

Chapter 3

Behavioral and Social Factors in Healthy Aging

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Healthy Aging

Two counter-currents characterize discussions of aging. On the one hand, living to an advanced age while retaining independence and vigor is desirable. On the other hand, many believe that aging is inevitably characterized by increased disease, dependence, and dementia. Although neither view is without supportive evidence, recent developments in the biology, physiology, and epidemiology of aging are providing increasing support for the more optimistic of these positions. Emphasis on the ability to maintain health and function in old age, versus inevitable declines, is based on observations of substantial heterogeneity in health and functioning at all ages (Rowe & Kahn, 1987), the impact of behavioral, social, and psychological factors on the health of the elderly (Kaplan & Haan, 1989), and the positive impact of interventions (Buchner & Wagner, 1992; Buchner et al., 1992).

Emerging from this growing body of evidence is the concept of healthy aging. Although many agree that healthy aging constitutes an important focus, its definition is unclear. Healthy aging could be defined as "in a normal condition." However, this raises the important issue of separating the impact of disease from the aging process, with normal being used in the sense of "usual" (Rowe & Kahn, 1987).

The Behavioral and Social Determinants of Healthy Aging

There is abundant evidence that the entire natural history of health and functioning in the elderly bears the imprint of behavioral and social processes (Kaplan, 1992b; Kaplan & Haan, 1989). Adoption, maintenance, and elimination of major risk factors for the leading causes of morbidity and mortality are heavily determined by behavioral and social factors. This is not to deny the impact of genetic or biological factors, but only to emphasize the critical involvement of behavioral and social processes. In the case of genetic factors, the behavioral and social environment provides the context that determines the expression of these factors. Even more importantly, behavioral and social factors may dynamically interact with biological processes to determine the health of the elderly. Finally, the heterogeneity of aging, with variation by time, place, and social structure argues for the importance of behavioral and social modifications of the aging process (Riley & Riley, 1989).

Behavioral and Social Factors in Longevity

Although increased longevity is not to be confused with healthy aging, most agree that increased longevity and the elimination of premature (early) mortality are desirable. An extensive literature now exists indicating that behavioral factors are strongly associated with risk of death. Although a number of behavioral factors have been implicated as risk factors for mortality, the strongest evidence is found for smoking and physical activity.

Smoking

Although there are some conflicting studies (e.g., Branch and Jette, 1984) the predominant pattern is higher risk of death among older smokers (Barrett-Connor, Suarez, Khaw, Criqui, & Wingard, 1984; Feldman, Makuc, Kleinman, & Cornoni-Huntley, 1989; Kaplan, Roberts, Camacho, & Coyne, 1987; LaCroix et al., 1991; USDHHS, 1990). In addition, the risk for those older persons who formerly smoked is generally less than for current smokers. In the Alameda County Study, quitting smoking was associated with decreased risk of death over the

Healthy aging could also be defined as being disease and dysfunction free. This use comes close to that of "successful aging" as used by Rowe and Kahn (1987) and others (Roos & Havens, 1991). Although this concept of healthy aging may be very informative for understanding basic mechanisms and modulators of aging, the high burden of disease and disability among the elderly means that it will apply to a relatively small, elite portion of the population. Furthermore, as our abilities to diagnose pathophysiological processes noninvasively and to measure physiological and performance dysfunction increases, a smaller and smaller portion of the population will be classified as healthy agers, thereby limiting the public health significance of this definition. Finally, healthy can also be defined as "good" or "sound." This is either a moralistic use of the term that mainly reflects the user's value system or represents a nonnormativistic view of health and disease based on biological absolutism (Caplan, 1990).

An Alternative Definition of Healthy Aging

We believe that a more productive view of healthy aging builds on the idea of prevention and emphasizes all three types—primary, secondary, and tertiary. It uses the term healthy aging to refer not just to those who are free of disease and dysfunction, but also to those in whom the progression of disease or dysfunction has been slowed or reversed, and to those in whom the consequences of disease or dysfunction have been reduced. Thus, it refers to successful aging that is contextual. Understanding the heterogeneity in outcomes at these three stages, and the primary, secondary, and tertiary efforts to improve outcomes for all, becomes the goal of the researcher and practitioner. We recognize that this concept of healthy aging is far from viewing healthy aging as referring to those with high levels of health and functioning. We propose it as an alternative that could lead to a potentially more productive focus on improving the health and quality of life of all older persons, regardless of whether they are in some pristine state of "optimal" health, are in the early stages of a degenerative disease, or are frail and cognitively impaired. Efforts to understand the heterogeneity in health and quality of life at these very different stages may lead to a fuller understanding of aging itself, as well as interventions that can benefit the majority of older persons. As will be seen later, there is much evidence to support such an approach.

