

Amina Abubakar
Fons J. R. van de Vijver *Editors*

Handbook of Applied Developmental Science in Sub- Saharan Africa

 Springer

Handbook of Applied Developmental Science in Sub-Saharan Africa

Amina Abubakar • Fons J.R. van de Vijver
Editors

Handbook of Applied Developmental Science in Sub-Saharan Africa

 Springer

Editors

Amina Abubakar
Department of Culture Studies
Tilburg University
Tilburg, The Netherlands

Fons J.R. van de Vijver
Department of Culture Studies
Tilburg University
Tilburg, The Netherlands

ISBN 978-1-4939-7326-2 ISBN 978-1-4939-7328-6 (eBook)
DOI 10.1007/978-1-4939-7328-6

Library of Congress Control Number: 2017956130

© Springer Science+Business Media LLC 2017

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer Science+Business Media, LLC
The registered company address is: 233 Spring Street, New York, NY 10013, U.S.A.

Amina Abubakar would like to dedicate this work to her late parents Neema Swaleh and Abubakar Ali.

Acknowledgements

During this project Amina Abubakar was funded by an open competition grant to Fons J.R. van de Vijver (400-08-198-MaGW), which is financed by the Netherlands Organisation for Scientific Research (NWO).

Contents

Part I Introductory Note

- 1 Introduction** 3
Amina Abubakar and Fons J.R. van de Vijver

Part II Social-Cultural Influences on Child Development

- 2 Parenting, Environment, and Early Child Development in Sub-Saharan Africa** 15
Marc H. Bornstein, Diane L. Putnick, Paul Oburu,
Jennifer E. Lansford, Kirby Deater-Deckard,
Robert H. Bradley, Riku Moriguchi, and Pia Rebello Britto
- 3 Exploring Differences in the Rural Home Environment: The Role of Biological and Environmental Factors** 55
Patricia Kadzo Kitsao-Wekulo, Penny Holding,
Robert H. Bradley, H. Gerry Taylor, Jane Kvalsvig,
Nori Minich, Christopher J. Burant, and Kevin Connolly
- 4 Early Socio-Emotional Development of Cameroonian Nso Farmer Children** 75
Hiltrud Otto and Heidi Keller
- 5 Fatherhood in the African Context: Review and a Case Study in Kenya** 87
Amina Abubakar, Stanley W. Wanjala,
and Anneloes L. Van Baar
- 6 Sibling Caregiving and Its Implications in Sub-Saharan Africa** 99
Maureen Mweru

Part III Biomedical Influences on Child Development

- 7 Infections of the Central Nervous System and Child Development in Sub-Saharan Africa** 117
Amina Abubakar

- 8 The Impact of Helminth Infections on Developmental and Educational Outcomes** 133
Margaret Nampijja
- 9 Diabetes in Sub-Saharan African Children: Risks, Care, and Challenges.** 157
Given Hapunda and Frans Pouwer
- 10 Nutritional Influences on Child Development in Africa** 173
Melissa Gladstone

Part IV Methodological Considerations

- 11 How to Adapt Tests for Sub-Saharan Africa** 197
Amina Abubakar and Fons J.R. van de Vijver
- 12 The Potential of Qualitative Research for Applied Developmental Science in Sub-Saharan Africa** 213
Carolyn Demuth
- 13 Ethical Issues in Conducting Child Development Research in Sub-Saharan Africa** 231
Cheryl D. Foxcroft
- 14 Doing Human Development Scholarship in Africa Within the Crosscurrents of Euro-Western Intellectual Cascades** 259
A. Bame Nsameng

Part V Intervention Strategies

- 15 Potential Uses of Computer-Based Cognitive Rehabilitation Programs** 281
Bryan Novak, Bruno Giordani, Michael Boivin, and Brian Winn
- 16 A Mediation Intervention for Sensitizing Caregivers (MISC): A Cross-Cultural Early Intervention** 291
Pnina S. Klein, Cilly Shohet, and Deborah Givon
- 17 A Culturally Sensitive Approach to Promoting Initial Literacy Development in Africa: Ongoing and Planned Research and Development at the University of Zambia's Centre for Promotion of Literacy in Sub-Saharan Africa (CAPOLSA)**..... 313
Robert Serpell, Jacqueline Jere-Folotiya, Tamara Chansa-Kabali, Jonathan Munachaka, Mwanza Nakawala Maumbi, Christopher Yalukanda, Francis Sampa, and Heikki Lyytinen

| | | |
|---|---|------------|
| 18 | Community-Based Rehabilitation for Human Development in Sub-Saharan Africa | 335 |
| | Elias Mpofu, Lisa Lopez Levers, Jonathan Makuwira, Kumbirai Mpofu, and George Mamboleo | |
| 19 | Education for All or Literacy for All? Evaluating Student Outcomes from Save the Children’s Literacy Boost Program in Sub-Saharan Africa | 347 |
| | Elliott Friedlander, Amy Jo Dowd, Jarret Guajardo, and Lauren Pisani | |
| Part VI From Research to Policy and Practice | | |
| 20 | Using Research to Influence Policy and Practice: The Case of the Pathways-to-Resilience Study (South Africa) | 373 |
| | Linda C. Theron | |
| | Author Index | 389 |
| | Subject Index | 415 |

Contributors

Amina Abubakar Department of Culture Studies, Tilburg University, Tilburg, The Netherlands

Anneloes L. Van Baar Department of Child and Adolescent Studies, Utrecht University, Utrecht, The Netherlands

Michael Boivin Department of Psychiatry, Michigan State University, East Lansing, MI, USA

Marc H. Bornstein Eunice Kennedy Shriver National Institute of Child Health and Human Development, Bethesda, MD, USA

Robert H. Bradley Family and Human Dynamics Research Institute, Arizona State University, Tempe, AZ, USA

Pia Rebello Britto UNICEF, New York, NY, USA

Christopher J. Burant Frances Payne Bolton School of Nursing, Case Western Reserve University, Cleveland, OH, USA

Tamara Chansa-Kabali Psychology Department, University of Zambia, Lusaka, Zambia

Kevin Connolly (deceased) University of Sheffield, Sheffield, UK

Kirby Deater-Deckard Department of Psychological and Brain Sciences, University of Massachusetts, Amherst, MA, USA

Carolyn Demuth Department Communication and Psychology, Center for Developmental and Applied Psychological Science (CeDAPS), Aalborg University, Aalborg, Denmark

Amy Jo Dowd Save The Children, New York, NY, USA

Cheryl D. Foxcroft Higher Education Access and Development Services, Nelson Mandela University, South Africa

Elliott Friedlander Friedlander Research, New York, NY, USA

Bruno Giordani Department of Psychiatry, University of Michigan, Ann Arbor, MI, USA

Deborah Givon School of Education, Bar Ilan University, Ramat Gan, Israel

Melissa Gladstone Department of Women and Children's Health, Institute of Translational Medicine, University of Liverpool, Liverpool, UK

Jarret Guajardo Save The Children, New York, NY, USA

Given Hapunda Department of Psychology, University of Zambia, Lusaka, Zambia

Penny Holding Independent Consultant, Nairobi, Kenya

Jacqueline Jere-Folotiya Psychology Department, University of Zambia, Lusaka, Zambia

