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Measuring early childhood development at a global scale: Evidence from the Caregiver-Reported Early Development Instruments

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ABSTRACT

Despite global interest in supporting and monitoring early childhood development (ECD), few valid and reliable tools exist for capturing ECD at scale across cultural contexts. This study describes the development and validation of the Caregiver Reported Early Development Instruments (CREDI) short form, a new tool for measuring the motor, cognitive, language, social–emotional, and mental health skills of children under age three in culturally diverse settings. Results from 8022 children living in 17 low-, middle-, and high-income countries suggest that the CREDI short form is valid, reliable, and acceptable for measuring population-level ECD. Data highlight differences in CREDI scores within and across countries based on maternal education, child nutritional status, and household stimulation practices. Implications for ECD policy and practice are described.

Over the past several decades, a growing body of research has highlighted the important role of early childhood development (ECD) for later-life success (Heckman, 2006; Moffitt et al., 2011; Nores & Barnett, 2010; Peet et al., 2015). The birth to three-year period is considered a time of particular biological and environmental sensitivity; it is during these early years that children begin to acquire some of the most basic yet transformative developmental skills (Black et al., 2017; Shonkoff et al., 2012). As a result, early childhood has increasingly been recognized by governments and non-governmental organizations (NGOs) as a "window of opportunity" for improving not only the developmental outcomes of individual children, but also the social and economic wellbeing of society as a whole (Black et al., 2017). This increased focus is also reflected in the recently ratified Sustainable Development Goals (SDGs), which directly incorporate early development under Target 4.2 (United Nations, 2015).

Despite this rapidly expanding interest in supporting ECD globally, no internationally validated tools of infants' and toddlers' skills currently exist that are sufficiently easy to administer, interpret, and compare across cultures. Such tools are necessary for monitoring global progress toward increasing developmental wellbeing and equity, as well as for generating better evidence on children's developmental strengths and needs across diverse populations. To address this gap, we developed a new tool called the Caregiver-Reported Early Development Instruments (CREDI). The CREDI was designed to assist in monitoring progress toward meeting SDG Target 4.2, as well as for generating new data on children's early wellbeing worldwide. The aim of this paper is to describe the development and validation of this new tool, as well as to provide initial data on the ECD status of children living in diverse parts of the world.

1. Existing approaches to estimating ECD status globally

Historically, several different approaches have been used to measure children's ECD. At the *individual level*, developmental screeners and clinical assessments such as the *Denver Developmental Screening Test*, the *Bayley Scales of Infant and Toddler Development*, and the *Ages & Stages Questionnaires* have been used for decades to screen and diagnose children with developmental disabilities or delays (Bayley, 1969; Bricker & Squires, 1999; Frankenburg & Dodds, 1967). The strength of these individual assessments is their ability to provide detailed, normed information on children's developmental skills and behaviors across multiple domains, including motor, language, and cognitive development.

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Although all of these instruments have been used by researchers in international settings, the application of these tools in non-Western settings is somewhat contentious, given that both their items and standards were developed for very specific (typically U.S.-based) populations (Peña, 2007). Furthermore, the costs associated with purchasing, training, adapting, and implementing these measures often preclude their implementation at scale (Fernald, Kariger, Engle, & Raikes, 2009).

On a global level, several tools have recently emerged to assess ECD at the *population level*. Unlike individual assessments, these population-level tools are typically designed to provide information on the average skill levels of children at the community, national, or regional level. By necessity, population-level instruments must be simple and inexpensive to implement, and they must be cross-culturally comparable. Several population-level tools exist for measuring the development of preschool and early school-aged children. The Early Development Index (EDI), for example, is a teacher-reported questionnaire targeting multiple dimensions of school readiness for children between 3.5 and 6.5 years of age. It has been used nationally since 2004 to capture information on more than one million Canadian kindergarteners (Janus & Offord, 2007). The EDI has also been adapted and applied for population-level use in a variety of other countries, including Australia, the United States, Indonesia, China, Peru, Brazil, and Jamaica (Brinkman et al., 2007; Brinkman et al., 2016; Ip et al., 2013; Janus, Brinkman, & Duku, 2011; Janus et al., 2014).

Other population-level initiates have been developed specifically with low- and middle-income country (LMIC) contexts in mind. The Regional Project on Child Development Indicators (PRIDI) led by the Inter-American Development Bank provides population-level data across Latin America on two- to four-year-old children's cognitive, language, social–emotional, and motor development based on a brief set of performance-based indicators (Verdisco et al., 2014). Save the Children's International Development and Early Learning Assessment (IDELA) uses a similar format to assess 3.5- to 6.5-year-old children and has been applied in more than 40 culturally and linguistically diverse LMICs (Pisani, Borisova, & Dowd, 2015).

