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Developmental Cascades

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ADVANCES IN CHILD DEVELOPMENT AND BEHAVIOR

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Preface

The fundamental goals of developmental science are to describe and explain development and (ideally) identify ways in which scientific findings can inform educational programs, interventions, and policies for children and families. However, developmental scientists typically operate within their siloed domain of expertise—whether visual processing, motor development, language learning, emotional regulation, social interactions, and so on—and consequently apply a narrow lens to the study of development. Indeed, the ever-increasing specialization of subdisciplines within developmental science has resulted in little dialogue among investigators from different areas of expertise. And although domain expertise is critical for depth of knowledge, focus on a single domain or age ("the trees") shortchanges an understanding of the complexity of development ("the forest").

A developmental cascades approach, in contrast, aims to break down silos by illuminating dynamic processes across domains, levels, and time. The development of any given behavior, skill, or ability unfolds in the context of a larger set of synergistic, reciprocal changes in the child, environment, and culture. As noted by Oakes and Rakison (2020), "development is a cascade of events by which behaviors, abilities, and achievements at one point and time set the stage for the development and acquisition of new behaviors and abilities" (p. 4).

Of course, the conceptualization of development as a series of multiple, interacting cascades has a long history, as reflected in the systems perspectives of development (Bronfenbrenner, 1977; Gottlieb, 1983; Masten & Cicchetti, 2010; Thelen & Smith, 1994). Yet, until recently, these theoretical foundations resulted in limited empirical findings and analytic tools. This situation has now changed: Studies that cut across domains and time have yielded fresh insights into the "whats" and "hows" of development, generated new tools for analyzing change at different time scales (from seconds and hours to days, months, and years), and sparked new considerations about how to apply research findings to interventions and programs.

New conceptualizations

Researchers are beginning to specify fundamental ways in which development in one domain paves the way for developments in other

domains, which may not always be obvious. By specifying developmental interactions, researchers gain new insights into the shape of developmental change and the underlying mechanisms that give rise to such change—in essence, the "whats" and "hows" of development. Accordingly, the chapters in this volume move beyond single-domain, single time-period emphases to illustrate the rippling and reciprocal effects of changes in one area (e.g., exploration, walking, talking) on changes in others (e.g., social interactions, motor skills, attachment) at different time scales (e.g., moment to moment and over years).

New analytic tools

A cascades perspective calls for rethinking statistical approaches that characterize the research of developmental science. Researchers have begun to apply new analytic tools to modeling reciprocal, cross-domain, and cross-time effects. However, traditional statistical decisions also raise questions and challenges. For example, statistically controlling one variable to examine its "independent" or "isolated" effect on another variable risks the oversimplification and perhaps even misrepresentation of the nature of development. Likewise, approaches that linearly examine the downstream effect of one variable on a second variable run the risk of ignoring bidirectional and complex recursive effects. Importantly, the chapters in this volume showcase a variety of analytic approaches for testing developmental cascades across multiple domains and time scales while also reflecting the limitations to different analytic choices.

Implications for interventions

A cascades framework has implications for interventions as well. In line with Masten and Cicchetti's (2010) classic essay on developmental cascades, the authors of several chapters in this volume show how a developmental cascades framework can open up new—sometimes surprising—avenues for intervention. For example, links between motor and communicative development create new directions for interventions with neurodivergent children. Links between early language growth and later academic performance point to the need to intervene early in cases of developmental language disorders. And reciprocal links among social media use, adolescent behaviors such as sleep, and adolescent depression

underscore the need to identify processes that link maladaptive vs adaptive media use to health outcomes.

The current volume

This issue of *Advances in Child Development and Behavior* places a cascades framework at the heart of contemporary developmental science. The chapters spotlight the dynamic, codependent nature of development, from infancy to adolescence, across multiple domains, using different analytic approaches, and with attention to the broad application of findings to programs and policies. The chapters are roughly organized chronologically, but even within this age-ordered presentation, each chapter focuses on a unique developmental topic. Chapters covering infancy and early childhood span domains of visual attention (Oakes, Chapter 1), object exploration (Malachowski & Needham, Chapter 2), language development (Guo, Pace, Masek, Golinkoff, & Hirsh-Pasek, Chapter 3), developmental differences in neurodivergent infants and children (Iverson, West, Schneider, Plate, Northrup, & Britsch, Chapter 4), and emotional functioning and friendship (Marquis-Brideau, Bernier, Béliveau, & Dirks, Chapter 5). Chapters covering childhood and adolescence highlight cascading processes in Black children's emotion regulation and attachment (Stern, Dunbar, & Cassidy, Chapter 6), prosocial behaviors and positive development (Malti & Speidel, Chapter 7), African American adolescents' future expectations (Cunningham, Francois, & Scott, Chapter 8), digital media use and mental health in adolescence (Flannery, Maza, Kilic, & Telzer, Chapter 9), educational attainment (Ahmed, Chaku, Waters, Ellis, & Davis-Kean, Chapter 10), and associations between academic achievement and depressive symptoms in adolescence (Brittain & Vaillancourt, Chapter 11). Importantly, in the context of comprehensive topical expertise and coverage, the authors of this volume share a commitment to advancing the theoretical, methodological, and developmental significance of a cascades approach for science and practice.

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