



Children, Youth and Developmental Science in the 2015–2030
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Children, Youth and Developmental Science in the 2015–2030 Global Sustainable Development Goals

Abbie Raikes
University of Nebraska Medical Center

Pia Rebello Britto
UNICEF

Hirokazu Yoshikawa
Steinhardt School of Culture,
Education and Human Development, New York University

Iheoma Iruka
University of Nebraska

Abstract

In September 2016, the member states of the United Nations completed the process of adopting and defining indicators for the Sustainable Development Goals (SDGs; United Nations, 2015). Developed through a three-year, worldwide participatory process, these 17 goals and 169 targets represent a global consensus on the part of U.N. member nations towards an inclusive, sustainable world, centered around ensuring equity in all countries at a time of great environmental and humanitarian crises. This Social Policy Report describes the central role of supporting child and youth development in achieving the vision behind the U.N. Sustainable Development Agenda. The report then addresses the importance of developmental science in achieving the aims of the Sustainable Development Agenda through generating knowledge of child and youth development in diverse contexts, monitoring and measurement to reveal patterns of success and inequity, and building capacity for developmental science in all countries. We emphasize the goal that most clearly encompasses development from birth to young adulthood (SDG 4) and also describe the relevance of developmental science to the other goals.

Author's Note:

Correspondence concerning this article should be addressed to Abbie Raikes, College of Public Health, University of Nebraska Medical Center, 986075, Omaha, NE, 68198. abbie.raikes@unmc.edu. Yoshikawa's work on this article was partially supported by a grant from the NYU Abu Dhabi Research Institute to the Global TIES for Children Center at New York University.

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From the Editor

The current state of economic and social inequality across the globe, challenges of war, forced migration, and environmental concerns such as climate change and lack of access to clean water, are just some of the international concerns that affect the healthy development of children and youth. In this SPR, Abbie Raikes, Hirokazu Yoshikawa, Pia Rebello Britto, and Iheoma Iruka examine the ways in which developmental scientists' past and future research can influence the achievement of the United Nations Sustainable Development Goals (SDGs) for 2030. Raikes et al. argue that by focusing on actions that assure the well-being and healthy development of children and youth in both low income and higher income countries, the SDGs are a potential mechanism for helping to improve the lives of children internationally—itsself a goal for developmental scientists.

This report lays out the arguments for the past influence and potential future influence of developmental science in achieving the Sustainable Development Goals. The authors note that in the current round of goal setting, the UN report specifically emphasizes concerns about the developmental trajectory from birth through adolescence. An emphasis on young children is not adequate to meet the needs of global youth.

Second, the authors argue that our research in recent years has pointed to the importance of integrating learning and social-emotional development in setting the agenda for children's healthy development, and that this integration is reflected throughout the Sustainable Development Agenda. While educational goals continue to be a part of the SDGs, the document also notes that learning goals in and of themselves are not enough—it is necessary to attend to both the quality of education and the social-emotional well-being of children in order to achieve substantial learning outcomes. And importantly, lifelong learning is an explicit goal. As Raikes et al. note, the SDGs ask that attention be paid to preparing youth for decent employment and entrepreneurial activities, as well as civic engagement.

Third, there is emphasis in the SDGs on the need to ensure gender equity—that both males and females achieve healthy development. Just as equity is important in setting goals that address issues of both low income and higher income countries, ensuring girls access to education and safe communities comparable to boys is important as well. Fourth, the challenges placed by environmental factors, including climate change and access to clean water, need to be addressed in the international context and should be monitored and documented.

A larger methodological argument beyond conceptual concerns is made in this report—that our achievement of sustainable goals and the impact of national and international policies should be measured via the integration of studies across communities and across time. Integration of survey and experimental data examining short-term outcomes with longitudinal data on child health and welfare measures is needed. Equally so, studies outside of Western nations, especially in Africa, Asia, and South America, are needed. Indeed, more funding for such research is needed as well. Finally, the authors note that the emergence and support of international scholars of developmental science, who by virtue of their national identities can bring more nuanced and culturally sensitive measures to the study of children's health and development, are essential to the study of how to achieve these Sustainable Development Goals. In short, this article asks us, as developmental scientists, to turn our attention to a larger set of long-term assessments of the state of children in today's world.

Children, Youth and Developmental Science in the 2015–2030 Global Sustainable Development Goals

As we head into the 21st century and recognize the potentially cataclysmic effects of climate change against a backdrop of societal instability, conflict, and migration, the United Nations Sustainable Development Goals (SDGs) outline 17 global goals considered central to sustainable development in all countries (see Sidebar 1). Sixteen of the goals address social, health, and economic conditions, and the protection of rights, and the 17th goal is focused on partnerships between countries, donors, and United Nations (U.N.) organizations required to reach the goals. Together the goals represent a framework ratified by all 193 U.N. member countries to guide action to address climate change and promote sustainable development at global, regional, and national levels. They aim to encompass and integrate five forms of development: people, planet, prosperity, peace, and partnership, building on a 2012 summit meeting calling for this integration (United Nations, 2012). The SDG conceptual framework acknowledges the mutual dependence of all countries and joint influences of economic, social, and health conditions on human well-being. Children and youth are woven into this agenda in many ways. As described below, several of the goals focus on children and youth, and the well-being and healthy development of children and youth are essential to achievement of the overall agenda.

This *Social Policy Report* outlines the role of developmental science in this new agenda, emphasizing the promotion of equity for children and youth, through three main mechanisms: first, by generating scientific insight on the role of environments in addressing inequity in human development; second, by creating measurement and monitoring systems that accurately call attention to inequity within and across populations; and, third, by building capacity for measurement and monitoring through partnerships that include universities, program evaluators, and policy makers both within and across nations.

What Are the Sustainable Development Goals? How Are They Different from the Millennium Development Goals?

