Introduction

Why a Volume on Multisystemic Resilience?

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Across diverse disciplines, the term *resilience* is appearing more and more often. However, while each discipline has developed theory and models to explain the resilience of the systems they study (e.g., a natural environment, a community postdisaster, the human mind, a computer network, or the economy), there is a lack of overarching theory that describes (i) whether the principles that underpin the resilience of one system are similar or different from the principles that govern resilience of other systems; (ii) whether the resilience of one system affects the resilience of other co-occurring systems; and (iii) whether a better understanding of resilience can inform the design of interventions, programs, and policies that address "wicked" problems that are too complex to solve by changing one system at a time. In other words (and as only one example among many), are there similarities between how a person builds and sustains psychological resilience and how a forest, community, or the business where he or she works remains successful and sustainable during periods of extreme adversity? Does psychological resilience in a human being influence the resilience of the forests (through a change in attitude toward conservation), community (through a healthy tolerance for differences), and businesses (by helping a workforce perform better) with which a person interacts? And finally, does this understanding of resilience help build better social and physical ecologies that support individual mental health, a sustainable environment, and a successful economy at the same time?

In response to such questions, the many contributing authors to this volume have shown that multisystemic thinking about resilience is growing in disciplines ranging from genetics to community development, family therapy, aviation, and dozens more. In the first chapter of the volume, I survey emerging discourses of resilience found across disciplines and the definitions that have followed. Whatever the focus of the discipline, the study of multisystemic resilience shifts the focus from breakdown and disorder to deepening our

understanding of processes like recovery, adaptation, and transformation that occur before, during, and after exposure to an atypical stressor. In this way, studies of resilience are distinguished from fields like positive psychology (where adversity is not a requirement for the study of systemic change) and materials science (where human interactions, such as the process of observation, account for only a small amount of the change in the material). Although this volume covers a lot of conceptual ground, to maintain a cohesive focus, each author was tasked with exploring resilience in a similar way. They all looked at how coping occurs when a system experiences adversity, although their explanations for why and how systems recover, adapt, and transform are disciplinarily diverse.

Given the range of disciplines represented, this volume is a first of its kind, an innovative endeavor that positions side by side very different ways of using the concept of resilience. I have clustered the chapters by topic area to make it easier for readers to contrast and compare theories and models and their application through the case studies each author included in their chapter. Although no one system is more important or influential than another, the sections of this volume move from smaller human systems to larger social, then built (engineered), and finally ecological systems. A closing chapter by Katrina Brown reflects on what can be learned from the volume as a whole. I encourage you to read her reflections.

Taken together, the sum of the chapters is greater than just the individual contributions. While each chapter alone only advances a theory of multisystemic resilience slightly (every chapter deals with more than one system and their interactions), the entire collection of papers suggests many different ways that the resilience of one system can influence the resilience of other systems. Thus, my goal is to rebut those who say resilience is an ambiguous concept that is difficult to operationalize in research and practice. I suggest, instead, that resilience is better understood as a multisystemic process that is extremely useful when thinking about how complex systems function under stress.

Readers will, therefore, want to approach this volume much as they would a buffet. While you may be drawn to one or two chapters that most suit your current interests (or tastes), I would encourage you to also sample chapters that explore content with which you are less familiar.

My hope is that you will be just as inspired by this collection of papers as I have been during my meetings with resilience scholars around the world and across disciplines. Although I am a social scientist by training, I have had opportunities to learn from geneticists and engineers, psychiatrists and ecologists, all of whom have sparked my imagination with their descriptions of systems that deal with adversity. Through hundreds of conversations I have come to see more similarities in our theories than differences. For example, those concerned with how humans overcome genetic susceptibility (see Chapter 3) and those thinking about how to design better computer systems (Chapter 34) to avoid latent vulnerabilities are likely to find they share many fundamental principles of resilience design.

The initial impulse for this specific work began when I read the exhaustive network citation analysis by Xu and Kajikawa (2017) who identified at least 10 disciplinary siloes concerned with the study of resilience, but very few examples of disciplines referencing each other's work. It is for this reason that most publications on resilience are concerned with just one discipline, even though the leading scholars in the field, such as Michael Rutter

(in developmental psychiatry) and Katrina Brown (who studies social ecological systems—see Chapter 39) have been arguing for more work to be done to build bridges between disciplines.

To help build these bridges, this volume draws together the world's foremost resilience researchers and an emerging next generation of scholars to answer questions such as

1. How can we better understand and develop theoretical models that explain the dynamic interplay of resilience processes across systems (and at different scales within systems)?
2. How do we assess, measure, and study the resilience of multiple systems across scales and over time?
3. How does an emerging science of systemic resilience help us generate scalable solutions to human-environment interactions that threaten the health of individuals, communities, and the planet?

Despite the need for cross-disciplinary, multilevel modeling of resilience to tackle these problems, most of the work focused on resilience has remained siloed.