Heidi Keller Department Culture and Development, University of Osnabrueck, Osnabrueck, Germany

Patricia Kadzo Kitsao-Wekulo Education and Youth Empowerment Unit, African Population and Health Research Center, Nairobi, Kenya
University of KwaZulu-Natal, Durban, South Africa
KEMRI/Wellcome Trust Research Programme, Kilifi, Kenya

Pnina S. Klein School of Education, Bar Ilan University, Ramat Gan, Israel

Jane Kvalsvig School of Nursing and Public Health, University of KwaZulu-Natal, Durban, South Africa

Jennifer E. Lansford Sanford School of Public Policy, Duke University, Durham, NC, USA

Lisa Lopez Levers Department of Counseling, Psychology and Special Education, Duquesne University, Pittsburgh, PA, USA

Heikki Lyytinen Department of Psychology, University of Jyväskylä, Jyväskylän yliopisto, Finland

Jonathan Makuwira Department of Development Studies, Nelson Mandela Metropolitan University, Port Elizabeth, South Africa

George Mamboleo Department of Counseling, Rehabilitation Counseling, and Counseling Psychology, West Virginia University, Morgantown, WV, USA

Mwanza Nakawala Maumbi Center for the Promotion of Literacy in Sub-Saharan Africa, University of Zambia, Lusaka, Zambia

Nori Minich Department of Pediatrics (University Hospitals Case Medical Center), Case Western Reserve University, Cleveland, OH, USA

Riku Moriguchi Einstein College of Medicine, Bronx, NY, USA

Elias Mpofo Faculty of Health Sciences, University of Sydney, Sydney, NSW, Australia

Kumbirai Mpofo Department of Teaching and Education, Western Sydney University, Bankstown, NSW, Australia

- Jonathan Munachaka** Department of Educational Psychology Sociology and Special Education, University of Zambia, Lusaka, Zambia
- Maureen Mweru** Department of Early Childhood Studies, Kenyatta University, Nairobi, Kenya
- Margaret Nampijja** MRC/UVRI Uganda Research Unit on AIDS, Entebbe, Uganda
- Bryan Novak** Department of Mathematics, University of Missouri, Columbia, MO, USA
- A. Bame Nsamenang** Emeritus Professor of Psychology, University of Bamenda, Bamibli, Cameroon
- Paul Oburu** Department of Psychology, Maseno University, Kisumu, Kenya
- Hiltrud Otto** Department of Psychology, Stellenbosch University, Stellenbosch, South Africa
- Lauren Pisani** Save The Children, New York, NY, USA
- Frans Pouwer** Department of Psychology, South Danish University, Odense, Denmark
- Diane L. Putnick** Eunice Kennedy Shriver National Institute of Child Health and Human Development, Bethesda, MD, USA
- Francis Sampa** USAID/Zambia Read To Succeed Project, Lusaka, Zambia
- Robert Serpell** Psychology Department, University of Zambia, Lusaka, Zambia
- Cilly Shohet** School of Education, Bar Ilan University, Ramat Gan, Israel
- H. Gerry Taylor** Department of Pediatrics (University Hospitals Case Medical Center), Case Western Reserve University, Cleveland, OH, USA
- Linda C. Theron** Centre for the Study of Resilience, Faculty of Education, University of Pretoria, Pretoria, South Africa
- Fons J.R. van de Vijver** Department of Culture Studies, Tilburg University, Tilburg, The Netherlands
- Stanley W. Wanjala** Department of Social Sciences, Pwani University, Kilifi, Kenya
- Brian Winn** Department of Media and Information, Michigan State University, East Lansing, MI, USA
- Christopher Yalukanda** Zambia National Union of Teachers, Lusaka, Zambia

About the Editors

Amina Abubakar, Ph.D., is an Associate Professor of Psychology and Public Health at Pwani University, Kenya, and a Research Fellow at the Kenya Medical Research Institute/Wellcome Trust Research Programme. She co-leads the Neuroscience research group at KEMRI-WTRP. She is also an honorary fellow at the Department of Psychiatry, University of Oxford, UK and Department of Culture Studies at Tilburg University, the Netherlands. Her main interests are in the study of developmental delays and impairments among children and adolescents exposed to various health problems such as HIV, malnutrition, and malaria. A focus in her work is the development of culturally appropriate strategies for identifying, monitoring, and rehabilitating at-risk children. She has (co)-authored more than 80 peer-reviewed journal articles and book chapters. She has served on technical working groups, and forums for various international organizations including the World Health Organization, National Academies of Sciences, Engineering and Medicine (USA), Save the Children, and Autism Speaks. She is actively involved in capacity building for African Scientists; she has supervised Postgraduate Diploma, Masters, and PhD students in Kenya. She has also supervised PhD students from South Africa, Tanzania, and Zambia.

Fons J.R. van de Vijver, Ph.D., holds a chair in cross-cultural psychology at Tilburg University, the Netherlands, and an extraordinary chair at North-West University, South Africa, and the University of Queensland, Australia. He has published more than 500 papers and chapters, mainly in the domain of cross-cultural psychology. His research focuses on bias and equivalence, psychological acculturation and multiculturalism, cognitive similarities and differences, response styles, and translations and adaptations. He supervises about 40 Ph.D. and 5 postdoctoral students. He has teaching experience in cross-cultural psychology and methods/statistics. Dr. van de Vijver has presented keynotes and invited lectures at various conferences and workshops in various countries. He is one of the most frequently cited cross-cultural psychologists in Europe.

In addition, Dr. van de Vijver has received grants from various Dutch institutions (e.g., NWO and WOTRO), European Union (e.g., Marie Curie), South African Netherlands Research Programme on Alternatives in Development, and South African National Research Foundation. He is member of several professional organizations, including the International Association for Cross-Cultural Psychology, International Association of

Applied Psychology, European Association of Psychological Assessment, International Academy for Intercultural Research, and the International Test Commission.

Dr. van de Vijver is the former editor of the *Journal of Cross-Cultural Psychology* and serves on the board of various journals; he has evaluated manuscripts for over 100 journals as ad hoc reviewer. He has been vice dean for research and vice dean for education of his faculty and vice director of Babylon, the interdisciplinary research center for studies of multicultural societies at Tilburg University. He was a former president of Division 2 (Assessment and Evaluation) of the International Association of Applied Psychology and the European Association of Psychological Assessment. He is the President of the International Association for Cross-Cultural Psychology.

