Chapter 29
Health and Aging: Early Origins, Persistent Inequalities?

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A sociological consideration of health and aging can be viewed primarily from one of two lenses. One focuses on the health of older people, emphasizing the centrality of health to the daily experiences and longevity of older people. For the most part, these studies examine older people only. Given that "older people" (65+) typically refers to a very wide cohort, the enormous health variability within this population spanning three or more decades merits systematic consideration.

A second lens focuses on the aging process and draws heavily from the life course perspective in order to understand how health variability plays out over time and culminates in the older adult population. It is also concerned with health variability among older adults, but emphasizes the life course processes leading to such variability. There is a clear need for both approaches; each is a valued intellectual endeavor with profound policy implications. Moreover, there is a need for integrative analyses that identify points of convergence and divergence.

Although both perspectives are needed and will continue to flourish, one of the great changes during the past three decades is a greater appreciation within sociology for the second approach emphasizing the aging process. This perspective is not new to the field of gerontology, but sociologists have played a critical role in promoting its utility. This has been seen most clearly in sociological theories of age, aging, and the life course (Elder 1974, 1998; Riley 1987; Settersten 2003). At the same time, the proliferation of longitudinal data, coupled with methodological innovations to analyze such data, has enabled a new and exciting genre of research on health and aging.

In this chapter, I recognize and draw from both lenses but emphasize the second – studying health processes over the life course. My aim is to highlight the scientific utility of this perspective to better understand health inequality in later life while reviewing some of the major findings during recent decades. Ultimately, I contend that greater appreciation for life course processes of health will aid our understanding of the health of older people, thereby enabling the design of more effective interventions.

Life Course Approach to Health and Aging

Sociologists, demographers, and psychologists have drawn important conceptual distinctions between individual, cohort, and population aging in order to better understand inequalities in physical and mental health (Alwin et al. 2006; Sliwinski and Mogle 2008). At the same time, a subfield of epidemiology known as "life course epidemiology" has emerged that shares many conceptual

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frameworks and methods of analysis with the life course sociological approach to health and aging (Kuh and Ben-Shlomo 1997; Lynch and Smith 2005; Wadsworth 1997).

In epidemiology's conceptualization of the interrelationships between host, agent, and environment, there is a premium placed on identifying exposure to potential risks. What is distinctive about life course epidemiology, however, is studying how these risks accumulate over time. When does exposure to a risk first occur? For how long is the host exposed to the risk? Once exposed to a risk, what mechanisms lead to compromised health? These and related questions have led to a pursuit of important periods of risk exposure that can be especially consequential to health. Although most sociologists are skeptical of complex stage theories of human development, they nevertheless recognize the importance of selected periods of the life course for shaping health outcomes (Ferraro and Shippee 2009). As Berkman (2009:30) described in a recent essay, "life course issues have recently come to permeate thinking about a broad number of exposures in public health. It is now commonplace to think of critical or sensitive periods in exposure to risk as well as to understand dynamics related to cumulative exposure."

If aging is a lifelong process from birth to death, then birth may play a pivotal role in life chances. This is seen in sociological analyses of the long-term effects of low birth weight on health and well-being, and this literature carries a heavy emphasis on socioeconomic differentials in birth weights and well-being (e.g., Conley and Bennett 2000). Stratification has a clear impact on the likelihood of a low birth weight, which, in turn, may shape socioeconomic status (SES) and life chances.

Birth weight is an outcome closely linked to maternal health, and British epidemiologists have pioneered a research program on the fetal origins of adult disease. Fetal origins of *childhood* disease is not a surprising link, but Barker's (1997, 2001) research has sought to identify how and why fetal development is related to *adult* health. In this sense, gestation may be a critical period for understanding health in later life. Such a notion was largely foreign to social gerontology three decades ago, but it is now considered quite plausible. Barker's findings that low birth weight is associated with elevated risk of obesity, diabetes mellitus, hypertension, and heart disease during adulthood have sparked other studies about whether diseases are programmed in utero. An alternative explanation to fetal programming is that the accelerated weight gain after a low birth weight is the mechanism for heightened risk of obesity and cardiovascular diseases (Singhal and Lucas 2004). In this sense, it may be the metabolic discontinuity (or whiplash) that links low birth weight babies with adult diseases. Whatever the case, diseases in adulthood and later life may have their origins in the womb. This realization is still permeating the gerontological community, but life course sociologists have widely acknowledged the importance of this critical period in shaping health outcomes.