All representatives of the 193 member states that comprise the U.N. General Assembly ratified the SDGs in September 2015, after several years of negotiations with countries and stakeholder groups on the most critical areas for global focus. Unlike previous global agendas, including the Millennium Development Goals (MDGs; U.N. Millennium Development Project, 2005), and global goals specific to education (UNESCO, 2000), the SDGs are universal and apply to all countries; their breadth of content is far wider; and they have explicit mechanisms in place for benchmarking progress to show gains. The process of creating the goals focused on extensive and inclusive consultation with diverse stakeholders, representing all countries and numerous nongovernmental organizations (NGOs). This process brought about a new emphasis on country-level interpretation and application of the goals. Previous development agendas were developed

Sidebar 1: The United Nations Sustainable Development Goals

- Goal 1. End poverty in all its forms everywhere
- Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- Goal 3. Ensure healthy lives and promote well-being for all at all ages
- Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- Goal 5. Achieve gender equality and empower all women and girls
- Goal 6. Ensure availability and sustainable management of water and sanitation for all
- Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all
- Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 10. Reduce inequality within and among countries
- Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable
- Goal 12. Ensure sustainable consumption and production patterns
- Goal 13. Take urgent action to combat climate change and its impacts
- Goal 14. Conserve and sustainably use the oceans, seas, and marine resources for sustainable development
- Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development

through consultation with fewer groups, which resulted in more discrete and measurable goals, but with limited scope and endorsement from stakeholders outside the United Nations. In addition, consultation from individuals worldwide was solicited through a web portal, titled “The World We Want.” The goals were thus selected to reflect the concepts and ideas that most resonated with stakeholders.

A core premise of the SDGs is the promotion of equity. The SDGs draw upon notions of equity rooted in rights frameworks; the goals map closely onto the Convention on the Rights of the Child (CRC), which was ratified by all but two nations in 1990 (UNICEF, 2016). Equity is framed in the SDGs as equal access to the resources, services, and opportunities that will ensure fulfillment of human potential. It is portrayed as an essential principle and a building block of sustainable development, both *between and within* nations. As examples of the focus on equity in the SDGs, the agendas of gender equity and reduction of economic and social inequality are explicitly included, a pivot from a sole emphasis on poverty reduction.

In previous agendas, more attention was placed on conditions facing people in low-income countries, with high-income countries expected to play roles as funders and providers of solutions within low-income countries. Recognizing that many people in low-income countries face barriers to healthy development and well-being, the SDGs ask wealthy countries to contribute to global equity by addressing inequity within their own borders, fairly acknowledging their contribution to climate change, and supporting less-wealthy countries in achieving well-being for their citizens. Meanwhile lower-income countries are asked to take steps now to invest in environmental protection and social and human development. Thus, there are still clear expectations for high-income countries to support economic and social development in low- and middle-income countries, but emphasis is placed on identifying the inequities inherent in most countries, regardless of overall country income. The resulting goals framework is therefore interconnected (LeBlanc, 2015), with greater emphasis on how actions in one area will affect action in another.

The SDGs build on the successes of the Millennium Development Goals (MDGs), the previous global development framework (U.N. Millennium Development Project, 2005), covering the years 2000-2015. Were the prior goals successful? The MDGs outlined eight goals centered on improving the lives of people in low-income countries through improved economic, health, and social conditions. During 2000-2015, substantial gains were made across a number of goals, and children and youth benefited as a result. For example, the number of people living in extreme poverty declined by half; the number of children attending primary school increased from 60-80%; rates of HIV/AIDS, malaria, and tuberculosis incidence were greatly reduced; and the number of malnourished people and under-5 mortality both decreased by half (Sachs, 2015).

The size and scope of the SDGs is both inspiring and daunting. It is estimated that it will cost \$3 trillion USD to reach them (New York Times, 2015). All U.N. member countries endorsed the goals, but plans to address them are at the discretion of each national government. Accountability for achieving results takes place primarily through a monitoring framework ratified by the U.N. Statistical Commission. All countries are expected to report regularly on progress towards goals. Four types of monitoring have been proposed by the U.N. Secretary General: global monitoring, using a set of globally comparable indicators agreed by the U.N. Statistical Commission; thematic monitoring, using indicators specific to each of the goals, which are not necessarily globally comparable; and regional and national monitoring, with specific indicators to be determined by regional and national bodies. This monitoring approach differs from the MDGs, which relied on one set of global indicators to track progress. However, with 169 targets that represent novel concepts not easily translatable

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into widely collected indicators, few if any countries are positioned to measure progress across the entire SDG agenda.

Reflecting the intention of SDGs to initiate action at the global, regional, and national levels, the SDGs present a malleable and responsive approach to monitoring that allows for considerable creativity and innovation, especially at the national and regional levels, which do not have any predefined indicators. In the lead-up to the 2014 ratification of the SDGs, the U.N. Secretary General called for “a culture of shared responsibility, one based on agreed universal norms, global commitments, shared rules and evidence, collective action and benchmarking for progress” (de la Mothe, Espey, & Schmidt-Traub, 2015, p. 1). The Sustainable Development Solutions Network, a global network of universities, research centers, and other knowledge centers focused on sustainable development, called for a strong culture of accountability, particularly at the national level, “building on existing national and local mechanisms and processes, with broad, multi-stakeholder participation” (de la Mothe, Espey, & Schmidt-Traub, 2015, p. 1).

The monitoring and reporting process creates an opportunity for dialogue across countries that leads to identification of areas of strength and challenge across populations. In turn, the process can stimulate investment where it is needed. Thus, tracking indicators is not simply meant to be a measurement exercise, but a powerful spur to national and regional action. Globally comparable data are essential to this process by providing a starting point for discussion within and beyond the United Nations. Measurement is especially central to identifying patterns of equity. Without measurement, it is impossible to identify which groups face disadvantage compared with others. Acknowledging the central role of data in identifying inequity and encouraging action to address it—as well as the lack of available data on many indicators—the U.N. Secretary General called for a “data revolution” as part of the sustainable development agenda (United Nations, 2014).

Children and Youth in the SDGs

The SDGs offer a more holistic vision of child and youth development than in previous agendas. Developmental science has been influential in shaping the SDGs in relation to early childhood development (e.g., Walker et al., 2007; Engle et al., 2011; Britto et al., 2017) and in highlighting the importance of health and well-being in adolescence (e.g., World Health Organization, 2014). For example, SDG 4 on learning and education, is more comprehensive than the education goal in the MDGs (see Sidebar 2). It covers “lifelong learning” and thus emphasizes the developmental outcome of education, rather than simply access to education itself. It also covers human development from early childhood (Target 4.2) through primary and secondary schooling (Target 4.1), technical and vocational education and university (Target 4.3), and certain other aspects of adolescence and young adulthood, including acquisition of skills and knowledge to promote sustainable development (Target 4.7), and preparation of youth for employment and entrepreneurship (Target 4.4). Mental health is also included explicitly in the SDGs under Goal 3, which includes language on prevention and promotion of mental health and well-being. However, few other specific references to outcomes related to socio-emotional development occur in the SDGs, although understanding of the importance of social and emotional development in learning is growing (e.g., Learning Metrics Task Force, 2013), which highlights the recent and rapid acceptance of holistic-development concepts. There is also no specific reference to children and youth with disabilities in the SDGs.