subsequent nine years (Kaplan & Haan, 1989). Although those who continued smoking had a 76% higher risk of death than those who discontinued smoking previously, those who quit during the first 9-year period had only a 33% higher risk. These results persisted even when there was statistical adjustment for prevalent health conditions at baseline and incident conditions that occurred during the period in which the smoking pattern was assessed. A beneficial effect of quitting smoking on all-cause mortality was also found in analyses of the nonsurgical control group in the Coronary Artery Surgery Study (Herman et al., 1988). In this study of patients with angiographically documented coronary artery disease, survival was better for those who had quit smoking in the year before the beginning of the study and who continued to not smoke throughout follow-up compared to those who continued to smoke. There was no indication of a weakening effect of cessation with increasing age.

Physical Activity

Low levels of physical activity have been shown to be associated with increased risk of death. Alameda County Study participants who were 70 or more years old and who reported no leisure-time physical activity were at 37% increased risk of death compared to those who reported some leisure-time physical activity (Kaplan et al., 1987). Interestingly, the increased risk associated with inactivity did not vary substantially by age. Follow-up data from NHANES II also indicated increased risk associated with a sedentary life style (Foley et al., 1990) as did low levels of physical activity for both older men and women involved in health screening at the Cooper Clinic (Blair et al., 1989). Changes in level of leisure-time physical activity also appear to be related to changes in risk of death. In the Alameda County Study, participants were asked on two occasions 9 years apart about the frequency and strenuousness of their leisure-time physical activity (Kaplan & Haan, 1989). Those who increased their level of activity showed a decreased risk of death and those who decreased their level of activity showed an increased risk of death compared to those who remained at the same level. This relationship persisted even when the analyses were restricted to those who were healthy at baseline and there was statistical adjustment for incident chronic conditions, alcohol consumption, changes in weight, smoking, and other variables. Similarly, Paffenbarger et al. (1993) found that older men who began moderate-

ly vigorous sports activities had lower mortality rates over an 8-year period than did those who remained less active.

Social Risk Factors

Seeman, Kaplan, Knudsen, Cohen, and Guralnick (1987) found that low social network participation was associated with a 69% increased risk of death over 17 years in a group that was 70 years of age or older. Similar results were found for men, but not women, in a population-based study in Sweden (Orth-Gomer & Johnson, 1987). In another Swedish study of persons 60 years old, low levels of activities outside the home and social activities were associated with increased risk of death over a 9-year follow-up period (Welin, Larsson, Svardsudd, Tibblin, & Tibblin, 1992). Using data from the Longitudinal Study on Aging, Steinbach (1992) found that low level of participation in social activities and low frequency of visits with friends and neighbors were associated with increased risk of death. There is some evidence that social participation may have a stronger relationship with mortality for those recovering from illness than in preventing new disease. Vogt and colleagues (1992) found that the relationship between social participation and mortality over a 15-year follow-up was stronger for persons with incident Ischemic Heart Disease (IHD), cancer, and stroke than for those free of illness at baseline.

Blazer (1979) found that low availability of social attachments and low perceived support were both associated with a doubling of 2.5 year risk of death in those 65-93 years of age. Using more extensive measures of both social networks and support, a recent study of men born in Malmö, Sweden found that measures of social anchorage, adequacy of social participation, and availability of social support were all associated with risk of death (Falk, Hanson, Isacson, & Ostergren, 1992). Although there have been no population-based interventions on social support or social networks, Kaplan and Haan's (1989) analyses indicated that increases in social network participation were prospectively associated with decreased risk of death, and vice versa.

Socioeconomic level has also been found to be associated with risk of death in the elderly. In analyses based on the almost 50,000 persons 75 years of age or older in the Cancer Prevention Study-I (Lew & Garfinkel, 1990), there was a clear relationship between education and risk of death. In almost all age/sex strata, those with less than a high school education had the highest mortality rates. Branch and Ku

(1989) found that poverty status was an important predictor of mortality risk in the Massachusetts Health Care Panel Study of those 65 years of age or older. For all age/sex strata except men who were 80 years or older, those at the poverty level had increased rates of death.

