



Differences in early cognitive and receptive-expressive neurodevelopment by ancestry and underlying pathways in Brazil and Argentina



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ABSTRACT

We examine disparities in early child cognitive and receptive-expressive skills by ethnic ancestry among infants aged 3–24 months from Brazil and Argentina. We employ unique data on the neurodevelopment of children who were seeking routine well-child care at a set of pediatric clinics in these countries. The sample included children who had normal birth outcomes and no major health complications, allowing us to focus on variation in neurodevelopment among children without major physical health limitations. The physicians attending the pediatric clinics were trained in administering the Bayley Infant Neurodevelopmental Screener, a standardized instrument used to screen an infant's risk of neurodevelopmental problems on various domains of abilities. We evaluate disparities in overall neurodevelopmental scores and risk for neurodevelopmental problems as well as in cognitive functioning and receptive-expressive neurodevelopment. We also examine the extent to which household demographic and socioeconomic characteristics and geographic location explain these disparities. We find large gaps in both cognitive and receptive-expressive neurodevelopment by ancestry. In Brazil, children of African ancestry have lower scores on both cognitive and receptive-expressive domains and on overall neurodevelopment than children of European ancestry. In Argentina, children of Native ancestry have lower scores on these outcomes than children of European ancestry. These gaps however are largely explained by differences in geographic location and household characteristics, highlighting the importance of policies that reduce socioeconomic and geographic disparities in social capital and economic development for eliminating ethnic disparities in infant neurodevelopment.

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1. Introduction

Racial and ethnic disparities in child health have been widely reported in racially admixed Latin American countries. Racial/ethnic gaps in early infant health indicators such as low birth weight or preterm birth have been documented in

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multiple South American countries including Brazil and Argentina, the two largest countries in South America (Nyarko, Lopez-Camelo, Castilla, & Wehby, 2013; Wehby, Gili, Pawluk, Castilla, & López-Camelo, 2015). Disparities in infant mortality and early educational outcomes have also been reported (Wood and Lovell, 1992; Victora, Vaughan, Barros, Silva, & Tomasi, 2000; Matijasevich et al., 2008). The consensus around these findings suggests that these gaps are almost entirely explained by differences in demographic and socioeconomic characteristics and geographic location.

Little is known however about racial/ethnic differences in early child neurodevelopment including both cognitive and receptive-expressive skills, which are important outcomes and markers for future health, education, and earnings later in life. Examining racial/ethnic disparities in early child neurodevelopment is important for identifying unwarranted sources of variation in child health and development and related future outcomes. Explaining observed gaps is essential for understanding the pathways underlying these disparities in order to subsequently develop policies and interventions to reduce them.

In this paper, we investigated differences in cognitive and receptive-expressive skills by ethnic ancestry during the first two years of life for two samples of children from Brazil and Argentina and explored potential mechanisms for observed differences. We employed a unique dataset that includes neurodevelopment measures for a sample of healthy children aged 3–24 months from Brazil and Argentina. The children had normal birth outcomes (birth weight, gestational age, Apgar scores), no major health complications, allowing us to primarily focus on variation in normal neurodevelopment among children without major physical health limitations. The children were enrolled by attending physicians during routine well-child care visits to pediatric clinics as part of another study of normal neurodevelopment among healthy children in South America, referred to hereafter as the “parent study” (McCarthy et al., 2012). The physicians affiliated with the parent study were trained and calibrated in administering the Bayley Infant Neurodevelopmental Screener, a standardized instrument that screens for infant neurodevelopment problems, achieving an 84.4% inter-rater reliability (McCarthy et al., 2012). The primary outcomes were measures of overall child’s performance on the instrument and on two specific domains including cognitive and receptive-expressive functioning. The physicians also interviewed the mothers about household demographics and socioeconomic characteristics and investments in child development. Child’s race/ethnicity was measured based on the child’s ancestry as reported by the mother in response to a specific question about the ancestries that the child has during her interview with the study physicians.

2. Background

Early-life neurodevelopment affects human capital formation over the course of life. Indicators of early child health and development have been linked to long-run health, cognitive and receptive-expressive development, and economic achievement over the course of life (Victora et al., 2008; Currie, 2009; Figlio, Guryan, Karbownik, & Roth, 2014). For instance, Helmers and Patnam (2011) report an important effect of child health at age one on cognitive development at age five using data from India. Impaired cognitive and health in adulthood as consequence of low early-life development is manifested in higher medical expenditures, worse health, poor decision-making process, and worse economic outcomes (Case, Fertig, & Paxon, 2005; Fang, Nicholas, & Silverman, 2010; McArdle, Smith, & Willis, 2009; Smith, McArdle, & Willis, 2010).

There are multiple developmental pathways involving both cognitive and receptive-expressive skill formation that link challenged early development with declines in long-term health outcomes and human capital formation. For example, early impairments of memory, communication skills, critical judgment and planning and accumulations of these impairments over time could ultimately result in poorer decision-making ability and lower educational achievement (Fang et al., 2010; McArdle, Smith, & Willis, 2009). Interventions to improve early neurodevelopment are especially important due to the complementarity between investments over time and the self-producing effects of child cognitive and receptive-expressive skills; these effects produce a dynamic process of development and skill formation that perpetuate and widen over time (Cunha & Heckman, 2007). There is evidence that interventions targeting cognitive and psychosocial development early in childhood result in improved labor market outcomes during adulthood not only in developed but also in developing settings (Gertler et al., 2014). Therefore, differences in neurodevelopment and formation of cognitive and receptive-expressive skills very early in life including during infancy and toddler years could translate into large differences in human capital and health outcomes later as a result of this process.

Variation in early neurodevelopment between individuals could be driven by multiple factors such as presence of one or both parents (Zhang, Berhman, Simon Fan., Wei, & Zhang, 2014), household environment especially the quality and intensity of parental investments (Wehby, McCarthy, Castilla, & Murray, 2011; Helmers and Patnam, 2011) and maternal health behaviors during pregnancy (2011b), and quality of physical and socioeconomic environment. However, gaps in child development across population demographic factors such as race/ethnicity are of greater concern and interest for policymakers than general variation between individuals because of their broad effects on large groups of the population and the consensus that they are largely rooted in policy-sensitive social and economic factors of the environments in which children grow, which could ultimately modify household effects on child development.

The literature on racial/ethnic disparities in neurodevelopment very early in life including during infancy is sparse. Wehby, McCarthy et al. (2011) study disparities in the first two years of life in a pooled sample across multiple countries in South America and observe important racial/ethnic disparities that are partly explained by differences in household investments. Fryer and Levitt (2013) evaluate racial differences in cognitive development in the US at different stages of childhood. They find no differences in the first year of life but observe differences later between black and white children. A broader literature

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