

# The Need for an Integrated Biopsychosocial Approach to Research on Successful Aging

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Successful aging is defined not by longevity alone but also by sufficient well-being (in multiple domains) to sustain a capacity for functioning adequately in changing circumstances. The determinants of such well-being and functional status are manifold and include the genetic endowment, physical environment, social environment, population and individual responses to challenges, the occurrence of disease, availability and effectiveness of health care, and personal prosperity. In the face of such complexity, scientific approaches to the phenomena associated with successful aging should be appreciative and wholistic as well as reductionistic.

Such a “natural science” of aging will be required to uncover and use information about linear, cause-and-effect phenomena, as well as about higher-order emergent patterns that are of relevance to the health of elderly persons, such as “resilience” and “generativity.” Taken as a whole, this multimethod research agenda will truly express an integrated biopsychosocial approach to research on successful aging.

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In the later stages of the 20th century, an exciting development in science was the emergence of a modern variant of the field of natural history (1). This renascent domain of inquiry, now often referred to as *ecological science*, is a contemporary version of the scientific discipline that would have comfortably accommodated the likes of Leonardo da Vinci and Goethe. Radically cutting across such traditional disciplines as anthropology, archeology, geology, history, biology, botany, physics, and climatology, individuals who espouse this modern manifestation of an older scientific tradition have many differences. However, they also have in common a proclivity to engage in the first and highest act of science—“leaning into the phenomena”—in order to arrive at a naturalistic understanding of the world in which we live.

This well-informed act of close appreciation may be an indispensable methodologic component of any natural science. Any less open-minded approach risks a certain blindness to the complexity of the world in which we live and could lead to an unintelligent application of a single-minded reductionistic approach. In nature’s complex, dynamic systems, in which every part interacts with every other part in ultimately unpredictable ways, linear cause-and-effect models are insufficient to describe the full array of interactions and some of the properties of the systems. This complexity, while at first seeming chaotic, contains patterns that are repeated and emergent properties that are sustained, as chaos theorists have taught us (2).

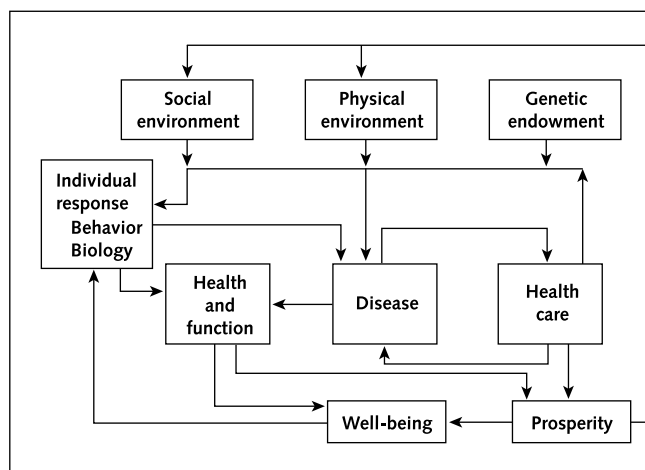
None of these phenomena are remote or arcane. Such complex, adaptive systems exist whenever multiple determinants of a dynamic equilibrium are in action simultaneously. This understanding of how the world works is as important to redesigning health care systems for improved quality of care as it is to contemporary, nonmechanical physics (3). It has relevance to our understanding of the origin of cardiac arrhythmias, how doctors and patients interact with one another, under what conditions disease outbreaks occur, how children develop healthy lives, and what medical and social policies promote such futures (4, 5).

## A DEFINITION OF SUCCESSFUL AGING

An ecologic inquiry is also necessary and should be fruitful in our attempts to arrive at an appreciation of the necessary ingredients for, and the nature of, successful aging. To understand this assertion and what follows, it will be necessary to be explicit about a working definition of the notion. From my own perspective, successful aging is not adequately understood as mere longevity. Instead, it implies sufficient well-being in a number of spheres (mental, physical, social, spiritual, economic) to sustain a capacity to function successfully in the changing circumstances of one’s life. The dimensions of well-being that are most relevant to successful aging might be expected to differ substantially among individuals and circumstances but certainly could be found in those domains of the person and his or her environment that are substantive determinants of health. It should be noted that this definition is radically contextual and does not require the absence of disease or disability for successful aging. Instead, it makes room for special emphasis on preservation of key capacities to perform in domains that are important to the individual in her or his niche. Franklin Delano Roosevelt, despite his need for a wheelchair, might be seen as one exemplar of successful aging.