The SDGs maintain emphasis on the unfinished agenda of the MDGs in poverty reduction, nutrition, health, clean water, and sanitation (SDGs 1, 2, 3, and 6, respectively). A strong gender-equity lens is added in the call for ending discrimination against girls (SDG 5). The SDGs also recognize the many influences on children’s development that go beyond access to basic services, such as promotion of peace (Goal 16) and the reduction of violence against children and of their trafficking, torture, and exploitation (Goal 16.2). The larger prominence of child and youth development in the SDGs relative to the MDGs acknowledges that without a next generation that achieves its human potential in growth, learning, and development, none of the ambitious agenda to achieve a sustainable planet will be realized. In addition, children and youth are the most affected by the degree of progress in all areas of the SDGs. The impact of climate change will fall heavily on children and youth (Currie & Deschenes, 2016; Broome, 2008; Sheffield & Landrigan, 2011), affecting both physiological and psychological well-being and threatening to reverse progress made in recent years on mortality and morbidity (e.g., Phalkey, Aranda-Jan, Marx, Hofle, & Sauderborn, 2016). Especially dire implications for health and well-being among children in low-resource settings are predicted—for example, among urban children in low- and middle-income countries (Bartlett, 2008), migrant and refugee populations, and children residing in all parts of the Global South (Hanna & Oliva, 2016). Developmental science thus can figure prominently to help make the voices of these children

Sidebar 2: Goal 4 Targets and Global Indicators

Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Target	Global Indicators
4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes	4.1.1 Proportion of children and young people: (a) in grades 2/3; (b) at the end of primary; and (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex
4.2 By 2030, ensure that all girls and boys have access to quality early childhood development, care and preprimary education so that they are ready for primary education	4.2.1 Proportion of children under 5 years of age who are developmentally on track in health, learning and psychosocial well-being, by sex 4.2.2 Participation rate in organized learning (one year before the official primary entry age), by sex
4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university	4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex
4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship	4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill
4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations	4.5.1 Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict affected, as data become available) for all education indicators on this list that can be disaggregated
4.6 By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy	4.6.1 Percentage of population in a given age group achieving at least a fixed level of proficiency in functional (a) literacy and (b) numeracy skills, by sex
4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development	4.7.1 Extent to which (i) global citizenship education and (ii) education for sustainable development, including gender equality and human rights, are mainstreamed at all levels in: (a) national education policies, (b) curricula, (c) teacher education and (d) student assessment

Source: Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (E/CN.3/2016/2/Rev.1)

heard.

Research, Measurement, and Capacity-Building in Developmental Science and the SDGs

Despite the progress made under the MDGs, much work remains to move the global agenda forward for children. In his recent foreword to the Global Education Monitoring Report, Columbia University economist Jeffrey Sachs noted that the review of progress in education over the last decade should “set off alarm bells around the world” because of the distance we have yet to travel to achieve the goals (Global Education Monitoring Report, 2016). Gross inequities in opportunities for children—from lack of access to clean water, lack of literacy materials in homes, recurrent poor health, and pervasive and persistent poverty—prevent them from reaching their developmental potential. Developmental science is needed to promote action in three areas: 1) generating locally and globally relevant information on the nature of human development in diverse contexts, including experimental studies, primary and secondary data analyses, program evaluations, and longitudinal studies to inform policy development; 2) ensuring reliable measurement and monitoring; and 3) building capacity for SDG- and policy-relevant developmental science across and within all countries. Across all three action areas, the United States has as much to gain as it has to share—persistent inequity, the impending pressures of climate change, and patterns of migration to the United States encourage U.S.-based scholars to turn their attention to other countries for insights into cultural patterns and innovations in programming and policy development.

First, generation of knowledge on normative and at-risk development in diverse contexts should accompany implementation of the SDGs. This could include outlining similarities and differences in child and youth development across environmental contexts, cultures, and in the wake of climate change, conflict, and migration; studying the impact of various interventions on children’s development; and documenting the experiences of all children in longitudinal and panel studies that include children in emergency situations, children who are not in school, and other groups who are hard to reach and not typically included in research or measurement. The substantial body of literature outlining the interactions between biology and environment on development has changed how human development is understood, helping policy makers and practitioners conceptualize the sensitivity and responsiveness of human beings to their environments. These ideas now need to be expanded and applied to more diverse contexts so that the mechanisms that promote healthy development in all places can be better identified and understood—and eventually addressed as needed.

Second, developing new approaches to measurement and monitoring to generate data and indicators to accurately track progress towards policy implementation and improved outcomes for children and youth is urgently needed. Drawing attention to children and youth, especially those most at risk, is achieved in part by accurately measuring and reporting on children’s development. This is especially critical for the millions of children who live on the margins, due to lack of birth registration and migration that create “invisible” populations of children who face severe risks in reaching their developmental potential. For example, countries may exclude out-of-school children or children in refugee camps from large-scale estimates of learning. Leaving out entire groups of children from such estimates undermines the goal of addressing equity. With a limited range of measures at their disposal, a small research base to draw from, and limited funds for representative samples that include all children, many countries will struggle to document the basic needs of their

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children, highlight their competencies, or include all children and youth in measurement as is required, for example, in the SDG education and learning indicators.

Monitoring is especially important since each country will develop its own plans for implementation, and relying on common measures will be instrumental to create shared purpose and build momentum for change across countries. Measurement will require development of outcome indicators, which track progress towards final goals for children and youth, as well as context and process indicators, which assess the extent to which children and youth can access quality services. The process of new indicator development ideally begins with strong empirical research using mixed methods and multidisciplinary research to fully define the underlying constructs (Hay, 2016). The research is then translated into indicators that are feasible to collect on a large scale, can adequately address questions of equity, and are useful in influencing policy and practice. The ideal suite of indicators across national, regional, thematic, and global scales will also likely include an emphasis on national accountability for specific programs and surveillance to improve knowledge of equity in service delivery as well as outcomes (Requejo, et al., 2015). Novel approaches to data collection are also needed to accurately track the millions of refugee and immigrant children who now comprise a large and growing proportion of the world's children.

Finally, partnerships and capacity building are required to build research and measurement infrastructures in each country. Most immediately, effort is needed to train and support students in developmental science from a range of countries and backgrounds. Partnerships between research institutions and implementation agencies are also needed to create research studies that address novel and timely approaches to developmental science in the context of climate change, conflict, and migration, for example. Funding for research on normative development in many countries is scarce, and partnerships can effectively leverage research investments and opportunities, as well as leading to new theories and approaches for developmental science.

