



# Depth, Persistence, and Timing of Poverty and the Development of School Readiness Skills in Rural Low-Income Regions: Results from the Family Life Project

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## ABSTRACT

The gap in school readiness skills between children growing up in poverty and other children has become a major policy issue as increasing proportions of families are living in poverty, especially in low-wealth rural communities. The purpose of this paper was to document the degree to which depth, persistence, and timing of poverty was related to the early development of children in a representative sample of 1,292 families in two of the four poor rural regions in the United States, labeled Appalachia and the Black South. Analyses documented the emergence of the poverty gap in the child's first 5 years of life, asking when the gap emerged and whether it continued to grow through the early childhood period. Findings indicated that families who experienced poverty during the child's first 2-years showed substantially lower cognitive, language, executive functioning, and social skills by 2 to 3 years of age (0.5 to 1.0 SD difference) and these gaps appeared to stabilize between 3 and 5 years of age. Transitions into deep poverty during the preschool period (3- to 5-years) were also related to substantially lower scores, and to a lesser extent, transitions out of poverty were related to higher skill levels. Accounting for baseline demographic and maternal characteristics diminished the poverty gap, but did not eliminate it. The poverty gaps at 3-years in language, executive functioning, and social skills accounted for much of the poverty gaps observed at 5-years. Policy implications for early care and education programming are discussed.

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## 1. Introduction

The widening gap in school readiness skills between children whose families *are* and *are not* poor during early childhood has become a major policy issue (Duncan & Murnane, 2011; Putman, 2015). The growing gap in family income in this country is accompanied by a widening gap in early health, social, cognitive, and academic development (Duncan & Murnane, 2011; Duncan, Magnuson, & Votruba-Drzal, 2015). This poverty gap emerges in the second year (Halle et al., 2009) and is large at entry to kindergarten

(Duncan et al., 2015; Raver, 2012; Yoshikawa, Aber, & Beardslee, 2012). These economic disparities in children's school readiness also appear to be larger in urban and rural compared to suburban areas (Miller, Votruba-Drzal, & Setodji, 2013)—highlighting the need for a place-based approach to the study of childhood poverty. Moreover, rural poverty is heterogeneous, with rural regions experiencing much higher levels of poverty and fewer opportunities for upward economic mobility for a generation or more (O'Hare, 2009; Vernon-Feagans, Gallagher, & Kainz, 2010). The emergence of the poverty gap during early childhood, however, has not been examined specifically for children in these very poor rural regions. The current study takes a place-based approach to documenting the emergence of the gap in school readiness skills in relation to the depth, persistence, and timing of poverty in a representative sample of children living in two of the four rural high-poverty regions in the United States: the Appalachian Mountains and the coastal plains of the Southeast labeled as Black South by demographers.

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## 2. Poverty and School Readiness

The proportion of children growing up in poverty increased substantially during the economic recession beginning in 2007, contributing to a large skills gap related to family income. The national poverty rate for young children has been estimated to be 24% overall (Duncan et al., 2015) and nearly 29% for young children in rural communities (Mattingly & Stransky, 2010). Perhaps the most visible outcome of childhood poverty has been lower educational achievement and attainment as well as lower earnings as adults (Duncan et al., 2015; Duncan, Ziol-Guest & Kalil, 2010; O'Hare, 2009; McLanahan, Haskins, Paxson, Rouse, & Sawhill, 2005). By the time children enter public school at 5 years of age, large gaps exist in the skills and competencies fundamental to their school success based on poverty status, with large gaps documented in language (NICHD Early Child Care Research Network [ECCRN], 2005; Snow, Burns, & Griffin, 1998; Vernon-Feagans, 1996), literacy (Duncan et al., 2015; Miller et al., 2013), mathematics (Duncan et al., 2015; Fuchs & Fuchs, 2001; Miller et al., 2013), executive functioning (EF; Espy et al., 2004; McClelland et al., 2007; Noble, McCandliss, & Farah, 2007), and social behavior (Duncan & Magnuson, 2011; Lipman & Offord, 1997; Pianta, 1999). These gaps are linked to lower levels of academic achievement (Reardon, 2011) as well as adult employment and income (Duncan et al., 2010).

Researchers have examined poverty status using a variety of definitions, with most studies using either the family's income or family's mean income-to-needs ratio (i.e., the total income for a household divided by the family income for a given household size determined by the federal government to qualify for federal assistance in a variety of programs). The gap in children's school related skills has also been examined in relation to several parameterizations of poverty status across time, including the depth, persistence, and timing of poverty. Although each parameterization of poverty status has been related to child development, they are typically not examined in the same study (Duncan et al., 2010; McLoyd, 1998; Micheltmore & Dynarski, 2016; NICHD ECCRN, 2005).

