

Adapting developmental science for a world of diverse families

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Abstract

As developmental science expands globally, its theories and methods must rise to the challenge. Children worldwide develop within caregiving ecologies that often differ from traditional family models. Understanding how infants adapt within these contexts reveals general principles of human development. Achieving this requires structural change: consensus-building, open methods, and theories grounded in the environments where most children actually grow up.

According to the 2024 United Nations World Population Prospects, there were an estimated 654 million children under the age of five worldwide (Figure 1). Roughly 50% of these children live in Asia (1 in every 2 young children), 33% in Africa (1 in every 3), 7% in Latin America and the Caribbean (1 in every 14), 5% in Europe (1 in every 19), 3% in North America (1 in every 32), and 0.5% in Oceania (1 in every 189). While migration between regions is difficult to estimate, recent findings leveraging social media suggest that at least 39.1 million people, including young children, crossed international borders in 2022 (Chi et al., 2025). In 2020, UNICEF reported that about 36 million young people under 18 were living outside their country of birth, a population comparable in size to the number of children under the age of five in all of Europe, and equal to one in eight international migrants. In other words, those 654 million children represent 654 million individual developmental trajectories, each shaped by the cultural, ecological, and biological conditions that surround them.

Despite the sheer scale and diversity of children's lives worldwide, developmental theories have been, and continue to be, built on observations from an alarmingly narrow slice of early development. If half of all young children live in Asia and a third in Africa, then developmental science has only covered a fraction of early child behavior as it is actually lived. To address this imbalance, Bard et al. urge the field to systematically broaden its empirical and theoretical reach by incorporating more cultures and local contexts into developmental research. While we are broadly aligned with their position, we argue that developmental science has yet to fully confront the theoretical consequences of such a shift.

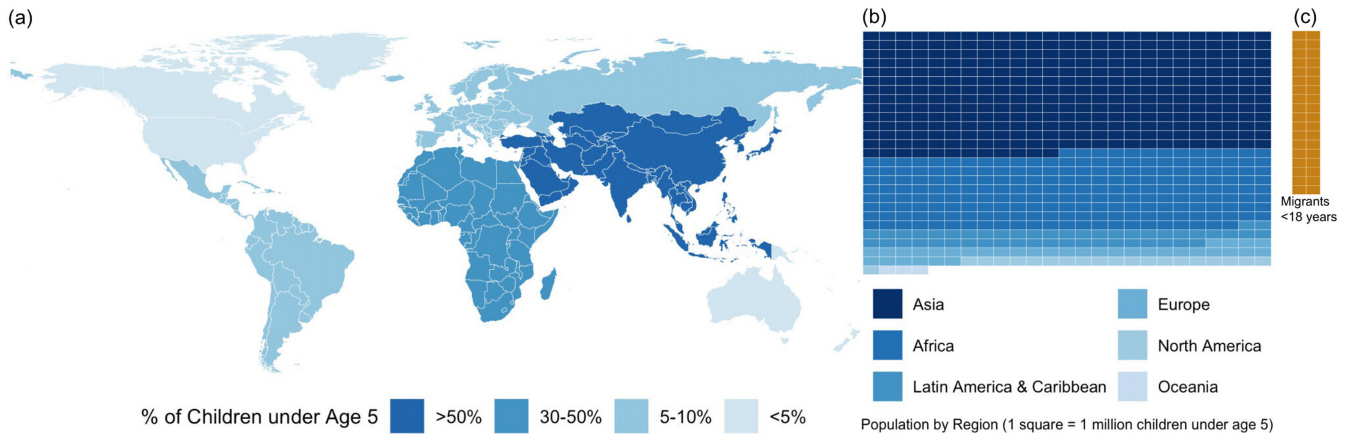


Figure 1 (Borjon et al.). Global distribution of children under age 5 (a–b) and migrants under age 18 (c). Regions in (a) follow United Nations classifications. Darker shaded regions in (a) and (b) indicate a higher proportion of children. Each square in (b) and (c) represents one million children.

Developmental scientists often presuppose caregiving environments that are stable, nuclear, and cooperative, assumptions rooted in Euro-American middle-class norms. In the pursuit of understanding infant behavior, such an assumption overlooks many other factors that impact development. Across cultures, children develop through fluid, heterogeneous, and often unpredictable caregiving ecologies that shape their behavior. Culture is not a monolith, and treating separate cultures as a proxy for diversity risks obscuring the profound variation that exists within them, within communities, families, and even individual developmental trajectories. Within any given society, families differ in caregiving practices, values, resources, and relationships. Caregiving may be shared, intermittent, institutionally mediated, transnational, or embedded within dynamic family constellations that shift with experience, migration, technology, or economic pressure. We argue that these diverse family structures are not edge cases; they are central to understanding how development unfolds in practice. The question is not how children thrive *despite* this variation, but how they adapt *through* it.

Efforts to increase the diversity of study populations often occur incidentally, whereby cultural or nationality labels are applied to the collected data without thoroughly characterizing the actual norms and circumstances of the individuals under study. Conclusions drawn from such data are then based on generalized assumptions about the culture as a whole that may not reflect the lived experience of the people from whom the data was collected. Moreover, developmental research produced outside the English-speaking world often remains untranslated, leaving it unincorporated into the English-dominant discourse of developmental science.

We propose that adaptation, not just diversity, is one of the conceptual centerpieces of developmental science. Infants and young children are biological and adaptive systems. Their capacity to creatively engage with, learn from, and adapt to the environments they inhabit is what catalyzes development in the first place (Ghazanfar & Gomez-Marín, 2024). A developmental science organized around adaptation would meet children where they are, across the globe, just as Bard et al. argue, and intentionally ground theories of development in the variable and fluid conditions where most children actually grow up. At present, we know remarkably little about the variability of infant behavior across the world: how often infants look, vocalize, move, are spoken to, or receive touch in daily life, among other behaviors. Without these reference points, we cannot distinguish what is

universal to and necessary for early development from what is local, adaptive, or contingent. After all, even infants who are rarely spoken to adapt to the sparse linguistic input and are still able to understand many words, demonstrating that comprehension emerges from flexible, adaptive cognitive processes (Foushee & Srinivasan, 2024).

Recalibrating developmental science around adaptation will also require structural change. To create a common ground from which innovations and discoveries can emerge, the field must continue pushing toward consensus grounded in open, accessible science and reciprocity. Consensus allows for transparent and shared tools, interoperable methods, and clearly defined yet falsifiable constructs, enabling research across contexts while remaining responsive to local meanings and practices. Such consensus is essential for identifying the commonality, variability, and diversity of infants' and young children's behavior. Initiatives such as the ManyBabies Consortium (Visser et al., 2022) are steps in the right direction for creating consensus across research sites in the service of open and reproducible science. Yet large-scale replication efforts are not enough to address the limitations inherent to theories derived from a minority of the world's children. Theories are produced by us, researchers whose perspectives and assumptions are themselves shaped and limited by our own cultural and individual histories. To understand adaptation, developmental science must build consensus not only in its methods and theories but also in recognizing and representing the full variability of human development as it occurs across the world.

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Competing interests. The authors declare none.

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