An Urgent Need to Understand Resilience

The world is changing faster than ever before. Rapid and unprecedented social and environmental change, accompanied by heightened uncertainties and novel and diverse risks are broadly recognized as a feature of contemporary life (Anderies, Folke, Walker, & Ostrom, 2013; Reid et al., 2010). Regardless of discipline, research shows that these disruptions to human and ecological systems are triggering new responses and adaptations, but it is also clear that these require profound and transformative action in order to be sustainable and equitable. As a recent special feature of *Science* observed, "Resilience is on many peoples' minds these days" (Couzin-Frankel, 2018). Indeed, research on recovery after Hurricane Katrina, adaptation to sea level rise in Bangladesh, and interventions to support refugees fleeing from war, are all examples of new research insights informed by the science of resilience. However, despite the ubiquity of the concept, we still know little about the mechanisms that produce resilience. And yet, with time our understanding of resilience is finding common ground across disciplines. Ann Masten (2014a), a world-renowned developmental psychologist who studies resilience defines the concept as "the capacity of a dynamic system to adapt successfully to disturbances that threaten system function, viability, or development" (p. 10). This definition is remarkably similar to that of the leading systems ecologist Carl Folke (2016) who describes resilience as "the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, and feedbacks, and therefore identity" (p. 44). Both definitions, from very different fields of study, emphasize the need to account for the way human and nonhuman systems deal successfully with shocks and disturbances to thrive despite exposure to adversity. A new science of multisystemic resilience that is advanced by this volume offers an innovative way to understand these changes and to approach problems in paradigmatically different transdisciplinary ways (Alexander,

2013; Brown, 2016; Masten, 2014b). For example, a multisystemic approach to resilience is likely to improve services in contexts of humanitarian aid by reminding us that when providing emergency aid to beneficiaries, they are seldom powerless victims, but instead individuals and communities with local resources and the potential for long-term ability to cope with future stressors. What we lack, however, is ways to document these strengths and the tools required to measure sometimes intangible traits and ambiguous processes that make the difference between successful and unsuccessful recovery, adaptation, and transformation after a major disaster.

For all these reasons, a siloed approach to the study of resilience needs to be challenged and a bridging concept across systems and disciplines introduced. Arguably, we need far less research on why things break down and far more on the way systems improve functioning and the principles that predict success. To accomplish this, we will need to shift our focus from one that conventionally deals with pathology—how the environment harms people, or how people harm the environment—to the ability of multiple human and ecological systems to reciprocally and positively interact in ways that respond to perturbations in ways that lead to health and sustainability. We also need to increase the breadth of resilience research to fully integrate the many different disciplines studying resilience to produce a transdisciplinary approach to understanding the processes that enhance the capacity of systems to experience resilience over time. Finally, and just as important, we need to confront the hegemony of Western scientific discourse in the study of resilience. More attention is required to account for the diverse sources of knowledge and world views about resilience, including those that indigenize and decolonize knowledge, as well as those that challenge discourses that privilege specific genders, abilities, or racial biases.

This volume, then, is riding the crest of an emerging trend. This is evidence from national policy forums, research investments, political rhetoric, and public discourse that greater resilience is going to be needed if people and our planet are going to survive. At the highest level, resilience underpins the Sustainable Development Goals and the UN's Global Agenda 2030 and was the focus of the 2018 High Level Political Forum, *Transformation Towards Sustainable and Resilient Societies.* But these calls must be supported by the highest caliber of science and new and novel approaches that take resilience beyond "business as usual" to address the complex problems and challenges of knowledge co-production for sustainable development (Folke, Biggs, Norström, Reyers, & Rockström, 2016). While definitions of resilience may be contested, there is plenty of agreement among scholars that further research that is bold and new is needed. Thinking about resilience multisystemically, as is the focus in this volume, is one way to find better solutions to persistent and challenging problems that have yet to be solved.

References

Alexander, D. E. (2013). Resilience and disaster risk reduction: An etymological journey. *Natural Hazards and Earth System Sciences*, *13*(11), 2707–2716.

Anderies, J. M., Folke, C., Walker, B., & Ostrom, E. (2013). Aligning key concepts for global change policy: Robustness, resilience, and sustainability. *Ecology and Society, 18*(2), 8. doi:10.5751/ ES-05178–180208

Brown, K. (2016). *Resilience, development and global change*. New York, NY: Routledge.

Couzin-Frankel, J. (2018, February 27). The science of resilience: What are the ingredients that help people cope? *Science Magazine News*. Retrieved from http://www.sciencemag.org/news/2018/02/ science-resilience-what-are-ingredients-help-people-cope

Folke, C. (2016). Resilience (Republished). *Ecology and Society, 21*(4), 44. doi:10.5751/ES-09088-210444

Folke, C., Biggs, R., Norström, A. V., Reyers, B., & Rockström, J. (2016). Social-ecological resilience and biosphere-based sustainability science. *Ecology and Society*, *21*(3), 41. doi:10.5751/ES-08748-210341

Masten, A. S. (2014a). *Ordinary magic: Resilience in development*. New York, NY: Guilford Press.

Masten, A. S. (2014b). Global perspectives on resilience in children and youth. *Child Development*, *85*, 6–20. doi:10.1111/cdev.12205

Reid, W. V., Chen, D., Goldfarb, L., Hackmann, H., Lee, Y. T., Mokhele, K., . . . Whyte, A. (2010). Earth system science for global sustainability: Grand challenges. *Science*, *330*(6006), 916–917.

Xu, L., & Kajikawa, Y. (2017). An integrated framework for resilience research: A systematic review based on citation network analysis. *Sustainability Science*, *13*(1), 235–254.