher public investment on public goods for children and families. If public and private investments interact to reduce inequality, we expect the main effect of SES (β_1) to be larger (since it includes those in low public spending states) and the interaction between SES and state spending (β_3) to be smaller (since it includes those in higher spending states). If public and private investments interact to increase inequality, then β_3 may be larger than the main effect of β_1. We will consider whether there is meaningful variation in patterns according to investments of time versus money in order to test our theories about the extent to which public investments may free up economic resources for financial investments in children (the family resources pathway) and/or may reduce time pressure and parental stress to increase investments of developmental time in children (the family stress and time-use pathway).

Next, we will examine whether parental investments explain part of any association between public investments on class gaps in child outcomes. Here, we will estimate models predicting child outcomes with and without controlling for private investments of time, in order to see whether β_1 and β_3 decrease after accounting for private investments. We will examine mediation using the KHB method and causal mediation analysis in order to compare coefficients across models and formally consider direct effects of public spending on class gaps in child outcomes, as well as indirect effects via parental investments (Imai, Keele and Tingley 2010; Karlson, Holm and Breen 2011). In addition to interpreting the coefficients, we will estimate predicted values of financial investment, time in developmental care, and child outcomes by SES and levels of public spending.

PRELIMINARY FINDINGS/TIMELINE

Table 2 shows preliminary regressions that demonstrate strong class gaps in children's reading and math achievement in 1997. As expected, higher levels of parental education and family income (as measured here by the household poverty ratio in 1996) are associated higher levels of achievement among children, net of a small number of control variables. Table 3 additionally demonstrates significant positive associations between social class and both child expenditures and parenting behavior, with higher-SES parents spending more money/year on educational supplies and expenses; more likely to engage on warm parenting behaviors; and less likely to have high levels of parenting stress.

These basic and preliminary results indicate strong class gaps in both parenting behavior and children's outcomes. Next steps include cleaning, imputing and preparing additional variables in the PSID-CDS, as well as examining state variation in the degree of family inequality in parenting behavior and child outcomes. Our database of state-by-state public spending is under construction, and preliminary data will be available by late 2018. At that point, we will merge

the PSID with the state-level data and estimate the planned models described above, completing the full analysis by February in order to complete a draft paper in March.

References

Alexander, Karl, Doris Entwisle, and Linda Steffel Olson. 2007. "Lasting Consequences of the Summer Learning Gap." *American Sociological Review* 72: 167-180.

Altintas, Evrim. 2016. "The Widening Education Gap in Developmental Child Care Activities in the United States, 1965-2013." *Journal of Marriage and Family* 78: 26-42.

Bassok, Daphna, Jenna Finch, RaeHyuck Lee, Sean F. Reardon, and Jane Waldfogel. 2016. "Socioeconomic Gaps in Early Childhood Experiences: 1998 to 2010." *AERA Open* 2(3):1-22.

Becker, G.S. and Tomes, N. 1979. "An equilibrium theory of the distribution of income and intergenerational mobility." *Journal of political Economy 87*(6): 1153-1189.

Billen, Patricia, Donald Boyd, Lucy Dadayan, and Thomas Gais. 2007. *State Funding for Children: Spending in 2004 and How It Changed from Earlier Years*. Albany, NY: Nelson A. Rockefeller Institute of Government.

Bradbury, Bruce, Miles Corak, Jane Waldfogel and Elizabeth Washbrook. 2015. *Too Many Children Left Behind? The U.S. Achievement Gap in Comparative Perspective.* New York: Russell Sage Foundation Press.

Brooks-Gunn, Jeanne and Lisa B. Markman. 2005. "The contribution of parenting to ethnic and racial gaps in school readiness." *The Future of Children* 15 (1): 139–68.

Cascio, Elizabeth and Diane Whitmore Schanzenbach. 2013. "The Impacts of Expanding Access to High-Quality Preschool Education." *Brookings Papers on Economic Activity* 47(2): 127-192.

Cheadle, J.E. 2009. "Parent educational investment and children's general knowledge development." *Social Science Research 38*(2): 477-491.

Chetty, R., Grusky, D., Hell, M., Hendren, N., Manduca, R., & Narang, J. 2017. "The fading American dream: Trends in absolute income mobility since 1940." *Science 356*(6336): 398-406.

Conger, Rand D., Xiaojia Ge, Glen H. Elder, Frederick O. Lorenz, and Ronald L. Simons. 1994. "Economic stress, coercive family process, and developmental problems of adolescents." *Child development* 65(2): 541-561.

Corak, M., Curtis, L., Phipps, S., Smeeding, T.M., Erikson, R. and Jänti, M., 2011. In *Persistence, Privilege, and Parenting: The Comparative Study of Intergenerational Mobility* (T. Smeeding et al., eds). New York: Russell Sage Foundation.

Corak, M. 2013. Income inequality, equality of opportunity, and intergenerational mobility. *The Journal of Economic Perspectives, 27*(3): 79-102.

Downey, Douglas, Paul von Hippel, and Beckett Broh. 2004. “Are Schools the Great Equalizer? Cognitive Inequality during the Summer Months and the School Year.” *American Sociological Review* 69: 613-645.