Depth of poverty was examined in two different ways. Some studies examined family income as a continuous variable and found lower incomes were related to lower academic and social skills at entry to school (Miller et al., 2013) and into adulthood (Duncan et al., 2010). These studies observed nonlinear associations between family income and child outcomes, indicating that outcomes were lower for children from families with less income, especially if the family income was in the poverty range. Another study categorized poverty status as *very poor* if the family income-to-needs ratio was between 0.0 and 1.0 (i.e., the poverty threshold) and as *poor* if the family income-to-needs ratio was between 1.0 and 2.0 (NICHD ECCRN, 2005). They reported the lowest levels of academic and social outcomes among children in the *very poor* category, with the children in the *poor* category having lower academic and social skills than among children in the *not poor* category (i.e., income-to-needs ratio > 2.0).

Most of the aforementioned studies also examined the persistence of poverty. The NICHD ECCRN (2005) defined persistent poverty as having a mean family income-to-needs ratio below 1.0 during the first 5-years in one index and during elementary school in a second index and related these indices to academic and social outcomes in elementary school. In analyses of the nationally representative Panel Survey of Income Dynamics, Duncan and colleagues (2010) computed the mean of the family income for the early childhood, middle childhood, and adolescent periods, and conducted hierarchical regressions that tested nonlinear associations between these family income measures and adult educational attainment, health, psychological adjustment, incarceration, non-marital births, earnings, and employment hours. Miller and colleagues (2013) also computed the mean of family

income assessed at four ages during the child's first 5-years and tested whether the mean family income showed nonlinear associations with academic outcomes at entry to elementary school, using the nationally representative Early Childhood Longitudinal Study-Birth Cohort (ECLS-B). In contrast, Micheltmore and Dynarski (2016) looked at whether a family qualified for free/reduced price lunch from kindergarten through eighth grade in relation to academic achievement test scores using educational administrative data from Michigan. Finally, Duncan and Magnuson (2011) and Reardon (2011) compared the bottom and top quartile of the income distribution on academic achievement. In these longitudinal studies of adults and children, cognitive and social outcomes were consistently and substantially lower among children experiencing lower mean family incomes over time or persistent poverty and highest among children with higher mean family incomes or who never experienced poverty (Duncan et al., 2010, 2011, 2015; Micheltmore & Dynarski, 2016; Miller et al., 2013; NICHD ECCRN, 2005; Reardon, 2011).

The timing of poverty also seems to be important. Compared to children who did not experience poverty, children who experienced poverty in early childhood showed lower levels of academic and social skills at entry to kindergarten (Miller et al., 2013) and throughout the elementary years (NICHD ECCRN, 2005) as well as lower adult earnings and employment hours (Duncan et al., 2010). Poverty during early childhood appears to be more detrimental to long-term behavioral and achievement outcomes than is poverty later in childhood (Bradley & Corwyn, 2002; Duncan & Murnane, 2011; Duncan, Yeung, Brooks-Gunn, & Smith, 1998) and to psychiatric morbidity (Duncan et al., 2015; Holzer, Schanzenbach, Duncan, & Ludwig, 2008). In contrast, compared to poverty only during early childhood, poverty only during middle childhood was more strongly related to academic skills during elementary school (NICHD ECCRN, 2005) and during middle childhood and adolescence to educational attainment, health, psychological adjustment, incarceration, and non-marital births (Duncan et al., 2010).

Despite extensive documentation of deleterious impacts of poverty on early development, there are several issues that have not been explicated. First, some scholars question whether poverty during the first 2-years may be especially harmful to children due to the rapid brain development they experience during that period. Second, prior work has not adequately examined the age at which the poverty gaps in children's cognitive and social skills emerges and whether that gap continues to grow larger during early childhood. Third, prior studies have not examined the poverty gap within the poorest rural regions of the U.S. These issues are discussed next.

### 2.1. Infant Poverty and Early Development

Brain development research has raised further questions about the timing of poverty, suggesting that children may be especially sensitive to the deleterious effects of poverty during the first 2 years of life. The first 12 to 24 months of a child's life is characterized by rapid brain growth followed by pruning that allows for greater connectivity, representing development and learning (Shonkoff & Phillips, 2000). Yet questions remain about whether poverty during the first 2-years may have especially negative consequences for early learning and development (Duncan et al., 2015). To date, this has not been examined empirically, nor has it been related to prior parametrizations of poverty such as mean family income and persistence of poverty. The purpose of the current study was to examine whether the first 2 years of life appears to be a sensitive period for associations between depth of family poverty and child development, and then to separately examine the depth, persistence, and timing of poverty within the child's subsequent 3 years of life.

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