And what are the determinants of health? The single best exploration of this question I have seen is contained in the volume titled *Why Are Some People Healthy and Others Not? The Determinants of Healthy Populations* (6). A remarkable summary of the evidence base for what has been termed the *health field model*, or *determinants of health model*, can also be found in the discussion of Evans and Stoddard (7). This model is a theoretical delineation of the interacting forces that contribute to the health, functional status, and well-being of an individual (or a population). At a high level of abstraction, it captures what we know about the linear cause-and-effect phenomena that affect health. However, because there are many interacting and bi-directional relationships in the model, it may be best

Figure 1. A naturalistic understanding of the determinants of health.



understood as a representational heuristic for the complex dynamic of health (Figure 1).

Health services researchers and clinicians tend to focus on one small (if resource-intensive) element of this model, emphasizing the occurrence of disease and the medical care response to this occurrence. Optimization of the medical care response to the occurrence of disease is certainly important to the refinement of medical care and to enhancement of its cost-effectiveness but is from any perspective only a small portion of the force field that establishes the potential for successful aging. Some of the other determinants of well-being and function lie in the genetic endowment, physical environment, social environment, the individual responses (behavioral or biological) to these environments, the contributions of all of the preceding to disease occurrence, individual and social responses to disease, and available economic resources (“prosperity”); all contribute to various states of well-being. Here, as in any natural history appreciation, our first-order recognition might be of the complexity in the dynamic processes of health and well-being. Changes in this dynamic over time would constitute the primary phenomena associated with healthy aging.

The health field model, as a general primer for understanding health as a dynamic and multiply determined state, has important uses in our research. It could be used to examine the phenomena associated with successful aging from a developmental perspective (5). For development of methods for tracking health status, documentation of “confounders” that might confuse inferences from interventional experiments, or performance of descriptive work in which observations are made repeatedly over time, it can be used as a template for developing a comprehensive measurement strategy. It is a framework within which policymakers can understand their choices for investment in health as they allocate social resources (8). It is also a heuristic for comprehensively examining the place of any par-

ticular intervention in health status while placing that intervention into a context of the whole set of potential investments in health.

### USE OF A DETERMINANTS OF HEALTH PERSPECTIVE IN RESEARCH

Two examples of the use of the health field model in gerontologic research might make the utility of the determinants of health model explicit. The first example is drawn from the Institute of Medicine’s project titled *Improving Health in the Community: A Role for Performance Monitoring* (9). This was a study undertaken by an Institute of Medicine committee to explicate a framework for understanding the community health improvement process, develop prototypical sets of population health indicators for specific health issues, and show how such indicators might be used to develop community health profiles and performance measures for health improvement activities. In the context of this committee’s work, two critical issues were encountered: finding a definition of health that might accommodate the perspectives of many stakeholders in community health improvement (clinicians, citizens, policymakers, industry) and finding a theoretical framework that would be meaningful to these diverse stakeholders.

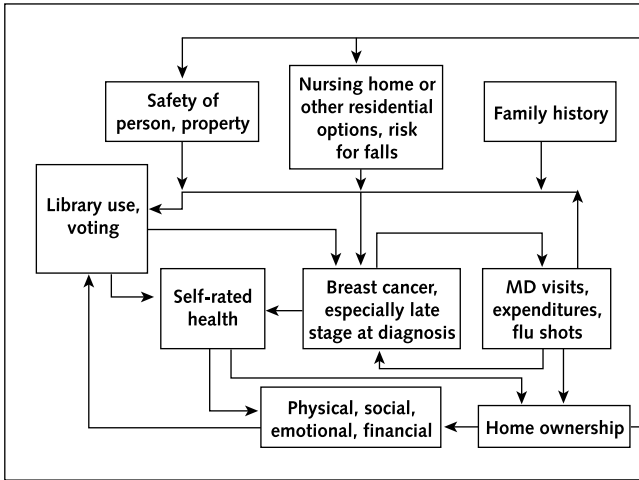
For the first issue, the committee decided to use as an operational definition of health one quite close to the notion I advanced as my working definition of successful aging: “a state of well-being and the capacity to function successfully in changing circumstances.” As a framework for identifying measures of health, the committee adopted the Evans and Stoddard determinants of health model. The Institute of Medicine committee then developed indicators sets for a variety of specific conditions, identifying a universe of potential indicators within each of the model’s categorical determinants and using familiar psychometric and other properties of measures as criteria for selection of a few. For this discussion, the “elder health” indicator set is of greatest interest to us (Table).