Childhood is widely noted in psychology as a critical period for personality development, but its significance for physical health is equally important. During the past 30 years, we have witnessed a proliferation of studies on the long-term consequences of childhood conditions or experiences, including: adversity (e.g., Shaw and Krause 2002), health (e.g., Blackwell et al. 2001), or "disadvantage" (i.e., typically measured as parental social class, Smith et al. 2009; Willson et al. 2007; Yi et al. 2007). Many of these studies show that childhood conditions and experiences can have long-term negative consequences on health in later life, and this line of research has come from sociology (Blackwell et al. 2001; Preston et al. 1998), epidemiology (Singh-Manoux and Marmot 2005; Surtees and Wainwright 2007), economics (Case et al. 2002), and medicine (Dube et al. 2001; Felitti 2002).

At the same time, investigations of the link between childhood conditions and adult health also show the power of compensatory or neutralizing forces to reduce or eliminate the negative effects. Psychological, economic, and social resources in adulthood may reduce the noxious effects of early adversity (Irving and Ferraro 2006; Smith et al. 2009), and this line of research is very important for the development of effective interventions (Schafer et al. 2009).

Research on the link between health during childhood and adulthood is especially intriguing because of the mechanisms involved. Many studies reveal that poor health during childhood is

associated with poor health during adulthood (Case et al. 2002; Haas 2008), but Preston et al. (1998) identify an alternative outcome that drives different etiologic processes: acquired immunity. For instance, age differences in the recent prevalence of H1N1 infection reveal the highest rates among persons 5–24 years of age. Indeed, the Centers for Disease Control and Prevention (2009) suggest that "older people may have pre-existing immunity to the novel H1N1 virus." What this suggests is that the age differences in H1N1 are actually cohort differences due to historical differences in prior exposure. Aging does not reduce risk for H1N1; rather, life experiences of the earliest cohorts resulted in a protective effect via acquired immunity.

Another mechanism linking health in childhood with later life may be illustrated with a viral disease. Although a vaccine for chicken pox was approved for use in the United States in 1995, millions of adults contracted chicken pox during childhood. The uncomfortable sores associated with chicken pox typically disappeared within a week, but the virus that caused them – herpes zoster – remains in the person's body. Shingles in adulthood and later life is a rash that results from reactivation of the herpes zoster virus, and several studies reveal that stress can cause the reactivation of herpes zoster (Schmader et al. 1998). The stress process is usually identified as leading to the development of chronic disease, but it may also compromise immune responses, leading to heightened susceptibility to or reactivation of a virus. Thus, using a life course lens for studying health in later life may enable investigators to identify early and meaningful antecedents of both chronic and infectious diseases in later life.

Health Dynamics in Social Context: Selected Findings and Research Frontiers

Research on health and aging has proliferated over the past 30 years, and several findings have been transformative on the field. One of the major streams of research during the past three decades was sparked by Fries's (1980) discussion of the compression of morbidity. Fries envisioned a delay in the onset of chronic disease, enabling many people to live a larger proportion of their lives free from disease and disability. Sociological study of the compression of morbidity has given fairly limited attention to disease onset, but warmly embraced efforts to examine whether disability has been compressed. This emphasis is not surprising given that sociologists have long emphasized the functional consequences of disease in terms of social interaction and organization.

In the mid-1990s, two studies of disability were especially influential in shaping the field and discussions of the compression of morbidity. Verbrugge and Jette (1994) outlined the disablement process, by which disease led to functional disability. For older people, the expectation was that the disablement process had a strong gravitational pull – once begun, there seems little hope to escape from its forces, only ways to minimize or stall the decline in functional ability. The authors identified factors that might "speed or slow disablement," with little attention given to reversing the process (Verbrugge and Jette 1994:1). About this time, however, research by Manton et al. (1993:S194) reported that disability actually *declined* among "chronically disabled community-dwelling and institutionalized elderly populations." This sparked a number of studies by sociologists, demographers, and epidemiologists investigating whether this finding could be replicated. The scholarly paradigm at the time accepted slowing down the disablement process, but the notion that we might observe a decline in disability sparked scores of studies to determine whether this actually occurred (Crimmins et al. 2009; Freedman et al. 2004).

