

Expanding the Boundaries of Health and Social Science: Case Studies in Interdisciplinary Innovation

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Research has become more interdisciplinary, and the interface between biological, behavioral, social, and health sciences has resulted in significant improvements in these health-related fields. Many of the most pressing health problems—cardiovascular disease, drug and alcohol abuse, human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), diabetes, cancer, chronic obstructive pulmonary disease, and affective disorders are social as well as biological phenomena that require an interdisciplinary approach. John Rowe, in the introduction of this interesting and unique book, defines interdisciplinary research as “a true collaboration—a melding of disciplines—various approaches are generally applied simultaneously over a substantial period of time rather than sequentially.”

The book is organized into 5 parts: social environment and cardiovascular health and disease, affective and cognitive neuroscience, positive health, population perspectives on health and longevity, and the prevention and management of HIV/AIDS. The case studies from prominent researchers’ actual experiences provide a basis for better understanding the conditions and interventions that promote successful interdisciplinary collaboration.

Chapter 1 is an introduction to the section on social environment and cardiovascular health and disease. Gary Bernston and John Cacioppo (Chapter 2) review their work on the organization of the nervous system and how it controls the heart’s response to various stressors. It is clear from their work that a link between psychological and biological processes cannot be comprehended fully by a single-level analysis and requires an interdisciplinary approach. Kathy Light and colleagues (Chapter 3) similarly focus on cardiovascular reactivity, but they have examined its relationship to hypertension and predisease indicators of hypertension such as left ventricular mass. They review their findings on genetic and behavioral risks for hypertension from their University of North Carolina Stress and Health Research Program. In Chapter 4, Jay Kaplan and Stephen Manuck discuss their research examining the interactive effects of social status and social environment on the contribution to cardiovascular disease. They demonstrate, using cynomolgus monkeys, that social disruptions and instability promote coronary atherogenesis.

Chapters 5 through 8 address the relationship between affective and cognitive neuroscience and span a range of levels; the authors review research that extends from molecular approaches in animals to brain imaging in humans. Davidson (Chapter 6) presents an overview of recent findings on the neural substrates of emotion. In Chapter 7, Kosslyn presents how visual mental imagery has progressed from a time of introspective analysis alone to an examination of the underlying brain circuitry. The authors outline how a combination of behavioral methods, computational modeling, and brain imaging provided the requisite tools to understand the mechanisms that underlie mental imagery. In Chapter 8, Dr. Meaney discusses the effect of parental care on the psychology and biology of offspring. The use of rodents provides a detailed model of how early

environmental influences can induce changes in the biology of the offspring at the level of gene expression.

Authors of Chapters 9 through 12 discuss how social and behavioral scientists together with biomedical researchers advance knowledge of positive health. Positive health is focused on the nature, antecedents, and consequences of human flourishing. Chapter 10 by Ryff and Singer addresses the topic of human resilience using a biopsychosocial approach. Resilience is the capacity to maintain or regain health and well-being in the face of adversity. Seeman draws on both social epidemiology and neuroendocrinology in Chapter 11 to address the protective effects of psychological strengths, social ties, and social support on health. Chapter 12, by George, examines the relationship between religion, spirituality, and health.

Chapters 13 through 15 examine the biodemography of aging, which examines the biology of human life, which creates the conditions under which social factors affect health and longevity. In Chapter 14, Michael Marmot examines how social resources such as social status affect biological functioning, illness, and length of life. Demographer Jay Olshansky and biologist Bruce Carnes examine in Chapter 15 the population consequences of the biological etiology of disease and death for individuals.

Chapters 16 through 18 summarize and present case studies, describing how interdisciplinary teams of investigators confront HIV/AIDS. The case studies provide cogent examples of how a range of behavioral and social science approaches have been used to tackle one of our most important public health problems. Schneiderman and Antoni in Chapter 17 largely focus on group-based, cognitive-behavioral stress management interventions among HIV-infected individuals. Drs. Chesney and Coates, in Chapter 18, discuss the Center for AIDS Prevention Studies and its various notable findings such as identifying important variables associated with medication nonadherence in HIV-seropositive patients. Chapter 19, by Patricia Rosenfield and Frank Kessel, is a nice summary of the work presented in the chapters and an informative discussion on barriers and facilitating factors of interdisciplinary research.

While the actual research endeavors of the authors are interesting, the most appealing aspect of the individual chapters is the authors’ discussion of the development of their interdisciplinary research endeavors. This was particularly the case with the descriptions of the impediments and facilitating factors they encountered.

It is clear that there was a consistent overlap in factors across the various researchers’ careers that help facilitate successful interdisciplinary research groups. One key was having an environment that permitted and encouraged interdepartmental collaborations. Intellectual breakthroughs are encouraged by institutional support and rarely occur spontaneously. A facilitative environment often occurred because of mutual respect and appreciation of colleagues from various backgrounds, as well as the willingness to take risks into uncharted territories. Successful interdisciplinary research programs included investigators who did not perceive boundaries between fields and disciplines and respected each other. For example, Bernston and Cacioppo discuss their mutual respect for each other’s research and the dissatisfaction and frustrations they had prior to working together. Another key was having interdisciplinary studies that were assisted by novel and important technological advances. For example, investigators who use

brain-imaging methods, as discussed in Chapter 6, require an extraordinary confluence of disciplines, including psychology, neuroscience, physics, and radiology. A third factor was that interdisciplinary research often began during investigators' training. For example, Davidson, in Chapter 6, describes how as a graduate student at Harvard he pursued work in personality and experimental psychopathology and then supplemented this work in neuroanatomy at MIT and behavioral neurology at Harvard Medical School. Mentorship and training often continued after graduate training. Drs. Seeman and Olshansky discuss how they obtained funding through career development awards from the National Institute on Aging Special Emphasis Research Career Award (SERCA). Through the SERCA funding, Dr. Seeman was able to develop a program of training in neuroendocrinology to enhance her abilities to explore models of development that focused on biological mechanisms through which psychosocial factors may affect trajectories of health. Dr. Olshansky used the career development award to pursue an independent course of study in the fields of evolutionary biology, molecular biology, epidemiology, and statistics. In addition, the career development awards allowed both to develop working relationships with researchers outside their own disciplines.

It is also worth recognizing that, in the development of the various described research programs, each author and research team had to overcome many obstacles. Many included review

panels at journals and funding agencies that could not appreciate and understand the interdisciplinary nature of the proposed research. Other obstacles included time constraints. It is clear from all the authors that collaborative research typically is more time-intensive and requires more effort than independent disciplinary work; however, as these authors can attest, it is worth the effort. With any important research there is, occasionally, politics involved. Drs. Marmot and George, in their respective chapters, for example, discuss how the political climate influenced their research and ways they conceived of presenting their work that were more acceptable. Finally, in interdisciplinary research, technical communication can be a big problem initially but can be overcome with persistence and training. The description of these obstacles and the anticipation of the problems will hopefully inspire continued development of these interdisciplinary approaches.

The book is likely to be of value not only to scientists but also to decision makers in universities, institutions, and funding agencies. The authors not only summarize interesting and important bodies of work, but also highlight bumps and directions along the winding road they took to achieve such success in their respective interdisciplinary fields.

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