Part I

Introductory Note

Amina Abubakar and Fons J.R. van de Vijver

Rationale for the Book

Africa is a continent with many young people (United Nations, 2015). In 2015, it was estimated that 41% of Africa's population were children less than 15 years of age (United Nations, 2015). Moreover, projections indicate that if the population growth continues at the current rate, by 2050 half of the world's children will be living in Africa. This population boom has the potential to provide the necessary workforce to propel Africa to economic prosperity, which has so far been elusive. These children can only be an opportunity for Africa if they are thriving and doing well. Statistics so far show that African children represent a large proportion of children from low- and middle-income countries (LMICs) who are failing to achieve their potential (McCoy et al., 2016). Due to exposure to various risk factors, such as infectious diseases, poor nutritional status, and chronic poverty, millions of children in LMICs are at risk of not achieving their potential (Lu, Black, & Richter, 2016; Walker et al., 2007; Walker et al., 2011). A recent analysis of data from 2010 indicated that a significant proportion of children in LMICs are at risk of

experiencing poor development. According to McCoy et al. (2016):

We estimate that 81.0 million children ages 3 and 4 y (95% CI 49.2 million, 113.3 million) in LMICs experienced low cognitive and/or socioemotional development in 2010, with the largest number of affected children in sub-Saharan Africa (29.5 million; 44.0% of children ages 3 and 4 y), followed by South Asia (27.8 million; 37.8%) and the East Asia and Pacific region (15.2 million; 26.0%). (p. 2)

Moreover, these authors noted that low development scores were associated with stunting, poverty, male sex, rural residence, and lack of cognitive stimulation (McCoy et al., 2016). It is, therefore, important to develop intervention programs and strategies to address developmental problems faced by African children if these children are to achieve their promise of propelling Africa's development. Therefore, a book such as the current handbook which synthesizes the evidence is highly needed and timely as it contributes toward offering practitioners and policy makers a resource for their work.

The second reason for the book arises from the underrepresentation of African research and findings in developmental science. In general, psychology as a field is highly skewed (Arnett, 2008). Most of the empirical work informing psychological theories emanates from North America and Western Europe (Tomlinson & Swartz, 2003) with very limited data coming from resource-con-

A. Abubakar (✉) • F.J.R. van de Vijver
Department of Culture Studies, Tilburg University,
Tilburg, The Netherlands
e-mail: A.AbubakarAli@uvt.nl

strained settings, such as sub-Saharan Africa (Marfo, Pence, LeVine, & LeVine, 2011). This underrepresentation of Africa calls for concerted efforts to broaden the database and to synthesize the existing knowledge base so as to make existing data more available to stakeholders.

Finally, several scholars, such as Marfo, Pence, Serpell, and Nsamenang, have argued that even the little data arising from Africa is “Eurocentric in nature” (Marfo, 2016; Marfo et al., 2011; Pence & Marfo, 2008). The core of their argument is that the extant literature is based on conceptualizations and theoretical backgrounds developed in North America and Western Europe (Marfo, 2016). They further note that the data collection methods and measurement procedures so far utilized in Africa were also largely developed in North America and Europe. Consequently, Africans have hardly had an opportunity to address the concerns of the continent from their point of view. These scholars argue that when studies are largely informed by Western theoretical and methodological approaches, they may fail to acknowledge complex cultural issues leading to biased results. This book addresses these concerns at various levels. First, among the authors, there is a good representation of African-based scholars and of scholars who have actively engaged in research in Africa over a prolonged period. The authors of the different chapters bring a wealth of experience from field work in Africa, thus providing an in-depth understanding of the developmental issues from an African perspective. Moreover, a lot of attention is paid to discussing methodological approaches that enhance the cultural sensitivities while carrying out studies in Africa. Here, for instance, we look at the potential of qualitative research in Africa, highlight approaches for developing tests in Africa, and discuss alternative Afrocentric approaches for doing research. We hope that this extensive approach to dealing with methodological concerns will provide the readers with a rich source of information to develop their appreciation of sociocultural influences in developmental psychology and would contribute toward more culturally sensitive work emanating from Africa.

The publication of this book is not meant to contribute to an indigenous African psychology that is independent of Western psychology. In our view, indigenous psychologies should enrich and be enriched by Western psychology. African developmental science can enrich developmental science in general as the continent harbors many unique cultural contexts for development. Studying how these contexts affect development will enable us to understand differences and similarities with non-African contexts. A truly universal psychology integrates studies done in multiple contexts so as to provide models that overcome the existing Western bias.

Principles Guiding This Book

In developing and shaping this book, we have been guided by principles arising from selected theoretical frameworks whose usefulness has been observed in various studies across the African context. In this section, we discuss these principles briefly. The starting point of the selected frameworks is that all development is “development in context” and that human development should always be interpreted in context.

Human Development Is Influenced by Multiple Layered Environments

In line with the bioecological model, in this book human development is approached as resulting from the influence of both biological and environmental influences. The book has been designed using the core tenets of a bioecological framework which indicates that the course of child development is shaped and influenced by both biological and environment factors including a child’s day-to-day experiences (Sameroff, 1998). According to this framework, developmental and behavioral outcomes are caused by ongoing reciprocal interactions between individuals and their environment (Bronfenbrenner, 1979; Bronfenbrenner & Ceci, 1993; Sameroff & Chandler, 1975). Child development happens in relationship with and as an inseparable part of

the child's social context. According to the bioecological model, child development is shaped by conjoint and interactive effects of individual characteristics (e.g., health, age, and personality) with contextual factors (e.g., parenting behavior and socioeconomic status) (Bronfenbrenner, 1977; Sameroff, 1998). The ecological environment of the individual is seen as a set of nested structures, representing the microsystem, mesosystem, exosystem, and macrosystem. The *microsystem* is the most influential to the child since it consists of persons and institutions that directly interact with the child and stimulate or hinder developmental outcome. In this book, the microsystem is addressed through aspects such as examining the influences of maternal and paternal behavior, quality of stimulation at home, and sibling caregiving. The next layer is the *mesosystem*, which represents how the interaction between the persons and institutions in the microsystem influences child growth and development. The third level is the *exosystem*, which is made up of persons and institutions that do not directly interact with the child but whose activities indirectly impact on the child's development, like conditions at work for the parents. The world views, ideologies, and customs of specific cultural groups compose the *macrosystem*. This level affects child development through its influence on behavior and activities of adults surrounding the child (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 1998). Contextual factors are hierarchically organized from the most distal macro-context (e.g., culture) to the most proximal micro-contextual factors (e.g., familial characteristics). Proximal micro-contextual factors exert relatively stronger influences in shaping outcomes than distal macro-contextual factors (Wachs & Rahman, 2013).

In refining the bioecological model to better suit risk and protective factors in the LMICs, Wachs and Rahman (2013) note three important points. Firstly, most of these risk factors covary (cluster); that is, children experiencing one risk factor (e.g., poverty) are at a higher probability of experiencing another one (e.g., exposure to pathogens) due to the lack of access to clean

water and adequate sanitation which in turn contributes to malnutrition due to wastage of consumed nutrients (see Fig. 1.1).

Secondly, given this clustering of various risk factors, the influence of a single risk factor may not be that strong, but the accumulation of risk is what tends to be most adverse for childhood outcomes. Lastly, in the examination of the different hierarchical contexts, risk factors could be divided into biological and psychosocial risk within the same level. For instance, within the microsystem, the biological risk would include infections and nutritional status, while psychosocial risk would include parental and caregiver characteristics (Wachs & Rahman, 2013) (see Fig. 1.1 for an illustration).