We outline how these three action areas relate to education (SDG 4) in the case example below.

Case Example: The Potential Role of Developmental Science in Progress Towards Sustainable Development Goal 4 on Lifelong Learning and Education

Although developmental science can contribute to a variety of goals and targets under the SDGs, for reasons of space and to illustrate in detail the application to one goal, we chose SDG 4 to discuss in depth. SDG 4 is one of the few goals that incorporates explicit attention in its targets to aspects of development from birth to adulthood.

SDG 4 addresses a critical gap in education's progress under the MDGs. The MDGs emphasized access to primary education, for example, without mentioning its quality. By wide consensus, the large rises in access to primary education (particularly in low- and middle-income countries) did not result in concomitant increases in learning (Pritchett, 2013), in part because neither quality nor a broad vision of learning and development were included as key targets. The UNESCO global goals for education, Education for All (UNESCO, 2000), outlined six goals targeted specifically towards improving quality and access to education; Goal 4 of the SDGs shows some degree of continuity from this earlier agenda. Although

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the Education for All goals began to add quality to global goal-setting in the field, SDG 4 addresses what has been termed the “crisis of learning”—increases in access to primary education, for instance, without concomitant increases in children’s skills. Research on children’s basic reading and numeracy skills, for example, show large lags relative to grade level in rural areas of middle-income countries like India, and in low-income countries such as Kenya (ASER Centre, 2016; Uwezo, 2012).

Knowledge generation through basic research, program evaluations, and longitudinal studies. Over the last decade, a new era of evidence-based decision-making for children and youth has emerged in many parts of the world, demonstrating both the importance and the appetite for research on children and youth to inform decision-making. Impact evaluations, for example, now regularly inform policy and programmatic investments; for example, based on initial impact evaluations, a regional intervention to improve reading outcomes in Kenya, is expanding nationally (Piper, Zuilkowski, & Mugenda, 2014). Another example is the Roving Caregiver home-visiting program in Jamaica, built on substantial research demonstrating the impact of home-visiting programs for young children and families, which has been replicated in more than 10 countries around the world and has begun to be incorporated into national programming (Greene, Murray, & Lynch, 2015).

Generative research on risk, protective, promotive, and resilience processes has informed productive programs of research and evaluation. The field of socioemotional learning interventions has had extensive grounding, for example, in longitudinal developmental science of this type (Luthar & Eisenberg, in press; Yoshikawa, Whipps, & Rojas, 2017). Approaches to programming grounded in contextual and cultural developmental science with evidence of positive impact on SDG-indicator outcomes include the Madrasa Early Childhood Program, which was based on local cultural norms regarding community learning contexts in East Africa, in addition to developmental science findings on how children learn in early childhood education settings. Impacts were measured on assessments tailored to the specific contexts of Kenya, Tanzania, Uganda, and Zanzibar (Mwaura & Marfo, 2011; Mwaura, Sylva, & Malmberg, 2008). Positive effects were found on multiple dimensions of early skills, including reasoning, language, and numeracy. Integration and syntheses of global and contextual influences on child development and family functioning also led to strong long-term impacts of the Turkish Early Enrichment Project (Kagitcibasi, 2014). Basic findings on developmental contexts, for instance, will continue to be of great utility in informing innovations in programs. As an example, Weisner and colleagues’ work documenting sibling and child-to-child caregiving in East Africa informed the development and ongoing evaluation of initiatives such as the Child-to-Child program that fosters positive interactions between peers as part of early childhood development (Weisner et al., 1977; UNICEF, 2012).

Longitudinal studies produce especially valuable evidence to inform policy and practice by serving as the basis for evaluation of policies or program interventions. For example, the Young Lives multi-country longitudinal study has spanned the periods of early childhood to mid-adolescence in Ethiopia, India, Peru, and Vietnam. Findings from the Young Lives studies have contributed substantially to policy and practice by focusing on the various dimensions of child

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well-being that are essential to achieving the vision behind the SDGs (e.g., Crivello, Camfield, & Woodhead, 2009). One recent study using the Young Lives data merged longitudinal data from the state of Andhra Pradesh in India with data on village-level implementation of women's political representation. An Indian national law requiring over 40% representation of women on community governance councils (*panchayat*) was implemented at staggered intervals during the course of the study across villages in that state. By merging data on such village-level implementation variation with the longitudinal developmental outcomes in the Young Lives data set, Pathak and Macours (2013) determined that villages that implemented women's political representation in this manner subsequently had children with better health and cognitive outcomes, especially if they were exposed to the policy in early development.

The translation of impact evaluation findings to effective, high-quality programs at scale can be challenging (e.g., Britto, Yoshikawa, & Boller, 2011). Lessons learned from global efforts may be useful to the somewhat similar challenges of scaling demonstration projects to district or state-level scale in the United States (Yoshikawa, Rosman, & Hsueh, 2002). Advances in implementation science increasingly call on the assessment of systems-level factors—whether of the workforce, governance processes, or monitoring and data management systems—to understand when and why local program-level implementation varies (Aarons, Hurlburt, & Horwitz, 2011; Pritchett, 2013; Yoshikawa, Kim, Raikes, & Wuermli, 2016). These efforts extend to global contexts that call for research directly addressing macrosystem factors in social and ecological models of human development (Bronfenbrenner & Morris, 2006).

Measurement and monitoring. As noted above, measurement and monitoring are central to achievement of global goals, and also play a critical role in producing “leading” indicators that forecast what is to come. More consistent measurement of learning, for example, may have predicted that education access would not lead to changes in learning. Several domains of development are explicitly identified as central to achievement of SDG goals in both learning and socioemotional skills in children and youth. Other important priorities are promoting access to health care, good nutrition, and protecting children and youth from violence. Creating effective SDG measurement asks developmental scientists to think broadly about how existing expertise can be applied across a range of high- to low-income settings; about how to develop new methodologies for measurement that utilize large-scale data sets and apply innovative analyses to look between and within countries; and about how to help develop new indicators that appropriately balance cultural sensitivity with global comparability.