The population-level ECD measure with largest reach and coverage to date is the Early Childhood Development Index (ECDI), launched by UNICEF as part of the fourth round of the Multiple Indicator Cluster Surveys (MICS; UNICEF, 2014). The ECDI uses a parent-reported format to capture 10 basic items covering three- and four-year-olds' literacy–numeracy, learning, social–emotional, and physical development. The ECDI has been administered to more than 160,000 children in over 60 LMICs, providing the world's first population-level information on children's ECD status. In particular, data from the ECDI have been used to estimate that approximately one-third of three- and four-year-old children living in LMICs – or approximately 80 million children in total – are experiencing setbacks in either their cognitive or social–emotional development, and that these developmental setbacks are negatively correlated with a number of within- and across-country characteristics, including Human Development Index scores, nutritional status, urbanicity, and wealth (McCoy et al., 2016). Despite its reach, the ECDI remains limited in its current form due to its focus on a relatively small number of items and limited age range.

2. The need for a global tool for children under age three

Despite the progress made in population-level assessment of ECD, to our knowledge there is no internationally validated tool currently available for measuring the early skills and behaviors of children under age three. Such a tool is needed for several reasons. First, population-level assessments of young children's developmental skills are necessary for monitoring the impact of national, regional, and global policies designed to improve ECD outcomes and reduce developmental inequities. The importance of the early childhood period has been recognized by several recent, ambitious policy initiatives. SDG Target 4.2, in particular, states that by 2030, all children must have access to "quality early childhood development, care and pre-primary education so that they are ready for primary education" (United Nations, 2015). To appropriately track progress toward meeting this milestone, a tool (or set of tools) is needed that can be implemented quickly and easily across many diverse yet often low-resourced settings. If appropriately planned, data generated from such a tool are also likely to have a number of additional practical benefits, including the ability to identify sub-populations of children who might be in need of additional supports, to track the effectiveness of large-scale intervention efforts, and to draw attention to developmental inequities (i.e., for advocacy purposes).

Current approaches to monitoring population-level outcomes for children under age three are insufficient. Most existing global estimates of young children's developmental needs have relied on proxy measures such as child stunting (a height-for-age *z*-score of <2 *SD*s below the median) and exposure to poverty, as these are often easier to quantify than complex developmental behaviors (Grantham-McGregor et al., 2007; Lu, Black, & Richter, 2016). And yet, even as rates of stunting and extreme poverty decrease worldwide (UNICEF, 2016; UNICEF, WHO, & World Bank, 2017), early developmental difficulties remain high (McCoy et al., 2016). Research has demonstrated that ECD is a product of a multidimensional set of environmental and biological inputs including not only malnutrition and poverty, but also the quality of caregiver–child interactions, cognitive stimulation, access to resources, and protection from violence and stress (Black et al., 2017; Nores & Barnett, 2010; Walker et al., 2011). Population-level measures that directly represent children's motor, language, cognitive, and social-emotional development are better positioned to capture the cumulative impacts of initiatives designed to target these multiple inputs, providing a more comprehensive "outcome-focused" perspective of true ECD status.

Second, population-level ECD instruments can generate improved evidence on children's early developmental status across diverse and often under-represented areas of the world. Historically, human development research and theory have largely focused on Western, educated, high-income samples (Henrich, Heine, & Norenzayan, 2010). At the same time, a large body of literature has emphasized the importance of children's environment for shaping their development (Bronfenbrenner & Morris, 2006; Sameroff, 2010), highlighting the need for additional research across diverse populations. Several studies from cross-cultural psychology have shown, for example, variation in the timing of basic motor milestone attainment (e.g., sitting, standing, walking) that is thought to be linked to cultural expectations and practices related to these skills (e.g., Werner, 1972). As noted above, more modern evidence has also shown country-level differences in preschoolers' cognitive and social–emotional skills (as measured by the ECDI) that are linked to countries' socioeconomic and nutritional status (McCoy et al., 2016). Generating further evidence on children's ECD in diverse parts of the world can inform a clearer understanding of developmental commonalities and differences, as well as what characteristics might be associated with positive population-level ECD outcomes. Together, this information can be useful for informing the design of more effective intervention strategies.

Descriptive data on ECD may be particularly important for the youngest children. Mounting evidence has confirmed the birth to three period as a time in which individuals are developing most rapidly and are most sensitive to environmental input (Farah et al.,