Sociocultural Niche as an Important Factor in Shaping Human Development

Influenced by anthropological traditions, cultural and cross-cultural psychology has gathered evidence to show that the socio-ecological-cultural niche within which a child grows up has a strong influence on child development (Harkness & Super, 1994; Weisner, 2002; Worthman, 2016). Early, very striking results showed that while the trajectory of child development may largely proceed in a similar manner, the pace and rate at which children acquire different skills and the value that is placed on the different skills may range sharply partly due to the sociocultural and ecological niches they are growing up in. For example, early research unveiled what was referred to as "African precocity" (Geber, 1958; Super, 1976; Warren, 1972) [note that some authors and scholars have criticized the use of this term since it takes a Eurocentric view of child development, as children from North America and Europe are taken to provide the standard rate of development, which is why African children were considered precocious]. During this period, it was reported that across numerous societies in Africa, children acquire early motor skills much faster (or at a relatively earlier age than children from Western countries). Paradoxically, it was

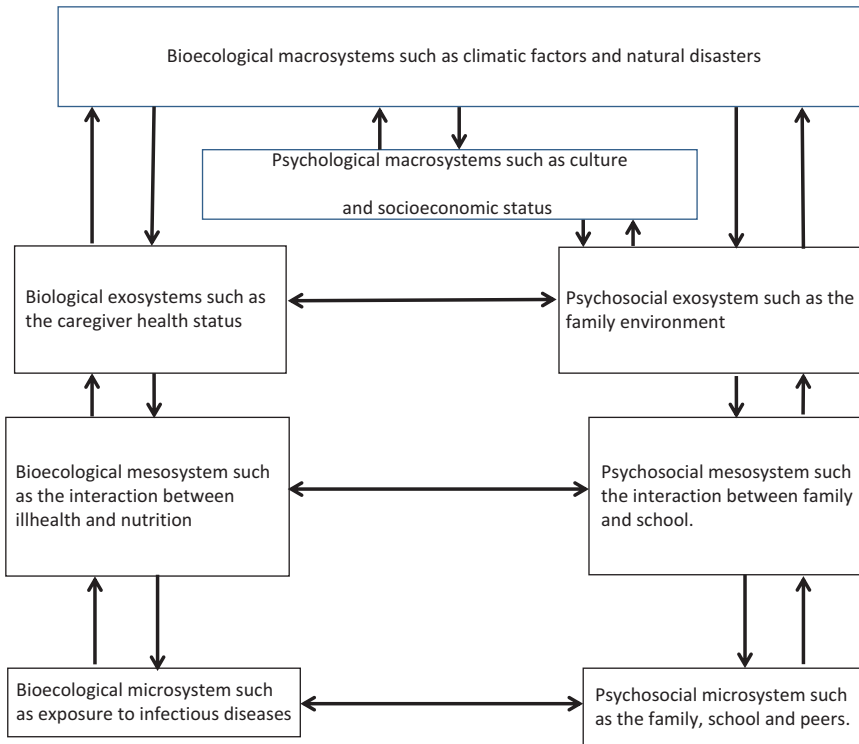


Fig. 1.1 An integrated model of biological and psychosocial environment. *Note:* This figure has been reprinted from Wachs (2003) with permission

simultaneously noted that around the age of 24 months or so, African children started slowing down until they eventually perform worse than children from other regions of the world (largely from those from North America and Western Europe where a lot of published data existed).

These observed differences in cross-cultural child development have been attributed to various factors. One potential source of cross-cultural variation in child development is caregivers' beliefs and practices regarding child development (Harkness & Super, 1996). For instance, it has been observed that African parents spend a lot of time with their children on motor activities. During these activities, they massage their children, place them in a sitting position early in life, and provide other activities to stimulate motor development. The range of these activities is thought to contribute to the early acquisition of motor skills in this context. Similar reports on the impact of parental beliefs and practices on child

development have been recorded with other development domains. For instance, in the 1970s, De Vries and De Vries reported that among the Digo's of Kenya, children were toilet trained very early in life [on average by 6 months] (De Vries & De Vries, 1977). This was achieved because the Digo's believed that children were capable of learning right from the very moment of birth (De Vries & De Vries, 1977). Consequently, Digo mothers started training their children while they were neonates. Digo mothers were observed to place the children on their laps and encourage them (through a hissing sound) to urinate. The training by Digo mothers was carried out at a scheduled time and in a consistent manner. Based on these practices, children were observed to have been toilet trained by 6 months on average which was almost 24 months faster than Kikuyu children and children from Western Europe.

Another source of cross-cultural variations in child development is what are considered adaptive

child-rearing practices adopted by each community to maximize the potential for the survival of not just the child but the whole community. An example of this can be seen from the work of Ed Tronick among the Efe in Congo (Tronick, Morelli, & Ivey, 1992). In a series of ethnographic work, Ed Tronick observed that among the Efe, a series of birth rites and rituals are carried out whose key aim was to ensure the child bonds to multiple caregivers (Tronick, 2007). For instance, in the first few days of life, a child is handled and breastfed by multiple adults. These activities were carried out to ensure that the children bonded with multiple caregivers so that if their mother passed away, they would still have an alternative caregiver. This kind of thinking was adaptive in a society where maternal mortality was extremely high. Moreover, the Efe lived in the forest, as a community they were exposed to an extremely high number of pathogens. For their young ones, building up immunity early in life was a key strategy in enhancing their survival chances. Exposing children to numerous adults early in life ensured that the children were exposed to a variety of pathogens.

Culturally Sensitive, Contextually Relevant, and Evidence-Based Intervention Can Make a Positive Change

We started the chapter by highlighting the numerous challenges on child development largely because early childhood is especially sensitive to brain insult. Under the right condition, the early years provide a great opportunity for recovery due to brain plasticity (Anderson, Spencer-Smith, & Wood, 2011). Empirical evidence from both basic and intervention science indicates that early childhood is a period of special sensitivity to experiences that promote development and that critical time windows exist when the benefits of early childhood development interventions are amplified (Black et al., 2017; Britto et al., 2017). The evidence indicates that intervention is most efficacious when implemented in the first 2 years of the

child's life, is targeted to the neediest, and uses multiple delivery channels (Pelto, Dickin, & Engel, 1999). Moreover, nurturing care and protection received from parents, family, and community has lifelong benefits including improved health and wellbeing and increased the child's ability to learn and earn. Britto and colleagues have defined nurturing care as "a stable environment that is sensitive to children's health and nutritional needs, with protection from threats, opportunities for early learning, and interactions that are responsive, emotionally supportive, and developmentally stimulating" (Britto et al., 2017, p. 91).

Given the fact that child development in LMICs is impacted on by multiple factors, an intervention targeting multiple areas (i.e., development, nutrition, social protection, and education) is likely to have the most benefit (Aboud & Yousafzai, 2015; Jensen et al., 2015). However, some sectors, such as health services, have been proposed as good entry point to establish contact with pregnant women (Richter et al., 2017), which provides the opportunity to implement interventions prenatally.

Additionally, while there are sensitive periods for intervention, it must be emphasized that both preventive and rehabilitative programs at any period of life are important to enhancing developmental outcomes. (Figure 1.2 presents some of the important interventions across the lifespan.) For resource limited settings such as sub-Saharan Africa, affordability and sustainability are key for the usefulness of any given intervention. Consequently, interventions that can use community-based, low-cost support programs are potentially very useful.

Lastly, moving an intervention from one cultural context to another without adequate adaptation may reduce or even eliminate its effects. It has been urged that it is important to ensure that every aspect of the intervention is tailored to its physical and cultural context. Some scholars have gone as far as suggesting that it is important to acknowledge that existing practices within the communities themselves can be rich sources of information to help plan targeted programs (Sternin, Sternin, & Marsh, 1998).