Questions about Increases in Longevity Lead to a Focus on Functional Ability

Thus, there is substantial evidence suggesting that behavioral and social factors are related to longevity in older persons, and nascent findings suggesting that alteration in behavioral and social factors might decrease mortality rates. These observations, coupled with the large decline in mortality risk and resultant increases in life expectancy at older ages, are reasons for optimism. But the impression they create could be misleading. Extending longevity in no way guarantees that the added years of life are spent in good health with high quality of life. This issue is at the heart of discussions of compression of morbidity, (Fries, 1989) and active life expectancy (Katz et al., 1983). In fact, some evidence suggests that these added years of life have been accompanied by increased prevalence of disabling chronic disease (Kaplan, 1991). The unanswered questions concerning the meaning of increased life expectancy at older ages for quality of life have turned attention to studies of functional status among the elderly, including physical, cognitive, social, and psychological functioning. In the discussion that follows, we will focus on physical functioning because it is an important factor in the ability to live independently, provides an important substrate for other domains of function, and appears to be modifiable in both the fit and frail elderly (Buchner & Wagner, 1992; Buchner et al., 1992).

What are the Determinants of Problems in Physical Functioning?

Chronic and Acute Disease

Table 3.1 summarizes evidence indicating that some of the strongest determinants of physical functioning are related to chronic conditions and acute events such as falls. Such results suggest opportunities for preventing declines in physical functioning. To the extent that chronic

TABLE 3.1
Chronic and Acute Conditions Associated with Physical Functioning:
Prospective Studies

Study	Population	Results (RR = Relative Risk)
Harris et al. (1989)	LSOA, 2-year follow-up Age 80+ at baseline	Among those physically able at baseline, arthritis (RR 1.9) and cardiovascular disease (RR 2.1) were associated with subsequent functional impairment
Guralnik & Kaplan (1989)	Alameda County Study, 19-year follow-up Age 65-89 at follow-up	Hypertension (RR 4.3), back pain (RR 2.0), and arthritis (RR 2.8) were associated with subsequent poorer physical functioning
Keil et al. (1989)	Charleston Heart Study, 25-year follow-up Age 60+ at follow-up	Cardiovascular disease (RR 1.6 to 2.6) and elevated systolic blood pressure (RR 1.4 to 2.3) were associated with subsequent difficulties in physical functioning
Lammi et al. (1989)	Finnish cohorts in Seven Countries Study, 10-25 year follow-up Age 65+ at follow-up	Low vital capacity, intermittent claudication, cerebrovascular disease, coronary heart disease, and emphysema were associated with subsequent lower physical functioning
Mor et al. (1989)	LSOA, 2-year follow-up Age 70-74 at baseline	Diabetes (RR 1.6) was associated with subsequent functional decline
Pinsky et al. (1987)	Framingham Heart Study, 21-year follow-up Age 56+ at follow-up	Ventricular rate in initially healthy males was associated with subsequent functional decline
Kaplan (1992a)	Alameda County Study, 9-year follow-up Age 59+ at follow-up	8 conditions and symptoms (RR 1.8 to 6.8) were associated with subsequent incidence of mobility/self care problems
Guralnik et al. (1993)	EPSE cohorts, 4-year follow-up Age 65+ at baseline	Incident myocardial infarction (RR 1.7 to 2.3), cancer (RR 1.2 to 2.6), stroke (RR 2.2 to 3.0), and hip fracture (RR 1.9 to 4.4) were associated with subsequent loss of mobility
Kaplan et al. (1992)	Alameda County Study, 6-year follow-up Age 65+ at baseline	Incident hip fracture, fall, stroke, and myocardial infarction were associated with subsequent decline in physical functioning

and acute conditions can be prevented or delayed, there will be higher levels of physical functioning. Although the evidence is impressive, considerably more detailed studies still need to be done (such as the Women's Aging Study being carried out with National Institute on Aging support at Johns Hopkins University) before it is possible to pinpoint the exact mechanisms by which chronic and acute disease influence functioning and quality of life.