Three conclusions emerge from this literature. First, there is considerable evidence that disability among older adults, measured via activities of daily living (ADL), actually declined beginning in the mid-1990s (Freedman et al. 2004; Manton 2008). Second, the meaning of this finding is important: ADL disability taps whether or not a person is functionally capable of independent living.

This measurement of disability is focused on more advanced forms of disability, and some surveys actually limit their samples to persons who were screened to have some disability (e.g., components of the National Long Term Care Survey). In such surveys, the decline in disability, although important, needs to be interpreted as a decline among persons who previously reported some ADL disability. In short, the decline is a real but proverbial tip of the iceberg in the study of disability among adults (Verbrugge 1986). Third, in addition to the observed decline in ADL disability, alternative measures of health and functioning reveal notable improvements; and these improvements are due in part to cohort differences in disease prevalence and physical functioning (Manton et al. 2008; Martin et al. 2007, 2009).

Research on the compression of morbidity spawned a number of studies that elucidate health dynamics in later life. Many of these recent studies highlight the fact that health changes are often episodic and nonlinear. The bulk of our analytic methods, however, are premised on linear change. Disability, in particular, does not change in ways that are easily predicted with linear models. Rather, disability, and health status more generally, may increase, decrease, or plateau – and these transitions are frequently episodic. Cross-sectional point estimates of health status are helpful in some respects, but cutting-edge research on health has moved to dynamic models, especially growth curve models to capture oscillations in health over time.

Although there is excitement that we have recently witnessed notable health improvements for current cohorts of older adults, this satisfaction is tempered by a concern that the rising prevalence of obesity may undo these precious public health advances. Many scholars contend that the growing rate of obesity may well halt any further compression of morbidity (Manton 2008). The rising prevalence of obesity, and severe obesity, will likely yield an epidemic of diabetes mellitus (Ogden et al. 2006). Given that obesity is a potent risk factor for disability (Ferraro and Kelley-Moore 2003), an increase in the prevalence of obesity may compromise further improvements in population health.

We have also witnessed in the past 30 years a growing interest in ecological determinants of health. Although contextual analysis has been used for decades, both theories and methods for studying "clustered observations" have advanced considerably in recent years. Most theories in sociology have some component that addresses multiple levels of analysis such as macro-, meso-, and microstructures and processes. Thus, studying ecological antecedents of health dynamics in later life can be beneficial for both theoretical development and empirical generalization.

Sociologists are well aware of the power of social context in shaping health across the life course, but the past three decades have accentuated this tenet in new ways. Research has identified important influences on physical and mental health due to social capital (Snelgrove et al. 2009), neighborhood characteristics (Lee and Ferraro 2007), and even architectural features of one's residence that facilitate social interaction (Brown et al. 2009). These are especially important findings when considering the health of older people: Limited mobility means that the importance of local social ties is magnified. When social capital is low, older adults may be particularly vulnerable as illustrated by Klinenberg's (2002) finding that mortality was highest for older adults facing a Chicago heat wave. Also, older adults are less likely than younger adults to relocate to independent residences. As such, the irony is that their residential *stability* is often associated with neighborhood *change*. Thus, whether the person moves or the community changes, a frontier for this genre of research is to examine how both social context and social change influence health dynamics (Wheaton and Clarke 2003).

Health Inequality

One of the major conclusions from the study of health dynamics is that there is substantial variability in the pace of change experienced by persons. Some older people are experiencing health declines, while others are experiencing improvements or seasons of stability. As such, sociologists

systematically study *health inequality* by identifying the processes leading to advantaged or disadvantaged health status over the life course. What factors mitigate the anticipated health declines associated with aging? What social forces benefit or harm people's life chances? And are the effects of these forces more or less important with aging?