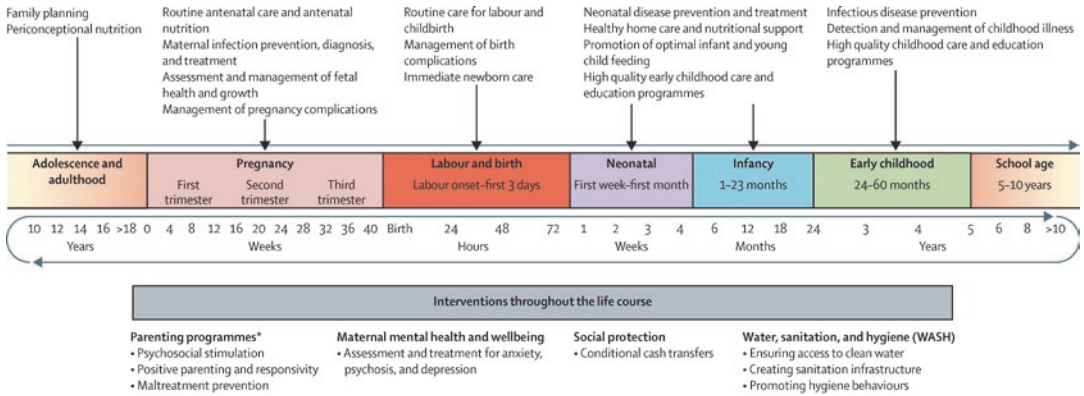


Fig. 1.2 Framework to promote young children through a multisectoral approach. *Note:* This figure has been reprinted from Britto et al. (2017) with permission

Our book is rich in examples of intervention strategies that have been tried and tested in sub-Saharan African settings and found to contribute significantly to improving outcomes for these children.

Overview of the Book

This introductory chapter forms the *first section* of this book. In this chapter, we have provided a rationale for the book, summarized the theoretical and conceptual issues guiding the book, and lastly, summarized the chapters in the book. This information provides the reader with a brief overview of the book. The *second section* of the book discusses the role of psychosocial factors in shaping child development. Parenting behaviors especially the home environment are discussed in two chapters. Moreover, given the specific caregiving context of Africa, we also discussed the role of alternative caregivers especially siblings and fathers. The chapter by *Bornstein et al.* forms the central chapter of this section. It presents data from more than 14 African countries and describes the contemporary situation of children in sub-Saharan Africa with successive foci on child growth, the home environment, parenting, and discipline, using data from the Multiple Indicator Cluster Survey (MICS). The MICS is a nationally representative, internationally compa-

table household survey implemented to examine protective and risk factors of child development in developing countries. The chapter is unique in its use of population-based data to provide results from a national representative sample. The chapter concludes with some policy implications from these findings. *Wekulo-Kitsao et al.* link to the discussion from the previous chapter by focusing on the quality and quantity of stimulation in the home. In a study involving school-aged children in Kenya, the authors provide a detailed description of the home environment before examining the role of the home environment in promoting cognitive and motor functioning in middle childhood. Consistent with what has been reported from other parts of the world, they report that a stimulating home environment, where the child is exposed to a variety of toys, learning materials, and experiences, contributes positively to child development. *Otto and Keller* present data from their work among the Nso in Cameroon. In this chapter, they illustrate the cultural specificities of early socioemotional development in Cameroonian Nso children. They first introduce the cultural models of autonomy and relatedness as a conceptual framework to explain different belief and meaning systems shared by different cultural groups. They investigate Cameroonian Nso parental beliefs, their parenting practices, and their children's formation of attachment relationships and compare these results with those

from middle-class German families. They conclude that the Nso families are more oriented toward relatedness and their early parenting behavior is more aimed at fostering relatedness which is in contrast to middle-class Western families and their orientation toward psychological autonomy in their socialization goals, caregiving strategies, and resulting attachment patterns. The following two chapters address, among other things, the policy and research implications of caregiving contexts. *Abubakar and Van Baar* review the limited data available on fatherhood in Africa. The review is supplemented with original data on the role of fathers from the point of view of both mothers and fathers from a rural setting in Kenya. The final chapter in this section is that by *Mweru* who addresses sibling relationships and its implications for the cognitive, social, and emotional development of children. She presents data from her work in Kenya to provide insight into the role of sibling relationships in shaping childhood outcomes.

Section 3 reviews and highlights the developmental problems associated with various medical conditions in Africa. *Abubakar* reviews the neurocognitive, mental health, and educational problems associated with infectious diseases. Two common infectious conditions are extensively reviewed (i.e., malaria and HIV) highlighting not only cognitive deficits associated with them but also discussing potential moderators and mediators. The chapter also reviews the impact of less well-known and studied conditions such as meningitis, neonatal sepsis, and jaundice. The key finding from this review is that different infectious diseases significantly and negatively impact on neurocognitive, mental, and education outcomes of children, thus contributing to them failing to achieve their potential. Additionally, it is noted that biomedical and psychosocial risk factors often interact to exacerbate the negative impact of different medical conditions, thus highlighting the need for interventions that are informed by both biomedical and psychosocial models. The second chapter in this section is by *Nampijja*; in this chapter, *Nampijja* looks at the cognitive effects of helminth infections on child development. The chapter starts by reviewing the

literature on the cognitive impact of worm infection and deworming. The author then presents data from a large-scale study which investigated the impact of deworming on cognitive development. The results indicated that worm infection has a small effect on cognitive and executive function; these functions seem to be especially vulnerable to the negative effects of parasitic infections. The third article in this section is by *Hapunda and Pouwer*; they review an increasingly important, yet understudied problem, namely, the effects of diabetes in sub-Saharan Africa. Given the emphasis on communicable diseases, noncommunicable diseases rarely receive a lot of attention in the African context. This much-needed chapter raises awareness of the epidemiology of diabetes and its psychosocial consequences. The last chapter in this section is by *Gladstone*, and it highlights the impact of malnutrition on child development. The chapter starts by discussing the biological mechanisms by which malnutrition impacts on child development. It then goes on to discuss the neurocognitive and neurodevelopmental impacts of malnutrition from studies largely carried out in sub-Saharan Africa. The chapter takes a developmental perspective where data on the impact of malnutrition are presented based on the timing of malnutrition as the impact of malnutrition is expected to be moderated by timing and chronicity of exposure.

The *fourth section* in this book addresses methodological considerations when carrying out developmental science studies in Sub-Saharan Africa. The section starts with a chapter by *Abubakar and Van de Vijver* which discusses approaches to developing tests and scales for use in Africa. The chapter presents a systematic procedure that can be used to carry different processes (i.e., adoption, adaptation, or assembly) alongside approaches for evaluating the level of success in providing an adequate measure for the context in which they are working. The chapter by *Demuth* addresses how qualitative research can fruitfully contribute to applied developmental science in sub-Saharan Africa. *Demuth* argues that qualitative methodologies, particularly ethnographically informed discourse analysis,

provide empirical procedures that allow for the development of a culture-sensitive developmental science. The next chapter by *Foxcroft* discusses ethical issues around child development research in sub-Saharan Africa. Foxcroft notes that while some of the ethical challenges experienced in Africa are common in child development research internationally, some have a uniquely developing world or African flavor to them. The last chapter in this section is by *Nsamenang*. He raises issues and challenges pertaining to research in Africa upstream Euro-American intellectual traditions and scientific ethos. His chapter focuses on developing theories and methodologies that are rooted in and applicable in Africa.