Behavioral and Social Factors

Although chronic and acute disease are important determinants of physical functioning, behavioral and social factors also have a role. Table 3.2 summarizes results from studies that have prospectively examined the impact of smoking and physical activity on subsequent levels of functioning in older populations. These studies should be seen as preliminary as they do not firmly establish the temporal ordering of the incident conditions and changes in functioning. In addition, it is possible that the incident chronic conditions are more severe in those who smoke or who are sedentary. Measures of disease severity will be necessary to clarify this issue. Nevertheless, the evidence is consistent with the hypothesis that levels of smoking and physical activity are important predictors of later declines in physical functioning. It is, of course, biologically plausible that smoking and low levels of physical activity will lead to compromised physiological functioning, without manifest disease, which will then lead to poorer physical functioning.

A variety of social factors have also been implicated in the natural history of physical functioning. For example, low socioeconomic level has been prospectively associated with poorer functioning in many studies (Camacho, Strawbridge, Cohen, & Kaplan, 1993; Branch & Ku, 1989; Clark & Maddox, 1992; Guralnik & Kaplan, 1989; Guralnik et al., 1993; Harris, Kovar, Suzman, Kleinman, & Feldman, 1989; Kaplan, 1992a; Kaplan, Strawbridge, Camacho, & Cohen, 1993b; Keil et al., 1989; Lammi et al., 1989; Maddox & Clark, 1992; Mor et al., 1989; Pinsky et al., 1987; Rogers, Rogers, & Belanger, 1992). Although there is abundant evidence that socioeconomic factors are associated with increased risk of poor physical functioning, it is not possible to specify the pathways that account for this association. For example, because socioeconomic level is associated with a wide variety of diseases (Haan, Kaplan, & Syme, 1989) it is possible that the association with function simply reflects increased incidence and prevalence

TABLE 3.2
Association between Smoking and Physical Activity and Physical Functioning: Prospective Studies

Study	Population	Results
Guralnik & Kaplan (1989)	Alameda County Study, 19-year follow-up Age 65+ at follow-up	Current smokers twice as likely to have low/moderate function compared to past/never smokers
Mor et al. (1989)	LSOA, 2-year follow-up Age 70-74 at baseline	Reports of no regular exercise in men and not walking one mile in women associated with decline in physical functioning
Pinsky et al. (1987)	Framingham Heart Study, 21-year follow-up Age 56+ at follow-up	Smoking in males associated with decline in function in healthy subset
Branch (1985)	Massachusetts Health Care Panel Study, 5-year follow-up Age 65+ at baseline	Smoking associated with incident disability
Kaplan (1992a)	Alameda County Study, 9-year follow-up Age 59+ at follow-up	Smoking and low leisure-time physical activity associated with incident mobility and self-care problems
Kaplan et al. (1993)	Alameda County Study, 6-year follow-up Age 65+ at baseline	Smoking and low physical activity associated with declines in physical functioning
Camacho et al. (1993)	Alameda County Study, 19-year follow-up Age 80+ at follow-up	Cumulative effect of low level of physical activity over previous 19 years on physical function

of disease. Although several studies have attempted to statistically adjust for underlying disease, most have used self-reported acute and chronic conditions that may not be sensitive enough. The consistency of the finding of an association between socioeconomic level and poorer functioning argues for focused research aimed at understanding this relationship.

There is also some evidence that marital status and levels of social networks or social support are prospectively associated with poorer physical functioning. For example, being unmarried was associated with poorer functioning in Mor et al.'s (1989) analysis of the Longitudinal Study of Aging cohort. In a 6-year follow-up of persons 65 years

old or older, Kaplan et al. (1993) found that being unmarried and having a low level of social network participation were both associated with greater declines in functioning. Camacho et al. (1993) found a cumulative effect of social isolation such that persistent social isolation over the preceding 19 years was associated with lower levels of physical functioning in those who reached at least 80 years of age. Although we do not fully understand the pathways accounting for the impact of social factors on physical functioning, the literature is consistent enough to suggest that socioeconomic level, marital status, social network participation, and social support may be important predictors of physical functioning.

Do Behavioral and Social Factors Modify the Impact of Disease on Functioning?

Compression of morbidity is a highly desirable goal, yet there is little evidence supporting movement in that direction. Given the low probability of ever eliminating all disease among the elderly—leading to people dying “healthy”—and the burden of disability associated with acute and chronic diseases among the elderly, it is reasonable to ask if behavioral and social factors might reduce the impact of disease on disability. There are, unfortunately, very few studies that have examined these issues with respect to physical functioning, although there are some studies that have looked at behavioral and social factors as modifiers of mortality risk after acute or chronic events (Berke, Leo-Summers, & Horwitz 1992; Ruberman, Weinblatt, Goldberg, & Chaudhary, 1984; Williams et al., 1992). So far the evidence is relatively consistent. The notion of behavioral and social modifiers of disease-related problems in functioning is not unreasonable because it is likely that physical function is determined by an interacting set of physiologic, behavioral, cognitive, psychological, and environmental factors. Evidence supporting an ameliorative role for behavioral and social factors is summarized in Table 3.3

What are the Environmental Factors Supportive of Healthy Aging?