Among sociologists, the influence of SES has been singularly important for identifying health inequality. The influence of SES on health status is pervasive and substantial (Link and Phelan 1995). For instance, there is evidence that the compression of morbidity discussed earlier may be limited to persons of middle- or upper-class standing; it does not extend to lower-status persons (House et al. 2005). Coupled with the study of the early antecedents of health inequality, others have uncovered that there are long-term effects of SES, especially education, on health in later life (Elo 2009; Haas 2008; Ross and Wu 1996).

For decades, the focus of studies on the SES/health relationship was on the distinct disadvantage due to poverty, but there is more to the SES/health relationship than the profound disadvantage experienced by persons in poverty. Rather, what Marmot (2003) has referred to as the "social gradient" in health means that there are noticeable differences in health by SES among persons at each level of social class (Adler et al. 2008). Stated differently, if one were to exclude persons in poverty from the analysis, there is still a striking advantage for higher SES persons.

Beyond the influence of SES on an individual's health, there is also the question of the contribution of parental SES and intergenerational mobility on health. Studies of low birth weights revealed that parental SES is consequential (Conley and Bennett 2000), but, additionally, recent research reveals that intergenerational mobility is consequential to women's mortality (Tiikkaja et al. 2009). In many of these studies, the question is often asked which element of SES is most consequential. Although measurement of each element remains fairly crude, most scholars agree that education is generally the most important predictor of health and mortality. Interestingly, when Herd et al. (2007) differentiated between the onset and progression of disease and functional limitations, they found that education was better than income for predicting onset, but that the opposite occurred for predicting the progression of both outcomes.

Stratification involves overlapping systems of differentiation, and both race and ethnicity are closely related to social class in many modern societies. During the past three decades, numerous studies have documented the antecedents and extent of the health gap between racial and ethnic groups in America. Given that many Asian-American groups have better health and live longer than the White population, the focus of the research during the past three decades has been on Black and Hispanic Americans.

Acknowledging that the racial gap exists at birth (e.g., prevalence of low birth weight), scholars have sought to identify whether the Black/White disparity continues across adulthood and into later life. Studies of older adults only tend to show that the Black/White differences observed are relatively stable during later life – persistent inequality (Kelley-Moore and Ferraro 2004). And a few studies of older adults show that the racial gap decreases or even manifests a crossover after age 75 or 85 on selected outcomes (Johnson 2000). By contrast, more cohort-inclusive studies (i.e., adults of all ages) generally reveal a widening of the gap in health between White and Black Americans (Ferraro and Farmer 1996; Haas and Rohlfson 2010), accompanied by higher mortality for Black adults (Geronimus et al. 2006; Warner and Hayward 2006). Thus, findings on the reduction in the racial disparity in advanced ages must be couched in the context of lifelong disadvantage for the majority of the population. Given the higher mortality risk for Black Americans, the big-picture view is a major racial gap in health from birth into old age, resulting in an exceptionally selective group of Black adults at ages 75 and higher. Indeed, selective survival may give the appearance of decreasing inequality (Ferraro and Shippee 2009).

A major idea that has permeated much of the research on Hispanic Americans is the "Hispanic paradox" (Markides and Coreil 1986). It is deemed paradoxical because mortality risk is *lower* for Hispanic Americans than for many White and African-Americans of comparable

socioeconomic standing. Explanations for this paradox have centered on social and cultural practices that have salutary effects on health and the relationship between migration and health. It is possible that the healthy migrant tendency and return migration (i.e., "salmon bias") are two selection processes that may give the appearance of a paradox.

Others have questioned the concept of an epidemiologic paradox on both theoretical and empirical grounds. According to Palloni and Morenoff (2001), documenting a paradox is contingent on three items: a health outcome, a target population, and a contrast population. Thus, rather than an omnibus Hispanic paradox, there could be dozens of paradoxes – or none – and the authors claim that the empirical evidence to support a paradox is quite limited. If a Hispanic paradox exists, it is probably a fairly recent phenomenon and refers to Mexican Americans only, not all Hispanic Americans (Palloni and Arias 2004).

Regardless of the ethnic group considered, research on health and aging is evolving beyond simple contrasts between social categories to studying the underlying processes associated with health inequality (Whitfield and Morgan 2008). In reviewing the literature, I identify four major streams of research that are advancing the cutting edge of minority health research across the life course. First, research on the relationship between discrimination and health is a major innovation for the field. Perceived discrimination negatively affects the physical and mental health of African, Hispanic, and Asian Americans, but according to Williams et al. (2003:200), there is a need to study how "the association between discrimination and health unfolds over the life course" (see also Noh et al. 2007).