The principal indicator for Target 4.1, for example, calls for measurement of reading and mathematics skills in Grades 2 or 3, and at the end of primary and secondary education (see Sidebar 2). Developmental scientists have expertise in the delineation of multiple components of reading and mathematics skills. Knowledge of how best to measure these skills, especially across diverse languages and cultural backgrounds, can now be used to improve measurement of learning. As an example, the development of the Early Grade Reading Assessment, which has now been used in hundreds of studies in low- and middle-income countries, was inspired by U.S.-generated measures of early reading (Gove & Wetterberg, 2011) and adapted for use in diverse settings. Just as important, the recognition of the importance of social-emotional skills in learning has been increasingly recognized globally, but with few measures workable for global use. While these skills are not explicitly articulated in the target or indicator, the growing understanding of the importance of social-emotional development has created demand among many governments for its mea-

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Target 4.2, on early childhood development, includes an indicator that is explicitly multidimensional—“developmentally on track in health, learning, and psychosocial well-being” by the age of 5. This language roughly conforms to current consensus on the multiple domains of early childhood growth and development across physical, cognitive, language, and socioemotional areas (Black et al., 2016). Several organizations and universities have invested in the creation of population-based measures for use globally and regionally, as seen in these two examples: UNICEF’s Early Childhood Development Index, a 10-item parent report on child development, has been used in at least 50 low- and middle-income countries through the Multiple Indicator Cluster Survey (MICS) household survey; and the East Asia Pacific Child Development Scales were designed to track progress based on national standards in eight East Asian countries (Rao et al., 2014).

While measurement options exist, this target also presents several challenges. It is not clear what “developmentally on track” means in various contexts, and more critically, how best to align measures of children’s development with local priorities for their development while simultaneously collecting reliable data across countries (see McCoy et al., 2016, for an initial analysis based on the UNICEF MICS Early Childhood Development Index). Several measures for children from birth to age 3 years are under development but are not yet available on a global scale. Despite the scientific rationale for examining children’s development from birth through the age of 8 (Raikes, Britto, & Dua, 2014), little infrastructure is in place to measure children’s development across a range of ages, and work also needs to be done to develop appropriate measures for children with special needs, who are at high risk for exclusion from large-scale surveys of children’s learning, and thus at risk of not being counted. While Target 2.2, focused on undernutrition, is now clearly defined by using existing global measures of linear growth, it is less clear how to measure the many antecedents to stunting in ways that capture the holistic nature of young children’s development—in particular, how stimulating and supportive caregiving may be able to ameliorate some of the effects of stunting on cognition (Walker, Chang, Powell, Simonoff, & Grantham-McGregor, 2007). Target 16.2, addressing violence against children, is perhaps one of the most critical indicators to measure through a range of methods, including community violence, domestic violence, as well as child abuse and neglect, and U.S. expertise in this area can be used to help support efforts in countries where such violence is neither well-acknowledged nor addressed.

Some of the targets’ wording represents new potential agendas for developmental science. Target 4.4 includes skills “for employment, decent jobs and entrepreneurship,” which demands definitions that clearly specify the skills that may be associated with these outcomes in particular countries. Currently, little longitudinal research exists concerning early predictors of entrepreneurial skills, for example. Target 4.7 on the skills that enable youth to promote sustainable development, is also an emerging area in civic engagement research (Pratt & Lawford, 2014). Programming and evaluation in sustainability curricula from the preprimary to the secondary levels are growing—but are still limited compared with evaluations of other forms of education and youth development (Hägglund & Samuelsson, 2009).

The wealth of efforts conducted to date in measuring dimensions of child health, development, and learning could be more effectively synthesized and disseminated so that scholars across nations have access to what has been done, both at the individual country and cross-national levels. New measurement tools used to generate indicators for national, regional, and global measurement must be compatible with local priorities for child and youth development so as to accurately describe children’s competencies and generate data that resonates with local policy makers, parents, and practitioners. Grounding measures in the context of cultural specificity and variation will benefit from the experience of scholars with deep expertise in the study of culture and human development. For example, the definition and relevance of specific indicators of socio-emotional development may be rooted in the values and meanings associated with specific social behaviors, interpersonal reactions, and emotional responses within each setting. What are considered appropriate goals for development, for example, vary considerably across cultures and communities (Keller & Kärtner, 2013). Dimensions of children’s behavior considered important in the landmark study in the Kikuyu culture of Kenya included bravery, inquisitiveness, and cleverness (Whiting, 1996), dimensions not often included in Euro-American scales of socioemotional development. Whiting and colleagues’ anthropological work in Kenya eloquently demonstrated how the unique interplay between cultural values and shifting societal norms influenced parenting and, in turn, sometimes conflicting expectations for children’s behavior at home and at school (Whiting et al., 2004).

Beyond social and emotional development, learning assessment is also deeply intertwined with the immediate

context and daily routines within which such learning occurs, not only within formal spaces of organized learning, but in community and home contexts (Rogoff, Paradise, Arauz, Correa-Chavez, & Angelillo, 2003; Super & Harkness, 1986). This is perhaps especially true for early childhood development, where cultural and contextual values for children’s behavior shape the timing and manifestation of developmental milestones. Bridging the two worlds of culturally grounded construct development and cross-nationally comparable measures of developmental growth and learning will be challenging but central to the goal of embedding measures in specific service and policy systems at the national level.

Second, in previous agendas, emphasis has been placed on globally comparable measurement, typically conducted through multinational organizations that define and measure key indicators. The combination of many undefined indicators and the acknowledgement of the new SDG agenda’s importance pushes boundaries on what “globally comparable” means and how much it should be prioritized. The new agenda coincides with rapid growth in innovation and capacity for measurement across countries, regions, and within many different types of organizations. With this capacity, there are new opportunities to understand which aspects of growth, learning, and development are globally comparable and which are specific to nations and within-country contexts. Greater capacity also brings increasing availability of and access to large-scale data sets.

Addressing questions of cultural and contextual sensitivity in measurement, especially across all countries and within a complex set of development goals, requires attention to conceptual as well as measurement equivalence. Models for invariance that were largely developed in the context of within-country variation become more complex when addressing both within- and cross-country variation. Approaches to integrative data analysis, across multiple country data sets, have rarely been combined with approaches to scalar, factorial, and configural invariance in measurement (Curran & Hussong, 2009; Millsap, 2011). Yet addressing both measurement equivalence and internal test functioning are essential for generating reliable estimates across diverse populations. Methodologists are needed to engage in three central questions to generate novel solutions on 1) how data sets can be integrated across countries; 2) how methods can be created to address within-country and between-country variation; and 3) what innovations in balancing global and culturally responsive measurement can now be applied on a larger scale.