Duncan, Greg J., and Katherine Magnuson. 2011. "The nature and impact of early achievement skills, attention skills, and behavior problems." In *Whither Opportunity: Rising Inequality and the Uncertain Life Chances of Low-Income Children* (R. Murnane and G. Duncan, eds.). New York: Russell Sage Foundation Press.

Edelstein, Sara, Heather Hahn, Julia Isaacs, et al. 2016. “Kids’ Share 2016: Federal Expenditures on Children Through 2015 and Future Projections.” *Urban Institute Research Report*, accessed here: http://www.urban.org/sites/default/files/publication/84301/2000934-Kids-Share-2016-Federal-Expenditures-on-Children-through-2015-and-Future-Projections.pdf

Farrell, C., O’Connor, W. 2003. “Low-Income Families and Household Spending.” Department for Work and Pensions Research Report No. 192. TSO, London

Gennetian, Lisa A., and Eldar Shafir. 2015. "The persistence of poverty in the context of financial instability: A behavioral perspective." *Journal of Policy Analysis and Management* 34(4): 904-936.

Gregg, Paul, Jane Waldfogel, and Elizabeth Washbrook. 2006. "Family expenditures post-welfare reform in the UK: Are low-income families starting to catch up?." *Labour Economics* 13(6): 721-746.

Halpern-Meekin, Sarah, Kathryn Edin, Laura Tach, and Jennifer Sykes. 2015. *It's not like I'm poor: How working families make ends meet in a post-welfare world*. Berkeley: University of California Press.

Hao, Lingxin and Wei-Jun Jean Yeung. 2015. “Parental Spending on School-Age Children: Structural Stratification and Parental Expectation.” *Demography* 52(3): 835-860.

Harknett, Kristen, et al. 2003. "Do Public Expenditures Improve Child Outcomes in the US? A Comparison Across Fifty States." Syracuse University Center for Policy Research Working Paper.

Hernández-Alava, M., & Popli, G. 2017. Children’s Development and Parental Input: Evidence from the UK Millennium Cohort Study. *Demography 54*(2): 485-511.

Imai, Kosuke, Luke Keele, and Dustin Tingley. 2010. "A general approach to causal mediation analysis." *Psychological methods* 15(4): 309.

Isaacs, Julia and Sara Edelstein. 2017. “Unequal Playing Field: State Differences in Spending on Children in 2013.” *Urban Institute Research Report, April.* Accessed here: http://www.urban.org/sites/default/files/publication/89881/unequal_playing_field_0.pdf

Jackson, Margot I. 2015. "Early childhood WIC participation, cognitive development and academic achievement." *Social Science & Medicine* 126: 145-153.

Johnson, Rucker C. 2015. "Follow the money: School spending from title I to adult earnings." *RSF: The Russell Sage Foundation Journal of the Social Sciences, 2*(5): 186–201.

Kalil, Ariel, Rebecca Ryan and Michael Corey. 2012. "Diverging Destinies: Maternal Education and the Developmental Gradient in Time with Children." *Demography* 49(4): 1361-1383.

Kalil, Ariel, Kathleen M. Ziol-Guest, Rebecca M. Ryan and Anna J. Markowitz. 2016. "Changes in Income-Based Gaps in Parent Activities with Young Children from 1988 to 2012." *AERA Open.*

Karlson, Kristian B., Anders Holm and Richard Breen. 2011. "Comparing Regression Coefficients Between Same-sample Nested Models using Logit and Probit. A New Method." *Sociological Methodology* 42:286-313.

Kornrich, Sabino. 2016. "Inequalities in Parental Spending on Young Children: 1972 to 2010." *AERA Open* 2(2):1-12.

Kornrich, Sabino and Frank Furstenberg. 2013. "Investing in Children: Changes in Parental Spend- ing on Children, 1972-2007." *Demography* 50:1-23.

Lareau, Annette. 2002. "Invisible Inequality: Social Class and Childrearing in Black Families and White Families." *American Sociological Review* 67(5): 747-776.

Meadows, Sarah O., McLanahan, Sara S., Brooks-Gunn, Jeanne. 2008. "Stability and change in family structure and maternal health trajectories." *American Sociological Review* 73 (2): 314–34

McLoyd, Vonnie C. 1998. "Socioeconomic disadvantage and child development." *American Psychologist* 53:185–204.

Milligan, Kevin and Mark Stabile. 2009. Child benefits, maternal employment, and children's health: Evidence from Canadian child benefit expansions. *American Economic Review 99*(2): 128-132.

Mirowsky, John, Ross, Catherine E. 2003. *Education, social status, and health*. New York, NY: Aldine de Gruyter.

National Research Council and Institute of Medicine. 2009. Depression in parents, parenting and children. Washington, DC: National Academies Press.

Pensiero, Nicola. 2011. "Parent-Child Cultivation and Children's Cognitive and Attitudinal Outcomes from a Longitudinal Perspective." *Child Indicators Research* 4:413-437.

Piketty, Thomas, and Emmanuel Saez. 2014. "Inequality in the long run." *Science* 344 (6186): 838-843.