Indicators were found for all of the determinants of health categories except “genetic endowment.” This latter measurement domain, of course, is not a null set. In a clinical circumstance in which individuals could be interviewed, as opposed to an exercise in which available pop-

Table. Performance Indicator Set for Elder Health

Self-rated health status
Physician visits per year
Area-adjusted average per capita expenditures for medical care
Influenza vaccination
Advanced-stage breast cancer
Percentage of elderly persons living in nursing homes
Presence of a full continuum of care
Library readership, voting (social participation)
Senior citizen income and property ownership
Crimes against elderly persons, residential burglaries
Falls among elderly persons resulting in hospitalization

**Figure 2.** Use of the determinants of health model in accordance with the Institute of Medicine performance indicator set for elder health.



ulation health indicators were being emphasized, family history could be used as an indicator of the “genetic endowment” that contributes to longevity.

Figure 2 presents an example of use of the determinants of health model to choose measures for comprehensive examination of the dynamic state of health in a special population of interest (elderly persons) and a particular geographic locale. This kind of measurement strategy, explicitly biopsychosocial in its orientation, would be necessary in any circumstance in which time-series observations were being made to track and monitor the health of elderly persons or interventions were being examined to determine their impact on successful aging. It should also be obvious that this theoretical framework uncovers many potential approaches to improving the health of an elderly population. Investments in public safety for elderly persons, transportation that enables social participation, elder political activism, and reverse mortgages that permit property ownership to supplement subsistence-level fixed retirement incomes might all have a sustaining effect on elder health in a broad sense.

A second example of the use of the determinants of health model is as a framework for understanding the findings from a remarkable sequence of studies in Seattle, Washington, that examined cognitive decline, incidence of dementia, and consequences of Alzheimer disease among Japanese-American persons (the Seattle Kame Study). In the Seattle Kame Study, a large cohort of Japanese-American persons was followed over an 11-year period. Through the resulting observations, it was possible to examine several determinants of the risk for cognitive decline and dementia, including biological, environmental, behavioral, and medical determinants (Figure 3). The only category of health determinants excluded from the study to date, to my knowledge, has been economic. Here the determinants

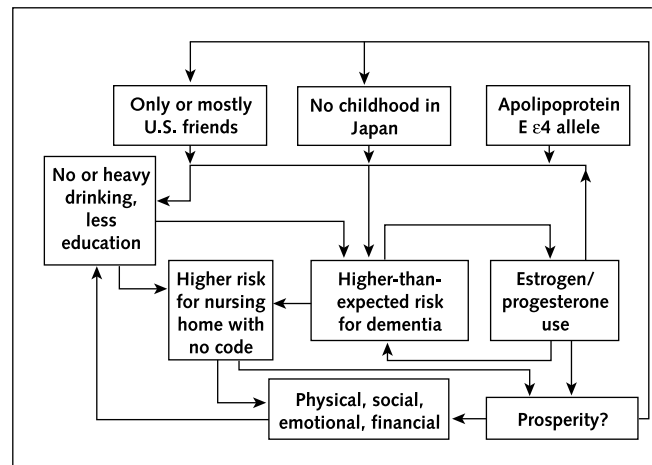
of health model is used not as a template for comprehensive measurement but instead as the “compound lens” through which we can appreciate more fully how the various findings from more focused studies create an appropriately complex understanding of the phenomenon of cognitive decline, its antecedents, and its consequences (10–15).

**THE ARGUMENT FOR A BIOPSYCHOSOCIAL RESEARCH APPROACH**

Here, then, is the core argument for an integrated biopsychosocial approach to research on successful aging. The phenomenology of successful aging will not be amenable to description, appreciation, and discerning understanding without the kind of transdisciplinary thinking that recognizes the complexity and multiplicity of determinants of health in elderly persons. Through research that embraces this complexity, successful aging—a capacity for functioning in a changing environment and the various states of well-being (biological, psychological, social, spiritual, economic, and medical) that serve as a foundation for this robust functioning—will come to be understood as dynamic equilibrium. Only by using a rich template for conceptualization and measurement will we recognize and document some of the higher-order patterns that prevail in successful aging, ones that we refer to today as “resilience,” “generativity,” or even “feistiness” but largely exclude from our research.

Although in this discussion I have used examples that included only quantitative measures, we will also want and need to use qualitative measures of successful aging to yield results that will help us recognize and interpret the meaning of such qualities as “resilience.” Finally, no framework less comprehensive than an integrated health determinants (biopsychosocial) model will suffice when public or organizational policy decisions on resource allocation are made

**Figure 3.** Cognitive decline and dementia among Japanese-American persons (the Seattle Kame Study).



in an attempt to enhance successful aging. The questions asked in such policymaking will not reside within one or another of the categorical determinants of health when, in reality, the choices contemplated are often tradeoffs among such radically different resources as bus passes, medications, city parks, senior citizen centers, and exercise programs.

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