Section 5 presents various state-of-the-art intervention strategies that have been found to hold great promise in improving developmental outcomes of children in sub-Saharan Africa. In the first chapter, *Novak and colleagues* discuss the development and initial field trial of the latest prototype computerized cognitive rehabilitation training program developed by Michigan State University's Games for Entertainment and Learning Lab. *Klein and colleagues* present a theoretical and practical framework for early intervention. The chapter describes the process of a Mediation Intervention for Sensitizing Caregivers (MISC) of infants and young children. The MISC is primarily concerned with enhancing parents' or caregiver's ability to provide children with quality interaction, consequently affecting their need system and creating dispositions that are essential for future learning. This chapter presents the basic reasons for implementation, processes of intervention, and outcomes of the MISC approach to early intervention, with a special emphasis on the implementation of the MISC in Ethiopia, Uganda, and Kenya and its potential relevance for other countries in Africa. The chapter by *Serpell and colleagues* presents a 4-year research and development program at CAPOLSA (the Centre for Promotion of Literacy in sub-Saharan Africa), aimed at enhancing literacy levels among Zambian children. The process of culturally adapting and evaluating a computer-mediated instructional resource devel-

oped in Finland, for effective intervention in an African society, is discussed in detail. Community-based rehabilitation strategies are the focus of the chapter by *Mpofu and colleagues*. The chapter highlights the fact that CBR remains the most viable instrument for human development support in the sub-Saharan African region. The next chapter by *Friedlander and colleagues* discusses how Literacy Boost, a program based on findings from the mainly developed world literature, functions when it is placed in the sub-Saharan African context. Using data from schools in three countries in sub-Saharan Africa, they describe Literacy Boost and outline the research upon which Literacy Boost was designed. Moreover, the positive impact of Literacy Boost on the reading skills of students is reported.

In the *last chapter* of this book, *Theron* advocates the usage of research evidence to inform policy and practice. Theron urges that in resource-constrained settings such as those in sub-Saharan Africa where disadvantage is rife, researchers have a duty to apply credible research results toward enabling improved life-worlds, above all for children and young people. Drawing on her previous work with the Pathways to Resilience Study, South Africa, Theron demonstrates how authentic researcher-community collaborations support policy and practice uptake of research results.

Conclusion

Historically, psychology is firmly rooted in Western culture. It has taken very long to appreciate the link between its models and theories to its cultural context. Fields like developmental science and cross-cultural psychology were and are instrumental in overcoming the spatiotemporal limitations of Western psychology. A truly universal psychology should accommodate differences in behaviors across a wide variety of cultures. Africa and in particular sub-Saharan Africa have not played a strong role in psychology. However, after an era in which the need for African input in psychology was expressed strongly, we now seem to move to an era in which

African psychologists and studies conducted in Africa indicate how African can contribute to psychology, notably to studies that link the unique African context to psychological functioning. Important characteristics of this work were illustrated in the book, such as studies of the psychological sequelae of infections, hunger, or tropical diseases, the consequences of poverty, caregiving beyond the nuclear family, procedures to adapt psychological tests, and an emphasis on policy-relevant and immediately applicable research findings. A final hallmark of this work is the emphasis on high-quality methodology. Quality standards are maintained, both in quantitative and qualitative work. We hope that this book contributes to the further development of African psychology. We do not see African psychology as a discipline that is independent of Western psychology. Rather, African psychology can enrich and be enriched by psychologies from other parts of the world so that our discipline becomes more inclusive and our results more widely applicable and, hopefully, applied.

References

- Aboud, F. E., & Yousafzai, A. K. (2015). Global health and development in early childhood. *Annual Review of Psychology, 66*, 433–457.
- Anderson, V., Spencer-Smith, M., & Wood, A. (2011). Do children really recover better? Neurobehavioural plasticity after early brain insult. *Brain, 134*, 2197–2221.
- Arnett, J. J. (2008). The neglected 95%: Why American psychology needs to become less American. *American Psychologist, 63*, 602–614.
- Black, M. M., Walker, S. P., Fernald, L. C., Andersen, C. T., DiGirolamo, A. M., Lu, C., ... Devercelli, A. E. (2017). Early childhood development coming of age: Science through the life course. *The Lancet, 389*(10064), 77–90.
- Britto, P. R., Lye, S. J., Proulx, K., Yousafzai, A. K., Matthews, S. G., Vaivada, T., ... the Early Childhood Development Interventions Review Group. (2017). Nurturing care: Promoting early childhood development. *The Lancet, 389*(10064), 91–102.
- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist, 32*, 513.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Bronfenbrenner, U., & Ceci, S. J. (1993). *Heredity, environment, and the question "How?": A first approximation*. Washington, DC: American Psychological Association.
- Bronfenbrenner, U., & Morris, P. A. (1998). The ecology of developmental processes. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology: Theoretical models of human development* (vol. 1, 5th ed., pp. 993–1029). New York, NY: Wiley.
- De Vries, W., & De Vries, R. (1977). Cultural relativity of toilet training readiness: A perspective from East Africa. *Pediatrics, 60*, 170–177.
- Geber, M. (1958). The psycho-motor development of African children in the first year, and the influence of maternal behavior. *The Journal of Social Psychology, 47*, 185–195.
- Harkness, S., & Super, C. M. (1994). The developmental niche: A theoretical framework for analyzing the household production of health. *Social Science & Medicine, 38*, 217–226.
- Harkness, S., & Super, C. M. (Eds.). (1996). *Parents' cultural belief systems: Their origins, expressions, and consequences*. New York, NY: Guilford Press.
- Jensen, S. K., Bouhouch, R. R., Walson, J. L., Daelmans, B., Bahl, R., Darmstadt, G. L., & Dua, T. (2015). *Enhancing the child survival agenda to promote, protect, and support early child development*. Paper presented at the Seminars in Perinatology.
- Lu, C., Black, M. M., & Richter, L. M. (2016). The risk of poor development in young children in low-income and middle-income countries: An estimation and analysis at the global, regional, and country level. *The Lancet Global Health, 4*(12), e916–e922.
- Marfo, K. (2016). Context and the advancement of a global science of human development: A commentary. *Monographs of the Society for Research in Child Development, 81*, 172–182.
- Marfo, K., Pence, A., LeVine, R. A., & LeVine, S. (2011). Strengthening Africa's contributions to child development research: Introduction. *Child Development Perspectives, 5*, 104–111.
- McCoy, D. C., Peet, E. D., Ezzati, M., Danaei, G., Black, M. M., Sudfeld, C. R., ... Fink, G. (2016). Early childhood developmental status in low-and middle-income countries: National, regional, and global prevalence estimate using predictive modeling. *PLoS Med, 13*, e1002034.
- Pelto, G., Dickin, K., & Engel, P. (1999). *A critical link, interventions for physical growth and psychological development: A review*. Retrieved from www.who.int/child_adolescent_health/newpublications
- Pence, A. R., & Marfo, K. (2008). Early childhood development in Africa: Interrogating constraints of prevailing knowledge bases. *International Journal of Psychology, 43*, 78–87.
- Richter, L. M., Daelmans, B., Lombardi, J., Heymann, J., Boo, F. L., Behrman, J. R., ... Bhutta, Z. A. (2017). Investing in the foundation of sustainable development: Pathways to scale up for early childhood development. *The Lancet, 389*(10064), 103–118.