Price, J., 2010. The effect of parental time investments: Evidence from natural within-family variation. *Unpublished manuscript, Brigham Young University*.

Ramey, Gary and Valerie Ramey. 2010. "The Rug Rat Race." *Brookings Papers on Economic Activity* Spring: 129-176.

Reardon, Sean F. 2011. "The Widening Academic Achievement Gap Between the Rich and the Poor: New Evidence and Possible Explanations." In *Whither Opportunity: Rising Inequality and the Uncertain Life Chances of Low-Income Children* (R. Murnane and G. Duncan, eds.). New York: Russell Sage Foundation Press.

Roksa, Josipa, and Daniel Potter. "Parenting and academic achievement intergenerational transmission of educational advantage." *Sociology of Education* 84(4): 299-321.

Romich, Jennifer L., and Thomas Weisner. 2000. "How families view and use the EITC: Advance payment versus lump sum delivery." *National Tax Journal:* 1245-1265.

Smeeding, Timothy M., Katherin Ross Phillips, and Michael O'Connor. 2000. "The EITC: Expectation, knowledge, use, and economic and social mobility." *National Tax Journal*: 1187-1209.

Strully, Kate W., David H. Rehkopf, and Ziming Xuan. 2010. "Effects of prenatal poverty on infant health: state earned income tax credits and birth weight." *American Sociological Review* 75(4): 534-562.

Vericker, Tacy, Julia B. Isaacs, Heather Hahn, Katherine Toran, and Stephanie Rennane. 2012. "How Targeted are Federal Expenditures on Children? A Kids' Share Analysis of Expenditures by Income in 2009." *Urban Institute* report, March. Accessed here: https://www.urban.org/research/publication/how-targeted-are-federal-expenditures-children

Villena-Roldan, Benjamin and Ceclilia Rios-Aguilar. 2012. "Causal Effects of Maternal Time-Investment on Children's Cognitive Outcomes." IZA Discussion Paper.

Waldfogel, Jane. 2016. "Presidential Address: The Next War on Poverty." *Journal of Policy Analysis and Management* 35(2): 267-278.

Waldfogel, Jane, and Elizabeth Washbrook. 2011. "Early years policy." *Child Development Research* 11: 1-12.

Yeung, W. Jean, Miriam R. Linver, and Jeanne Brooks–Gunn. 2002. "How money matters for young children's development: Parental investment and family processes." *Child development* 73(6): 1861-1879.

Yoshikawa, H., Weiland, C., Brooks-Gunn, J., Burchinal, M., Espinosa, L., Gormley, W., Ludwig, J., Magnuson, K., Phillips, D., & Zaslow, M. 2013. Investing in our future: The evidence base on preschool education. Foundation for Child Development report. Available at: http://fcd-us.org/sites/default/files/Evidence%20Base%20on%20Preschool%20Education%20FINAL.pdf

Table 1: Summary of Study Variables and Measures

	Primary Measures	Years	State Spending Data	PSID and CDS/TA
Public Spending	Income Support (including EITC); Health; Other Spending	1992-2015	X	
	K-12 Education	1992-2015	X	
	Spending amounts per child; Eligiblity criteria; Means-testing	1992-2015	X	
Socioeconomic Status	Parental Income Rank (National/State-Specific); Parental Education	1992-2015		X
Private Investments				
Child Expenditures	Books, supplies, equipment; Tuition, tutoring, room and board; Food; Out of pocket Medical Care	1992-2015		X
	Lessons; Organized Programs; Food; Medical Expenses	1997, 2002, 2007		X
Parenting	Parent-Child Interaction; Harsh Parenting; Maternal Depression; Parenting Stress	1997, 2002, 2007		X
Child/Youth Outcomes	Reading and Math Achievement; Social Skills; Internalizing/Externalizing Behaviors	1997-2015		X
	High School Graduation; College Attendance/Completion	2005-2015		X
Other Measures	Public Transfer Receipt; Family Structure; Household Size; Race/Ethnicity; Gender; Parental Employment; State-level demographic and policy variables	1992-2015	X	X

Table 2: Regression of Math and Reading Achievement on Family Income and Parental Education, PSID-CDS 1997

	Applied Problems Z-Score	Letter-Word Z-Score
Years of Education, HH Head	0.077**	0.079**
	(0.01)	(0.01)
Household Poverty Ratio	0.038**	0.051**
	(0.01)	(0.01)
N	3,191	3,191

** p<.01; * p<0.05

Models also control for child age, sex and race/ethnicity; the number of children under 18 in the household; and parental marital status in 1997.

Table 3: Regression of Parental Expenditures and Behavior on Family Income and Parental Education, PSID-CDS 1997

	Educational Expenditures ($/yr)	Parental Warmth Scale	Aggravation in Parenting Scale
Years of Education, HH Head	103.16**	0.014**	-0.015*
	(22.5)	(0.00)	(0.00)
Household Poverty Ratio	201.88**	-0.0045	-0.017*
	(20.2)	(0.00)	(0.00)
N	3,191	3,191	3,191

** p<.01; * p<0.05

Models also control for child age, sex and race/ethnicity; the number of children under 18 in the household; and parental marital status in 1997.