The evidence reviewed so far has focused primarily on the role of factors in the individual that predict healthy aging. Although the evi-

TABLE 3.3
Behavioral and Social Modifiers of Disease-Related Problems in Physical Functioning

Study	Population	Results
Cummings et al. (1988)	Hip fracture patients 6-month follow-up Age 60+ at baseline	Greater number of social supports associated with increased ability to walk unaided
Verbrugge et al. (1991)	Supplement on Aging Self-reported arthritis Age 55+ at interview	Being married, higher education, and non-black status associated with higher levels of functioning
Nickel & Chirikos (1990)	Cohort of patients hospitalized for coronary care, 6 month-9 year follow-up Mean age 74 (males) and 59 (females) at baseline	Among those who survived to 8-9 year follow-up, greater disability associated with lower income; for women being unmarried associated with less disability
Kaplan (1992a)	Alameda County Study, 9-year follow-up Age 59-89 at follow-up	Among those with incident heart trouble, stroke, or arthritis, smoking and inadequate income associated with twice the risk of incident mobility problem
Magaziner et al. (1990)	Hip fracture patients, one-year follow-up Age 65+ at baseline	Greater contact with social network at 2 months associated with better walking ability, less physical dependence and less instrumental dependence at 1 year
Marottoli et al. (1992)	New Haven EPESE cohort, 6-week and 6-month follow-up of hip fracture patients Age 65+ at baseline	Higher levels of physical functioning pre-fracture associated with higher physical function post-fracture
Kaplan et al. (unpublished)	Alameda County Study, 6-year follow-up Age 65+ at baseline	In those with incident stroke, prior low income and low physical activity associated with greater decline in physical functioning

dence suggests that modification of these factors holds promise in promoting our expanded concept of healthy aging, there are important factors outside the individual that need to be considered.

The Healthcare Environment

Much more attention needs to be paid to the influence of access to and provision of health care services to the elderly, including preventive, rehabilitative, and case management services (Ory & Bond, 1989). It is likely that if we can prevent or delay the onset of chronic and acute diseases and their sequelae in the later years, we will be able to prevent the progressive declines in functioning that interfere with healthy aging. Evidence suggests that rehabilitative services and possibly interventions that increase exercise capacity and strength might have a substantial impact on the postponement of frailty (Bucher & Wagner, 1992). Unfortunately, these services are limited in availability and are seldom reimbursed by second-party payers.

The Social Environment

We have reviewed several studies which suggest that social support, social networks, education, socioeconomic level, and other socioenvironmental factors are associated with level of disability both in the presence and absence of diagnosed disease. The evidence with respect to recovery of function post-hip fracture is particularly consistent (Cummings et al., 1988; Magaziner, Simonsick, Kashner, Hebel, & Kenzora, 1990). Several Swedish studies also illustrate the impact of socioenvironmental interventions on functioning for older persons. Arnetz and colleagues (1983, 1987) conducted an intervention in a senior citizen apartment building, with two floors randomly assigned to control and intervention status. The intervention consisted of a "social activation" program directed at increasing social activity and independence, and the impact of this intervention was evaluated at 3 and 6 months. Positive changes associated with the intervention included increased social activity, independence, and resistance to control, increased height, and increased anabolic and decreased catabolic hormones indicating decreased stress. In another study, elderly female pensioners who rated themselves as lonely and were awaiting placement in housing units were assigned to group meetings with peers or a waiting list (Andersson, 1984). At a 6-month follow-up, the participants in the peer group meetings were less lonely, had greater self-confidence, and lower blood pressure. Finally, Lökk, Theorell, Arnetz, and Eneroth (1991) conducted a trial with adult day care patients, most of whom suffered from cerebrovascular disease. The intervention engaged patients in small group activities, including

discussing the goals and progress of rehabilitation and going on outings, and encouraged them to contact each other outside the facility. At 24 weeks, those in the intervention group scored higher on a number of psychological scales, showed greater improvement in physical functioning, and showed decreases in plasma prolactin, possibly indicating lower stress. Thus, interventions aimed at modifying the social context of aging could significantly promote healthy aging. These studies indicate that relatively simple interventions, focused on social support and autonomy, can help to promote "healthy aging," even in patients requiring adult day care.