Second, for most ethnic groups, information on immigration and nativity is critical for understanding health disparities (Angel et al. 2001). For groups that have recently immigrated, it is essential to measure duration of residence and generational status because residential history and acculturation may shape health inequality.

Third, there is an emergent body of research on the effects of racial/ethnic segregation on health, but the findings are inconsistent. Although most studies of segregation and health reveal a detrimental effect (e.g., Acevedo-Garcia 2001; Jackson et al. 2000), some studies of Hispanic communities reveal a beneficial effect on selected outcomes – what some refer to as the *barrio* benefit (Eschbach et al. 2004; Lee and Ferraro 2007).

Fourth, more studies are integrating information on medical care use over the life course in studies of health. This type of research is clarifying the processes leading to and consequences of primary care (e.g., Decker et al. 2009) and hospitalization (e.g., Ferraro and Shippee 2008).

Health inequality is substantial in many modern societies. Although we can appreciate the progress made to understand the extent and sources of SES and ethnic health inequality, we need to turn to investigating the exposures and available resources over the life course in order to break the chains of risk that generate the inequalities.

Cumulative Inequality in Health

The inequalities discussed in this chapter have stimulated research on how to capture the many insults experienced by persons over the life course. In this regard, theories of cumulative disadvantage (Dannefer 2003; O'Rand 1996) have garnered considerable interest for understanding these life course processes. More recently, cumulative inequality theory has been advanced as a middle-range theory for the study of health and aging (Ferraro and Shippee 2009), integrating elements from cumulative disadvantage, life course (Elder 1998), and stress process theories (Pearlin 1989). Pertinent to this chapter, two elements of the cumulative inequality theory are especially relevant: (a) life course trajectories are shaped by the accumulation of risk, available resources, and human agency and (b) trajectories are affected by the onset, duration, and magnitude of exposures (Ferraro et al. 2009).

As has become clear in this chapter, the literature on health and aging is moving beyond point estimates of exposures to risks and resources to measuring the onset, duration, and magnitude of such exposures. Many scholars use the term "accumulation," but there is precious little specificity in the use of the term. In its simplest form, cumulative exposure often refers to a sum of exposures. Scholars routinely add together events or experiences, and this is a very meaningful first step. Nevertheless, there are alternative ways of conceptualizing and measuring accumulation.

To illustrate different forms of accumulation, consider previous research on the link between childhood adversity and health. If the aim is to study the health consequences of multiple adversities, there are many ways to specify the multiple adversities in analytic models. Figure 29.1 presents four heuristic models for the accumulation of such adversity.

First, some scholars examine the unique effects of given adversities on adult health, addressing questions such as whether material adversity (family poverty) is more or less consequential than insults related to family organization (Kuh et al. 2002). I refer to this as the *unique adversities* approach, depicted in Fig. 29.1 as Model 1. The letters A through K represent separate adverse events or experiences such as parent death or family poverty.

Other investigators conceptualize the effects of childhood adversity as a dose–response function, what I refer to as *additive adversity* (Model 2). They often do this by adding adversities into an overall measure of cumulative adversity, arguing that there is a need to study joint or *cumulative* effects of the adversity (Felitti 2002; Turner and Lloyd 1995). One might also test polynomial forms of this variable to capture nonlinearities in the relationship between childhood adversity and adult health.

Third, still other scholars conceive of clusters of adversity, whereby some adversities tend to co-occur with others (O'Rand & Hamil-Luker 2005). *Adversity clustering* is depicted in Model 3.

Finally, it is possible that some early adversities may be endogenous to other adversities, even during childhood. Such a conception of *pathway adversity* specifies that selected adversities heighten the risk of other adversities or experiences (Model 4 in Fig. 29.1). For an example of Model 4, early adversity may increase the risk of smoking initiation in adolescence (Anda et al. 1999), which may lead to other adversities.

The four models outlined in Fig. 29.1 are a sample of the ways in which previous investigators have used extant measures of adversity or disadvantaged status. One can readily specify additional models such as those that combine one or more elements of these four.