- Sameroff, A. (1998). Environmental risk factors in infancy. *Pediatrics*, *102*, 1287–1292.
- Sameroff, A., & Chandler, M. J. (1975). Reproductive risk and the continuum of care-taking causality. In M. H. Horowitz, S. Scarr-Salapalek, & G. Siegel (Eds.), *Review of child development research* (pp. 187–244). Chicago, IL: University of Chicago Press.
- Sternin, M., Sternin, J., & Marsh, D. (1998). *Designing a community-based nutrition program using the hearth model and the positive deviance approach – A field guide*. Westport, CT: Save the Children.
- Super, C. M. (1976). Environmental effects on motor development: The case of 'African infant precocity'. *Developmental Medicine & Child Neurology*, *18*, 561–567.
- Tomlinson, M., & Swartz, L. (2003). Imbalances in the knowledge about infancy: The divide between rich and poor countries. *Infant Mental Health Journal*, *24*, 547–556.
- Tronick, E. (2007). *The neurobehavioral and social-emotional development of infants and children*. New York, NY: Norton.
- Tronick, E. Z., Morelli, G. A., & Ivey, P. K. (1992). The Efe forager infant and toddler's pattern of social relationships: Multiple and simultaneous. *Developmental Psychology*, *28*, 568.
- United Nations, D. o. E. a. S. A. (2015). World population prospects: The 2015 revision, key findings and advance tables. In W. P. N. ESA/P/WP.241 (Ed.), *Population division*. New York, NY: United Nations.
- Wachs, T. D. (2003). Expanding our view of context: The bio-ecological environment and development. Starting with the psychosocial environment. *Advances in Child Development and Behaviour*, *31*, 365–367.
- Wachs, T. D., & Rahman, A. (2013). The nature and impact of risk and protective influences on children's development in low-income countries. In *Handbook of early childhood development research and its impact on global policy* (pp. 85–122). New York, NY: Oxford University Press.
- Walker, S. P., Wachs, T. D., Gardner, J. M., Lozoff, B., Wasserman, G. A., Pollitt, E., ... Group, I. C. D. S. (2007). Child development: Risk factors for adverse outcomes in developing countries. *The Lancet*, *369*(9556), 145–157.
- Walker, S. P., Wachs, T. D., Grantham-McGregor, S., Black, M. M., Nelson, C. A., Huffman, S. L., ... Lozoff, B. (2011). Inequality in early childhood: Risk and protective factors for early child development. *The Lancet*, *378*(9799), 1325–1338.
- Warren, N. (1972). African infant precocity. *Psychological Bulletin*, *78*, 353.
- Weisner, T. S. (2002). Ecocultural understanding of children's developmental pathways. *Human Development*, *45*, 275–281.
- Worthman, C. M. (2016). Ecocultural theory: Foundations and applications. In M. C. Hay (Ed.), *Methods that matter: Integrating mixed methods for more effective social science research* (pp. 13–38). Chicago, IL: University of Chicago Press.

Part II

Social-Cultural Influences on Child Development

Parenting, Environment, and Early Child Development in Sub-Saharan Africa

2

Marc H. Bornstein, Diane L. Putnick, Paul Oburu,
Jennifer E. Lansford, Kirby Deater-Deckard,
Robert H. Bradley, Riku Moriguchi,
and Pia Rebello Britto

Early childhood is a critical period as rapid gains in physical, cognitive, and socioemotional domains of development constitute “building blocks” of children’s later growth. Despite consensus about the significance of early childhood, and what it portends about ontogeny in the balance of the life span, as well as the life-course consequences of both caregiving and the environments of early development, there is a surprising dearth of population-based multinational data from developing countries on the diverse experiences and conditions that promote or thwart child

well-being. Studies of development, caregiving, and context are requisite to encompass the full scope of childhood. However, context-related limitations continue to constrain our global understanding of child development and caregiving. A narrow participant database in the research literature is one of the major limitations. Perhaps only 10–20% of the body of developmental science emanates from regions of the world that account for perhaps 80–90% of the world’s population (Tomlinson, Bornstein, Marlow, & Swartz, 2014), and critics wisely reject broad generalizations derived from contextually restricted findings (Arnett, 2008; Bornstein, 2010; Henrich, Heine, & Norenzayan, 2010; Serpell, 1990). Thus, most of what is currently known about child development comes from studies of children in the minority developed world. Most of what is known about child development in the majority world of developing low- and middle-income countries (LMIC) still comes from studies of small samples in single locales, even if this situation is changing (for reviews, see Engle et al., 2007; Walker et al., 2007). Population-based multinational data from LMIC are indispensable for identifying countries, regions, and communities where children are at risk, crucial for monitoring which domains of child development are susceptible to which experiences, and necessary to expand the database on human development. Such data would also leverage better-informed national and international policies

M.H. Bornstein (✉) • D.L. Putnick
Eunice Kennedy Shriver National Institute of Child
Health and Human Development,
Bethesda, MD, USA
e-mail: Marc_H_Bornstein@nih.gov

P. Oburu
Department of Psychology, Maseno University,
Kisumu, Kenya

J.E. Lansford
Sanford School of Public Policy, Duke University,
Durham, NC, USA

K. Deater-Deckard
Department of Psychological and Brain Sciences,
University of Massachusetts, Amherst, MA, USA

R.H. Bradley
Family and Human Dynamics Research Institute,
Arizona State University, Tempe, AZ, USA

R. Moriguchi
Einstein College of Medicine, Bronx, NY, USA

P.R. Britto
UNICEF, New York, NY, USA

for early child development. Furthermore, taking such aggregates into account would improve our understanding of developmental trajectories for individuals and populations and help to ensure equality of opportunity to all children. The main aim of this chapter is to describe the contemporary situations of multiple domains of early child development across 14 developing sub-Saharan African countries.

Poverty in Sub-Saharan Africa

Sub-Saharan Africa (sometimes referred to as *Afrique Noire* or *Black Africa*) is a region best understood for its uniqueness, bewildering diversities, and perceived inconsistencies with Western paradigms of developmental science (Nsamenang & Lo-oh, 2010). Underlying apparent varieties are commonalities among its inhabitants that emanate from ecological adaptations and similarities in historical and present-day experiences. Some of the contextual influences on child development that set this region apart are its very low per capita income in comparison to other regions of the world, terrible burden of diseases including HIV/AIDS, numerous wars and conflicts resulting in displacements of persons, and high infant mortality and comparatively low child survival rates. The region also harbors numerous economically impoverished countries. Together, these factors render children in sub-Saharan Africa among the most disadvantaged.