The Physical Environment

The role of the physical environment in promoting healthy aging is relatively unstudied. Some current interventions are directed at reducing hazards in home environments that lead to falls (Stevens, Hornbrook, Wingfield, Hollis, & Greenlick, 1991). But even broader interventions might be necessary. The evidence we have reviewed suggests that higher levels of physical activity promote "healthy aging," and it is reasonable to ask if there are environmental barriers that interfere with physical activity. One possible barrier is traffic. If older persons cannot cross streets, they might restrict their walking. Based on walking speeds from the Established Populations for the Epidemiologic Study of the Elderly (EPESE) studies (J. Guralnik, personal communication) we have illustrated in Figure 3.1 how far older persons might get across the street in front of the authors' office. Assuming a 2-second delay in beginning to cross after the light turns green, males and females who are 65+ years of age would get only three quarters of the way across the street before the light turns red. An 80+ year old woman would get less than half way. It seems reasonable to believe that environmental factors like these impede activity among the elderly.

Unanswered Questions

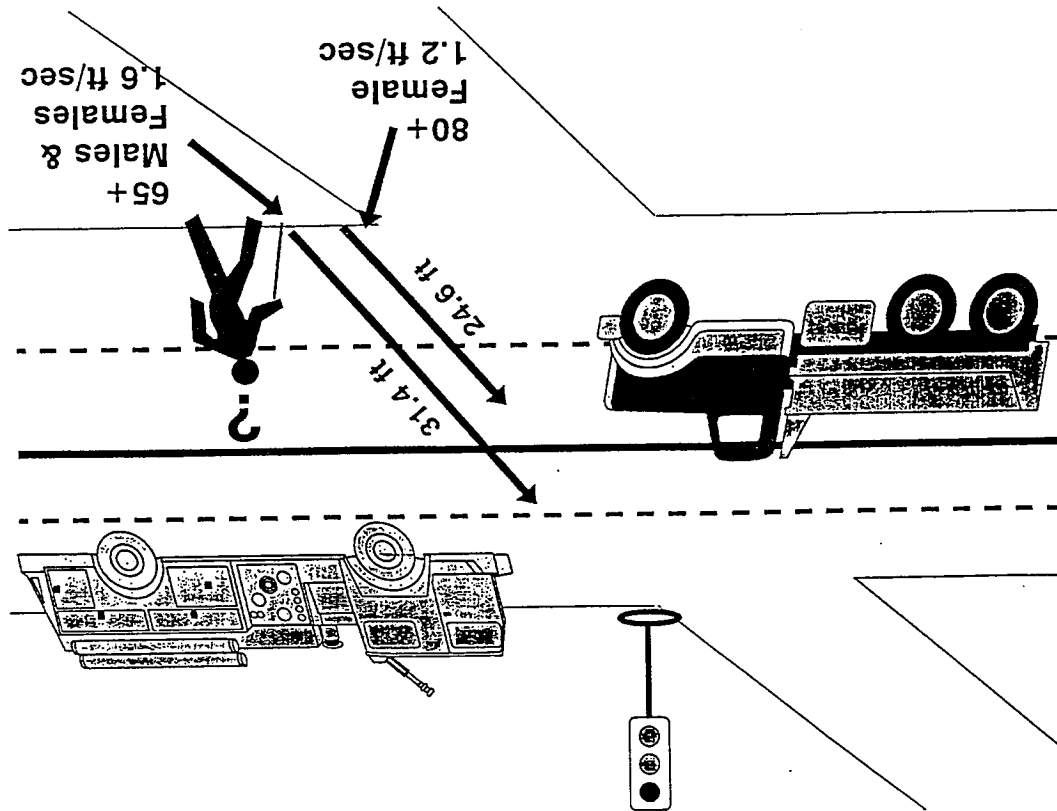
We have contended that an expanded view of healthy aging is required, one that considers the importance of primary, secondary, and tertiary prevention. Although the small amount of evidence available supports such a perspective, considerably more work needs to be done to meet the conceptual and methodologic challenges posed by

this view. In this chapter we restricted our discussion to physical functioning. It is clear that a full view of healthy aging will need to consider the full spectrum of domains of functioning (Roos & Havens, 1991). Such consideration will lead to new definitions of active life expectancy that involve domains beyond physical functioning, and that, consistent with a conceptualization of healthy aging, are applicable throughout the disease spectrum.