In thinking of how to better study accumulation processes, there are also some phenomena that have received little or no attention in prior studies of health. I contend that we need better measures of some of our familiar concepts as well as new measures to effectively analyze cumulative inequality in health. At a minimum, it may be useful to consider two dimensions of accumulation that merit greater attention: (1) temporal and (2) perceptual.

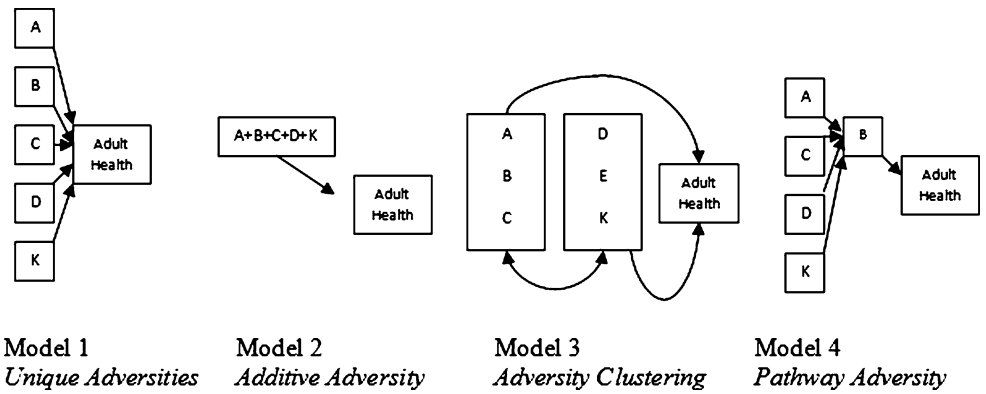

Fig. 29.1 Heuristic models for the accumulation of adversity

First, in studies of SES and health, we all too often resort to a single measure such as education at a given time. In studies of the link between religion and health, the predominant approach is measuring a religious phenomenon at a single point in time. In order to advance the science of the social antecedents of health, we will need more than a single slice in time to adequately capture exposure to risks or resources (Berkman 2009). Ideally, we want to know something about the onset of the exposure and its duration as well as interruptions. Did the accumulation begin during a critical period in the life course? The timing of accumulation matters, a fact easily illustrated with investment practices (i.e., contrast the consequences of investing the same amount of money but on two different time schedules). We are only beginning to see studies capture life course information on exposures and how they affect health outcomes (Schafer and Ferraro 2007; Willson et al. 2007), but they are needed to advance our understanding of health and aging.

Second, a good portion of the literature on cumulative inequality gives little attention to how the actor perceives his or her trajectory in a given life domain. Although the terms *adversity* and *disadvantage* are often used as synonyms, I draw a distinction between the two. Adversity refers to specific events that are perceived to be unfortunate or undesired, but disadvantage relates to a condition – a structural position – in some type of social hierarchy.

Cumulative advantage/disadvantage theory emphasizes the structural positions, but cumulative inequality theory emphasizes the dialectic between the structural positions and the actor's perception of experiences associated with these positions (Schafer et al. 2009). Not all positions, such as limited education, are regarded as a form of adversity. An actor may favorably judge what many consider to be an unfavorable position or vice versa.

Beyond a single judgment of a position, event, or experience, there also is the actor's evaluation of the accumulation of such experiences. Actors seek to make sense of their lived experiences. Thus, scientists may have a better understanding of why certain exposures do or do not have an anticipated effect by asking respondents about their experiences. As an exemplar for this type of research, Surtees and Wainwright (2007) asked respondents to assess the impact of various experiences on their lives. Life course epidemiology would benefit from tapping the actor's perceptions and definitions of life situations rather than presume what is in the actor's worldview. More generally, one could say that there is a subjective life course that needs to be considered in the study of aging and health.

In conclusion, the systematic study of accumulation is an important frontier in research on health and aging. If we can identify the accumulation processes related to health, we are better positioned to prevent disease, disability, and premature death. Moreover, as sociologists increasingly incorporate biomeasures into their analyses, earlier detection of health inequality should be beneficial to health for persons of all ages.

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