Third, recent advances in developmental science can contribute substantially to the measurement of the quality of educational, early childhood, and youth development programs. Goal 4 and Targets 4.1 and 4.2 all include the word “quality” with reference to education and to early childhood development programs and policies. In addition, target 4.a calls for “safe, inclusive and effective learning environments for all.” Recent advances in observational assessments of the quality of classrooms have built on decades of developmental science. Several such assessments have been examined as possible mediators of quality improvement initiatives and child outcomes in early and later education in countries such as Bangladesh, Chile, Colombia, and Jamaica (Baker-Henningham, Scott, Jones, & Walker, 2012; Bernal, 2015; Moore, Akhter, & Aboud, 2008; Yoshikawa et al., 2015). In Europe, the breadth and meaning of “quality” across countries has been documented, along with points of similarity between countries (e.g., OECD, 2015), a narrative that highlights shared and distinct conceptual bases for defining quality in the United States and other high-income countries. The measurement of process quality, in particular, has moved the field of quality measurement in education beyond the structural indicators that are more often the focus of regulatory policy and monitoring and evaluation systems. The importance of recognizing the diverse and multilayered definitions of “quality” has also been highlighted in recent years (Dahlberg, Moss, & Pence, 2007). Some countries are beginning to include process qual-

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ity indicators in their efforts to monitor the quality of education, a nascent but important trend that ideally would be supported by researchers locally, while drawing upon the expertise developed in countries with long histories of quality measurement and policy, such as the United States.

In youth programming, similarly, concepts of quality stemming from developmental science, such as a focus on youth active engagement, have led to better understanding of effective youth programs (e.g., Akiva, Cortina, Eccles, & Smith, 2013). The measurement of social interactions that may contribute to the positive effects of youth empowerment, livelihoods, health and educational programs represents a productive research agenda for partnerships between youth development scholars and NGOs, government, and civil society organizations implementing youth programming.

Capacity Building in Research, Measurement, and Monitoring

The SDG agenda will require new kinds of global exchange—certainly of financial capital—but also, just as critically, of human capital. The challenge of a single global agenda that integrates work on equity, quality, and human development across high-, middle-, and low-income countries is an exciting one, we believe, for developmental science. We highlight aspects of partnership and pathways towards mutual research network- and capacity-building across often-segregated research communities below.

New models of partnership. Three kinds of partnerships are needed to promote evidence-based action for the SDGs relevant to children and youth: 1) partnerships between different stakeholders, including funders, researchers, civil society organizations, and governments; 2) transdisciplinary research that works across disciplines, especially to link the goals related to climate change, ecosystems, energy, biodiversity, and agriculture to child and youth development; and 3) translation of the science into application, so that the results can directly lead to impacts for children and youth. First, countries can be supported in the effort to implement the SDGs through partnerships between universities and research institutions, on the one hand, and local and national NGOs, multilateral agencies (e.g., UNICEF, UNESCO, the World Bank), and donor agencies on the other. These partnerships can help ensure that research questions and the entire research process are conducted in ways that are culturally sound, meaningful and relevant to programming and policy at scale. Local partnerships are especially important in ensuring that measurement and evaluation efforts are culturally grounded. These partnerships can be viewed as ones of mutual benefit, leading to new insights on the nature of children's development, as well as helping to support country implementation of the SDG agenda.

Second, the transdisciplinary nature of the new agenda has several implications for science generally, and for developmental science specifically. The new agenda requires interdisciplinary approaches due to the interlinked nature of the goals, across climate, ecosystems, and other “macro-system” factors. Perhaps most critically, the new agenda must include the generation of conceptual models and research designs that can come closer to representing the multiple influences on child and youth development. Network development among researchers is vital. Several such efforts are currently underway, such as the UNESCO Institute for Statistics' Global Alliance to Monitor Learning, the Early Childhood Development Action Network initiated by UNICEF and the World Bank, and the Sustainable Development Solutions Network (Sustainable Development Solutions Network, 2015). Collaborations among different types of research institutions may also be important. For example, teaching institutions, which train health workers and teachers, might collaborate with research universities and policy research institutes. New models of mentoring across career phase and disciplinary divides will also be critical. We discuss the additional topic below of capacity building in parts of the world where research, data, and measurement capacity may be limited (Jha, Kickbusch, Taylor, & Abassi, 2016).

Finally, the SDGs provide an opportunity to build novel approaches to research that will more quickly translate science into action, by engaging stakeholders as co-investigators in research and emphasizing research designs that address community priorities and needs. The SDGs clearly articulate the necessity of reaching all populations of children and youth and generating evidence to guide policy and programs in a range of contexts. As a result, new models of research collaboration between communities and scientists may be essential for implementing the SDG agenda. Developmental science can benefit by exploring the shifts in research models and epistemology arising from global climate change (Lang et al., 2012). These models call for conceptualizing knowledge as generated between partners with different perspectives, constituting an important philosophical shift for addressing climate change and equity. This shift in orientation is leading to novel approaches to working closely with communities and families to take scientific findings and integrate

them to create effective models—for example, using rapid-cycle testing of alternative interventions supported by Saving Brains, a global program to improve early brain and child development of the nonprofit Grand Challenges Canada (Radner, Silver & Foote, 2015).

Several models of these types of partnerships in the fields of public health and biomedical science may also be useful to draw upon, with scientists serving in various roles as partners to communities in documenting successful practices, working to scale effective models, and helping communities integrate viewpoints from multiple scientists to create customized solutions that reflect community needs. Such partnerships can inform both program design and measurement. Deep engagement of communities is essential not only for generating effective interventions, but also for producing the type of measures that will both lead to country accountability while also accurately reflecting community values and priorities.

Building capacity for community-scientist partnerships will require researchers and community partners to approach the application of science to practice with patience and tolerance of ambiguity and potential failure. A considerable body of expertise in community-engaged research has been developed in the field of public health to support academic research centers in creating effective partnerships to address inequity in health outcomes, and it identifies some of the tensions that can arise in community-engaged research (e.g., Lloyd Michener et al., 2012). We can use this expertise to inform capacity-building efforts in community-engaged developmental science in the United States as well as in low- and middle-income countries. For communities with little previous exposure to developmental science or research methods, or conversely developmental researchers with little exposure to diverse global communities, such partnerships may be especially powerful. Funders are called upon to help support these types of models, with support for researchers to help develop models across and within high-, middle-, and low-income countries.