We also need to know the mix of short- and long-term determinants of healthy aging. That is, the respective contribution of long-term, life-time exposures and more proximal exposures that are amenable to modification in later life. The preliminary evidence with respect to smoking suggests that smoking cessation at older ages reduces mortality risk, but we do not know if it also improves functioning. In general we recommend that existing longitudinal studies that have data covering decades before reaching the older years be exploited to investigate this issue. An initial approach to this was taken by Camacho et al. (1993) who examined the cumulative effects of behavioral, social, and psychological factors on physical functioning in those who had reached 80 years of age or more. Over the previous two decades, higher functioning was related to the consistency of the patterns of physical activity, moderate alcohol use, moderate weight for height, and absence of depression. There was also suggestive evidence of a cumulative effect of social isolation.

Finally, we must recognize that any adequate approach to healthy aging will have to accept the recursive, interdependence of health status, physical, social, cognitive, and psychological functioning (Kaplan, 1992b). Figure 3.2 presents the pattern of interrelationships found in the Alameda County Study. High levels of depressive symptoms are associated with declines in physical activity (Kaplan, Lazarus, Cohen, & Leu, 1991) and increased risk of social isolation (G. Kaplan et al., unpublished data). Low levels of physical activity are associated with increased risk of incident depression (Camacho, Roberts, Lazarus, Kaplan, & Cohen, 1991), and increased social isolation (G. Kaplan et al., unpublished data). At the same time, social isolation is associated with declines in physical activity (Kaplan et al., 1991), and increased risk of depression (Kaplan et al., 1987). Although this web of causation leads to analytic difficulties, it is a reality that needs to be addressed in approaches to healthy aging.

FIGURE 3.1 Schematic illustration of problems encountered by the elderly when crossing intersections. Arrows indicate distances covered by indicated groups before light turns red. Walking speeds taken from National Institute on Aging Established Populations for the Epidemiologic Study of the Elderly (J. Guralnik, personal communication).