The United Nations (UN, 2001, p. 2) defines poverty as “a human condition, characterized by the sustained or chronic deprivation of the resources, capabilities, choices, security and power necessary for the enjoyment of an adequate standard of living and other civil, cultural, economic, political and social rights.” The literature from the developed and developing worlds has cogently demonstrated numerous noxious links between child development and living in conditions of where families have little personal wealth and limited access to other forms of resources that support children’s health and competence. These associations are particularly important to bear in mind important, given esti-

mates of the millions of sub-Saharan children living in economically deprived circumstances (Harper, Marcus, & Moore, 2003).

Sub-Saharan-based knowledge remains largely uncharted territory (Nsamenang & Lo-oh, 2010). Almost all that is known about the region are by-products of European and American cultural precepts that were imported for the purpose of extending mainstream psychology (e.g., Pence & Nsamenang, 2008). Otherwise, issues pertaining to the region will continue to be disregarded or the likelihood of misinterpretation increased.

The MICS3

At the World Summit for Children held in 1990, the World Declaration on the Survival, Protection, and Development of Children and its Plan of Action in the 1990s were adopted. Signatory governments pledged to monitor progress toward achieving goals elaborated in the World Declaration. In response, UNICEF developed the Multiple Indicator Cluster Survey (MICS), a nationally representative and internationally comparable household survey for nation states to evaluate country-level progress of children and women in LMIC (UNICEF, 2006). The main purposes of the MICS are to support evidence-based policy formulation, assess trends, and measure disparities. The MICS plays a role in the global scene of planning and reporting on children and women, being a reliable source of data for many indicators that are difficult to find otherwise. The MICS is one of the main tools used to measure progress toward international goals, such as the Millennium Declaration, the Millennium Development Goals (MDGs), and the Sustainable Development Goals (SDGs).

The findings we report in this chapter come from wave 3 of the MICS (MICS3) administered between 2005 and 2010, representing more than 72,000 0- to 4-year-old children in 14 sub-Saharan African countries (Fig. 2.1). We used data from three of the five MICS3 Questionnaires. The Household Questionnaire

Fig. 2.1 14 Sub-Saharan African countries in this study



assesses education level and schooling of household members, water and sanitation, and support to children. The Questionnaire for Individual Women assesses maternal and newborn health. The Questionnaire on Children under Five assesses birth registration, early learning, and anthropometry. We used these MICS3 data to focus on four areas of child life: physical growth, household resources, caregiving, and discipline and violence. Although these multiple domains of child development are interlocked (Elder, Shanahan, & Jennings, 2015; Lerner, Hershberg, Hilliard, & Johnson, 2015), for heuristic purposes we treat them separately.

Child Growth

About 35% of under-5 child deaths, and 11% of the total global disease burden, are attributable to undernutrition (Black et al., 2008). Concerns about growth deficiencies and mor-

ality remain paramount in countries where poverty is endemic. In consequence, a primary MDG established by the United Nations was the reduction of undernutrition (United Nations, 2000). Approximately 167,000,000 children in developing countries are stunted; and, even though prevalence rates of stunting decreased from about 40% in 1990 to about 27% in 2010, projections suggest that about 22% of children in developing countries will likely be stunted in 2020 (De Onis, Blossner, & Borghi, 2012). Furthermore, Victora, de Onis, Hallal, Blossner, and Shrimpton (2010) identified pregnancy, and the first 2 years of life, as critical for the prevention of significant growth problems worldwide. Using data from the WHO global database on child growth and malnutrition, Victora et al. (2010) learned that children in Africa were born at nearly one standard deviation below average on weight-for-age (underweight) and about two-thirds of a standard deviation below average on height-for-age (stunting). From age 2 to age 5, African

children averaged more than two standard deviations below the global mean on both growth indicators.

Poor nutrition and unsanitary conditions are presumed to be the major causes of growth problems, such as stunting, but the link between household- and community-level conditions and children's health remains incompletely characterized. In societies where household facilities and access to material resources are generally low, even small differences in what is available may loom large in determining children's chance of survival and their growth trajectories (Boyle et al., 2006; Darmon & Drewnowski, 2008; Wachs, 2008). Because factors contributing to growth problems in early childhood tend to persist, and because of collateral damage to other biological systems, growth retardation in early childhood often augurs difficulties in cognitive processing and school achievement (Berkman, Lescano, Gilman, Lopez, & Black, 2002; Cheung, 2006; Martorell, Rivera, Kaplowitz, & Pollitt, 1992).

Household Resources

The quality of children's housing and the materials available in the home play instrumental roles in children's health and adaptive functioning. They also help determine what parents can do to help assure their children's well-being.

Quality of Housing For several decades, efforts have been made to establish standards pertaining to housing quality, both as regards the structural materials used to build homes (e.g., mud, thatch, wood) and the internal facilities (e.g., access to toilets, piped water, closed facilities for cooking, and refrigeration appliances). Studies in Ethiopia, Nigeria, Ghana, and Cameroon point to serious problems connected with crowding, poor construction, and inadequate facilities (Aribigbola, 2008; Cameron, 2009; Fiadzo, 2004; Muoghalu, 1991; Yongsi, 2010).

1. *Provisions for water.* WHO estimates that water contaminants account for 4% of all deaths and 6% of all disease burden for young

children. Several African studies indicate that, when water does not come directly into the house, contamination with bacteria and parasites is commonplace, resulting in diarrhea and malnutrition (Roberts et al., 2001; Teklemariam, Getaneh, & Bekele, 2000; Yongsi, 2010). Contaminated water becomes a source of disease that can lead to growth retardation and death (Abou-Ali, 2003; Halpenny, Koski, Valdes, & Scott, 2012; Nandy & Gordon, 2009; Ouattara, N'Guéssean, Yapi, & N'Goran, 2010). Only 58% of people in sub-Saharan Africa have access to improved drinking water sources (i.e., either piped into the home or from other nearby sources such as public taps, tube wells, boreholes, protected dug wells, protected springs, or rainwater collections; WHO/ UNICEF JMP, 2008).

2. *Sanitation facilities.* Not having proper facilities to deal with waste contributes to childhood illness and mortality (Agha, 2000; Mertens, Jaffar, Fernando, Cousens, & Feacham, 1992; Podewils, Mintz, Nataro, & Parashar, 2004) and can lead to behavior and academic problems (Grantham-McGregor & Fernald, 1997; Mendez & Adair, 1999). Fecal-oral spread of bacterial pathogens, resulting from lack of access to appropriate toilets, contributes to diarrhea and growth problems for children (Hong, Banta, & Betancourt, 2006; Podewils et al., 2004; Prüss-Üstün, Kay, Fewtrell, & Bartram, 2004). There is a higher incidence of intestinal parasites in children who share toilets or lack connection to a city sewer system (Ludwig, Fernando, Firmino, & Joao Tadeu, 1999; Mahfouz, El-Morshedy, Fargaly, & Khalil, 1997). Not having adequate toilet facilities at home is particularly problematic for young children as they struggle to withhold bowel movements and fear using pit latrines (Cameron, 2009; Curtis et al., 1995; Lindskog & Lundqvist, 1998).

3. *Food storage/refrigeration.* Poor food storage facilities are a major problem for health and growth in children (Hong et al., 2006; Motarjemi, Käferstein, Moy, & Quevedo, 1993). When homes lack adequate facilities, food is often left out for later consumption,