Build developmental science in low- and middle-income countries. The grounding of developmental science in culture and context relevant to the global and universal nature of the SDGs will require a new generation of developmental scientists less rooted in assumptions of the small number of English-language countries that have produced most of the developmental science to date (Arnett, 2008). As Marfo, Pence, LeVine, and LeVine have noted in the context of Africa (2011), the developmental literature published from data on that continent has largely represented adaptations of Euro-American developmental constructs such as attachment or parenting dimensions such as control and warmth. They note that building a developmental science that is conducted by and for African scholars will require addressing the power imbalances that reside in institutions, research funding, and other resources across the rich countries that have produced the bulk of globally recognized research in the field and the lower-income countries that are home to most of the world's children. Centrally, the imbalance that has resulted in research funding and resources that are wildly tilted towards continued research in a limited number of rich countries will need to be addressed. They note the need for mentoring among African scholars across their career phases (senior and junior) and an approach to engagement of scholars from the rich countries that represents mutual learning rather than one-way mentorship or capacity building. Current models include collaborations among the African Scholars Workshop, the Early Childhood Development Virtual University, and the African Early Childhood Network (African Early Childhood Network, 2016; Marfo & Pence, 2016; Yoshikawa, Wuermli, Aber, Chavan, & Bahadur, 2016). Support for partnerships between researchers across countries is also growing. For example, Canada's Saving Brains, supported by several private and public funders, has made substantial contributions to developmental science in the very early years by enabling research on innovative

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models in many low- and middle-income countries.

Support the application of lessons from low- and middle-income countries (LMIC) to high-income countries.

The use of the majority of developmental science—conducted on about 10% of the world’s population in high-income countries—to influence programs and policies in LMIC contrasts with an alternative that is not often considered. That is, how do findings from LMICs translate to high-income countries? The recent evaluation of the first conditional-cash transfer program in the United States modeled on one in a middle-income country, Progresa/Oportunidades in Mexico, is an example of how a program model that has achieved widespread adoption in over 30 LMIC might be adapted and evaluated in the United States. In this evaluation, developmental mechanisms specific to New York City were assessed and examined (Aber, Morris, Wolf, & Berg, 2016). Further work adapting and evaluating approaches with promise in achieving progress on SDG indicators across the high- and middle-income and low-income countries may require changes in the practices of research funding institutions (which often concentrate on a single country), researcher training, and cross-national collaboration.

Beyond “business as usual” in the methods and practice of developmental science. Integrating impact evaluation research with culturally and contextually grounded developmental science represents an additional agenda for the research community. The growing efforts to experimentally evaluate programs and policies affecting children in low- and middle-income countries rarely incorporate advances in developmentally informed child and youth assessments or assessments of their contexts (Wuermli, Tubbs, Petersen, & Aber, 2015). Similarly, the practice of impact evaluation for children and youth in these countries rarely is built on a larger suite of methods including qualitative ones, even when evidence and multiple examples show us the benefits of integrating such methods into the development, implementation, and improvement of programs (Huston, Duncan, & Yoshikawa, 2016). Diverse research skills across causal impact evaluation, implementation science, and the science of culture, context, and human development are all equally important in informing the SDGs from a child and youth development standpoint. Currently, training models in developmental science often result in specialization in one area of these research skills, but not all.

Research on implementation and scale is an emerging area that is only beginning to be integrated with developmental science. Despite recent efforts to understand fidelity of implementation in highly structured programs, much remains to be learned about how to assess, conceptualize, and utilize measures of the quality of services at scale—the process of expansion of programs from demonstration projects to the level called-for in the SDGs, which is universal provision on a national scale. Although it may be argued that the SDGs are not realistic in their universal nature, in several areas of child development, the MDGs produced national and substantial improvements in key indicators (e.g., the 50% reduction in under-5 mortality that occurred in low- and middle-income countries during the MDG years; United Nations, 2014). In some countries, intentional approaches to scaling, such as continuous quality improvement of national health care systems, were employed in service of reductions in infant and under-5 mortality (e.g., Ghana’s Fives Alive! initiative; Sodji-Tettey et al., 2015). The effects of efforts to intentionally scale programs with quality on child development are only beginning to be evaluated (e.g., Arbour et al., 2015; Boller et al., 2015).

Study designs to describe normative developmental patterns in children and youth in diverse contexts are an essential part of the package to achieve equity between and within countries. Because information is needed to inform policy decisions in the very near future, and resources for generating new information are limited, creative efforts are needed to complement and expand upon the existing knowledge base. For example, several hundred impact evaluations addressing educational interventions have been conducted in recent years (e.g., Ganimian & Murnane, 2016), but there have been few studies tracking cohorts of children and youth into adulthood. However, impact evaluations are limited in scope by design, and focus on a narrow range of influences on children’s lives. To fully inform developmental theories and application of findings to practice, results from impact evaluations should be integrated with and complemented by longitudinal, descriptive studies that offer a more complete and nuanced view of the lives of children and youth, as seen in projects related to the Young Lives Study mentioned earlier. These longitudinal studies can be used to estimate approximate causal effects, such as fixed effects of a policy change on child or youth outcomes. For example, a quasi-experimental impact evaluation of early childhood programs in Zambia was embedded within a national longitudinal study of child development in that country, using propensity score techniques (McCoy, Zuilkowski, Yoshikawa, & Fink, 2016). Integrating family- and community-level assessments can additionally provide rich information on the cultural specific-

ity of program and policy impacts as well as developmental change (Mistry et al., 2016; Rogoff et al., 2003). In sum, a broader mix of study designs is needed, with longitudinal studies as a centerpiece, to more fully address development of children and youth in diverse contexts.