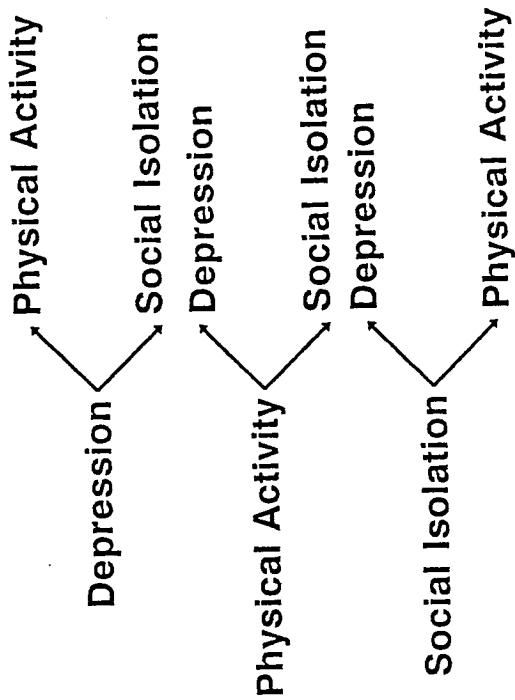
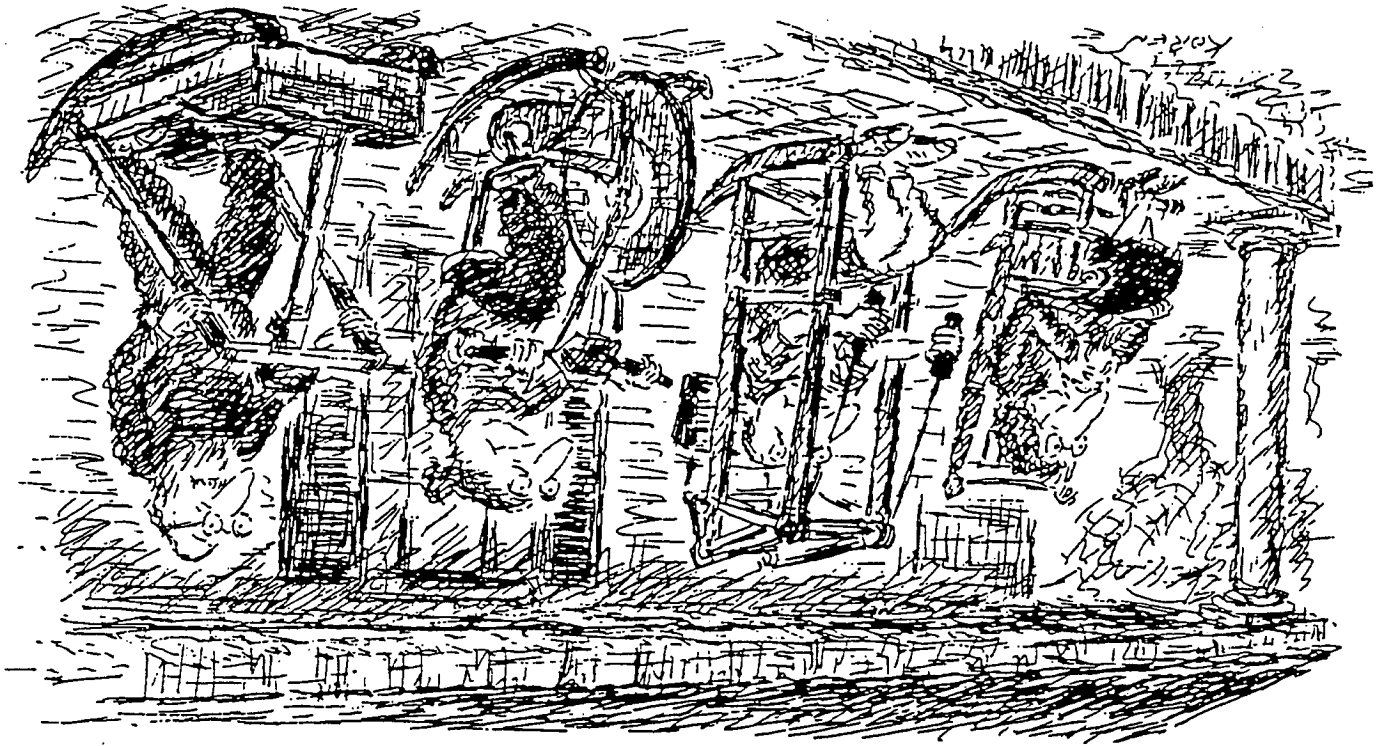


FIGURE 3.2 The recursive interplay of behavioral, social, and psychological factors. Based on prospective data from the Alameda County Study.

Conclusion

Although we may hope for the outcomes portrayed in Figure 3.3, it is a view of aging whose time has not yet come for the bulk of the population. An expanded view of healthy aging that recognizes the possibility of increasing health, functioning, and quality of life at all stages of the health-disease continuum creates exciting possibilities for primary, secondary, and tertiary prevention and leads to the following conclusions:

- Age is not destiny. There is substantial variation in health and functioning between individuals of the same age.
- Behavioral and social factors are associated both with mortality and with the level of health and functioning among those who survive to older ages.
- Disease is not destiny. Behavioral and social factors may modify the impact of acute and chronic disease on functioning.



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- Such a perspective leads to increasing optimism about the possibilities for increasing the levels of healthy aging in the population, thereby adding "life to years."

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Chapter 4

Disability in Late Life

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For most adults, the time between the onset of chronic morbidity and death is long, measured in years and decades. Discomfort and limitations become everyday matters—perpetual for some people, episodic for others. In the long run, symptoms and dysfunctions tend to increase, and correspondingly, so do professional and personal efforts to slow the progress of medical conditions, blunt symptoms, and restore function. Many such interventions are successful so that people return to work, play tennis again, readily get out for movies and shopping, feel hopeful about the future, and stow away the medical paraphernalia they no longer need.

"Disability" refers to the impact that chronic conditions have on people's ability to act in necessary, expected, and personally desired ways in their society. Chronic conditions are progressive diseases and sensory or structural abnormalities; their onset is usually in middle or older ages. Examples are arthritis, ischemic heart disease, hypertension without heart disease, Alzheimer's disease or other dementia, emphysema, bunions, persistent hemorrhoids, hearing loss, vision loss, and chronic low back pain. Our attention is on long-term, but not necessarily static, consequences of those conditions on functioning.

Available statistics on disability give a brief, narrow picture of the disability experience. They focus on abilities to perform basic personal care, household management, and work activities. They query a per-