Finally, leveraging the funds of knowledge and human capital of students studying developmental science outside of their countries of origin can help in generating and effectively implementing best practices to support the SDG agenda. In 2014–2015, the Institute of International Education's *Open Doors Report* showed a record high of almost one million (974,926) international students in the United States, primarily from China, India, Saudi Arabia, and South Korea (Institute for International Education, 2015). However, the number of international students from other countries such as those from sub-Saharan Africa and Latin America and the Caribbean also saw increases of 10–15%. This increasing population of international students has implications for examination of global child and youth development, especially because over 13% of these students are studying the social sciences, education, or health professions. In line with an intentional exchange strategy, developmental science students from high-income countries should also be supported in pursuing developmental science and program development and evaluation science study abroad. As this report seeks to meet the global SDGs, especially as it concerns children's development and learning, it is critical that developmental scientists are part of this work, but it also emphasizes the importance of ensuring that the research workforce itself incorporates such diversity across nations. In addition to ensuring diverse representation in senior researchers and practitioners, the challenge of the SDGs is also an opportunity for developmental scientists to seek out, support, and leverage students' funds of knowledge regarding their countries and communities. Rich opportunities and mechanisms exist in high-income countries for funding undergraduate and graduate students, as well as junior scholars, to participate in research through graduate fellowships, grant supplements, early scholar awards, etc. Various studies have pointed to new approaches in universities in mobilizing interdisciplinary scholars to create global knowledge, especially on matters of world impact (e.g., Larner, 2015; Lehtomäki, Moate, & Posti-Ahokas, 2015). There is a consensus that ". . . internationalization of higher education is powerful. The purpose includes communication and transfer of knowledge (two-way), innovation in approaching global challenges, cultural understanding and appreciation of different strengths, and the development of talent among students and staff to be fit for the future" (Hearn, 2014). With the recognition of the urgency in addressing global issues such as conflict, migration, climate change and food security, public health in noncommunicable diseases, sustainable resources and environment, and access to high-quality early learning opportunities, researchers, including emerging scholars (i.e., graduate and undergraduate students) must be incorporated into the work sooner rather than later.

Conclusion

Developmental scientists have made notable contributions to the achievement of well-being for all children as reflected in the SDGs' breadth and acknowledgement of children and youth. Now, with a new global agenda, we are calling for a concerted effort to maintain and build upon successes in using developmental science to promote global equity. To usher in a new era of developmental science, three main functions of developmental scientists are now needed: knowledge generation that covers children and youth in all countries and captures both universal aspects of human development and the importance of context; monitoring and measurement that contributes to equity; and capacity building to create the infrastructure for high-quality research in all countries, and draws upon the diversity and insights of a diverse group of developmental scholars. To maximize the impact of developmental science in the SDGs will require new ways of work-

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ing: a stronger focus on building collaborations; expanding the research base to include new conceptualizations of child and youth development that may arise from diverse contexts; and a clear intention to integrate developmental science across country borders, by both supporting and relying upon research from low- and middle-income countries to inform research and practice in the United States and other high-income countries. By following this agenda, developmental scientists can serve as creators of equity within and beyond the scientific community.

The new global agenda represented in the 2015–2030 Sustainable Development Goals creates a unique opportunity to promote human potential across the lifespan through application of science to policy and practice. By continuing to invest in knowledge generation, the development of scientifically based measurement tools, and monitoring in conjunction with capacity building, developmental scientists can help usher in a stronger focus on children and youth, and most importantly can ensure that they meet their potential. Developmental scientists are encouraged to devote their ideas and expertise to this new agenda through engagement in global efforts and partnership with universities, governments, NGOs, and communities throughout the world.

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About the Authors

Abbie Raikes, Ph.D., MPH, is an assistant professor at the College of Public Health, University of Nebraska Medical Center, and a Fellow at the Buffett Early Childhood Institute. Dr. Raikes' recent work has focused on improving early childhood programs and policies in low- and middle-income countries. Her research background also includes a strong focus on young children's social/emotional development. Working in partnership with the World Bank and other organizations, Abbie supports low- and middle-income countries in adopting effective measurement systems for early childhood development, through her leadership of the Measuring Early Learning and Quality Outcomes project. Previously, Abbie contributed to early childhood policy development in several countries as a program specialist for the United Nations Education, Science and Culture Organization (UNESCO) in Paris, where she also participated in UNESCO's process to develop indicators for the Sustainable Development Goals. Abbie was a senior program officer at the Bill & Melinda Gates Foundation, and has advised several organizations on early childhood development and education. Abbie has served on several boards, including the Consultative Group on Early Childhood Development and the Gretchen Swanson Center for Nutrition.

Hirokazu Yoshikawa, Ph.D., is the Courtney Sale Ross Professor of Globalization and Education, and a University Professor at New York University. He conducts research on the effects of programs and policies related to early childhood development, immigration and poverty on child and youth development. He co-directs (with Larry Aber) the Global TIES for Children Center at New York University. He is also Co-Chair of the Thematic Network on Early Childhood Development and Education (i.e., for the area of Sustainable Development Goal, or SDG 4) of the Sustainable Development Solutions Network (SDSN), the research network advising the Secretary-General on the development and implementation of the global SDGs. He serves on the boards of trustees of the Russell Sage Foundation and the Foundation for Child Development, and the advisory boards of the Early Childhood Program of the Open Society Foundations and the UNESCO Global Education Monitoring Report.

Pia Rebello Britto, Ph.D., Global Chief and Senior Advisor, Early Childhood Development, UNICEF, is internationally renowned for her expertise in early childhood policy and programmes. Dr. Britto obtained her doctoral degree in Developmental Psychology from Columbia University (New York, NY, USA) and prior to joining UNICEF she was an Assistant Professor at Yale University (New Haven, CT, USA). Dr. Britto has worked on developing, implementing and evaluating early childhood programmes and policies around the world. In particular, she has strengthened the application of evidence for programming, promoted the role of governance and finance of national systems in achieving equity, access and quality, developed and evaluated models for implementation of quality early childhood services and supported the role of parents and caregivers, including women's economic empowerment. Most recently, Dr. Britto is involved in work examining the relationship between early childhood and peace building. Within the United States, Dr. Britto is known for her scientific work on young children's early literacy development, early intervention program evaluations, and identity development of Muslim and Arab children. Dr. Britto is the recipient of several national and international grants and awards in recognition for her work and has published numerous books, articles, chapters and reports, and has presented extensively at conferences, meetings and workshops (academic and non-academic) globally.

Iheoma Iruka, Ph.D., is the Director of Research and Evaluation at the University of Nebraska Buffett Early Childhood Institute. Dr. Iruka's research focuses on determining how early experiences impact poor and ethnic minority children's learning and development, and the role of the family and education environments and systems. She is engaged in projects and initiatives focused on how evidence-informed policies, systems, and practices in early education can support the optimal development and experiences of low-income, ethnic minority, and immigrant children, such as through quality rating and improvement systems, home visiting programs, and preschool. In addition to being co-PI for the IES-funded Early Learning Network, Nebraska Site, Dr. Iruka is the lead research director for the Omaha Metro Superintendents' Early Childhood Plan and the Nebraska Early Childhood Workforce Survey. She is engaged in addressing how best to ensure excellence for diverse young learners, such as through classroom observation measure, public policy, and publications geared towards early education practitioners. She has served on numerous national boards and committee, including National Academies of Sciences Study on Parenting and National Research Conference on Early Childhood.

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