

CHAPTER 3

A Developmental Approach to Psychosocial Risk Factors and Successful Aging

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Successful aging has been characterized as maintaining physical health (avoiding disease), sustaining good cognitive function, and having active engagement with other people and productive activities (Rowe & Kahn, 1998). Although these three factors are known to be interrelated, the field has largely examined physical health outcomes as primary and separate from cognitive outcomes, with active social engagement as a predictor of physical health and occasionally cognitive functioning. In this chapter we take a more transactional perspective to these factors of successful aging, understanding how they interact throughout the lifespan to create developmental trajectories of varying levels of success. In addition, we utilize the extensive evidence from health psychology that personality characteristics such as hostility and neuroticism also place individuals at risk for aging unsuccessfully (Krantz & McCeney, 2002; Smith & Ruiz, 2004). The associations among physical health, cognitive functioning, social functioning, and personality (Elias, Elias, Robbins, Wolf, & D'Agostino, 2001; Seeman, Lusignolo, Albert, & Berkman, 2001; Smith & Ruiz, 2004; Waldstein & Katzel, 2001) are suggestive of a lifetime connection among these factors of successful aging. From a developmental perspective, the im-

portant question is "What are the processes whereby risk factors operate over the course of a lifespan to affect successful aging?"

In this chapter we provide a lifespan developmental approach to understand how individuals, with their early personality predispositions and ways of interacting with their social world, can age successfully (or unsuccessfully) physically, cognitively, and socially. First, we begin by briefly reviewing existing work within health and aging that focuses on two types of psychosocial risk factors for physical health: personality characteristics and the quality of the social environment (social support, active engagement with others, and productive activities). Next we present a transactional developmental model that explores how early individual differences in personality may provide a way of interacting with one's environment that affects the quality of one's social interactions and has implications for both physical health and cognitive outcomes. This model proposes that personality and social support are not separate risk factors, but that they aggregate in their potential for risk and coexist with cognitive and physical health in the lifespan experience of individuals (Smith, Glazer, Ruiz, & Gallo, 2004; Smith & Spiro, 2002). Finally, we provide a window into this developmental process as we explore how specific aspects of personality (namely, hostility) may place individuals at risk for poor physical, cognitive, and social functioning in the context of marriage. The transactional quality of this developmental framework holds promise for understanding the intricate connection among the elements of successful aging (physical health, cognitive health, and social health) identified by Rowe and Kahn (1998) that often are examined separately in the literature.

TRADITIONAL PSYCHOSOCIAL RISK FACTORS AND AGING

The study of psychosocial risk factors for disease and reduced longevity has typically included a conceptual distinction between characteristics of persons— notably, personality variables—and characteristics of their social circumstances (e.g., social isolation, support, conflict). Decades of research have produced compelling evidence that personality characteristics predict the onset and course of serious and often fatal illness (Friedman & Martin, Chapter 9, this volume; Smith & Ruiz, 2004), and social isolation and other characteristics of the social environment are similarly well-established as risk factors (Uchino, 2004). In what follows here we briefly review major observations in this literature and describe how these associations between psychosocial risk factors and health outcomes may change with age. We focus in this section on traditional physical health outcomes and address in the next section how these risk factors can also affect cognitive and social outcomes.

Personality as Risk

Among the wide variety of personality characteristics studied as risk factors, hostility, neuroticism, and optimism are among those with the greatest empirical support. "Hostility" refers to a set of cognitive, affective, and behavioral characteristics (Smith, 1992). Cognitively, hostility refers to "a devaluation of the worth and motives of others, an expectation that others are likely sources of wrong-doing, a relational view of being in opposition toward others, and a desire to inflict harm or see others harmed" (Smith, 1994, p. 26). Affectively, "anger" refers to the tendency to experience frequent and pronounced episodes of this emotion, which varies from irritation or annoyance to fury and rage. Aggressiveness includes a variety of behaviors involving attacking, destructive, or hurtful actions, though behaviors associated with trait hostility also include a cold, disagreeable, quarrelsome, and antagonistic interpersonal style.

Recent interest in hostility as a risk factor for cardiovascular disease and premature mortality stems from efforts to identify the specific unhealthy elements within the broader Type A behavior pattern (Siegman, 1994). A prior quantitative review indicated that across a variety of measures of hostility, trait anger, and aggressiveness, this set of characteristics is associated with increased risk of coronary heart disease (CHD) and reduced longevity (Miller, Smith, Turner, Guijarro, & Hallet, 1996). Although not all subsequent studies have produced positive findings (Eng, Fitzmaurice, Kubansky, Rimm, & Kawochi, 2003; Sykes et al., 2002), several large and well-controlled prospective studies have produced positive results (see Smith, Orleans, & Jenkins, 2004, for a review). Various measures of hostility have been associated with concurrent levels and progression of atherosclerosis in otherwise healthy samples (Harris, Matthews, Sutton-Tyrell, & Kuller, 2003; Iribarren et al., 2000; Matthews, Owens, Kuller, Sutton-Tyrell, & Jansen-McWilliams, 1998), and with the progression of atherosclerosis and susceptibility to myocardial ischemia acute coronary events among persons with established cardiovascular disease (Angerer et al., 2000; Mendes de Leon, Kop, de Swart, Bar, & Appels, 1996). This suggests that hostility may influence multiple processes within the decades-long changing etiology of CHD (Smith, Glazer, et al., 2004).

Individual differences in the tendency to experience sadness, anxiety, and other negative emotions have long been suspected as leading to poor health (Smith & Ruiz, 2004). Negative affectivity (Watson & Clark, 1984) and neuroticism (Costa & McCrae, 1987) reflect the disposition to experience negative emotions and related cognitions (e.g., low self-esteem, worry) within the range of normal adjustment, but they also confer vulnerability to the development of clinically diagnosable mood and anxiety disorders (Zonderman, Herbst, Schmidt, Costa, & McCrae, 1993). Neuroticism and

negative affectivity are associated with symptom reporting and other illness behaviors that are in excess of independently confirmed physical illness (Costa & McCrae, 1987; Watson & Pennebaker, 1989). However, a large and growing body of evidence suggests that these traits are also associated with increased risk of objectively verified cardiovascular disease and reduced longevity (Smith & Ruiz, 2004). For example, various measures of negative affectivity have been associated with the development of high blood pressure (Jones, Frank, & Ingram, 1997), and among persons with hypertension, the incidence of stroke and death from CHD (Simonsick, Wallace, Blaser, & Gerlman, 1995). Among initially healthy individuals, these traits have been found to predict the development of CHD (Barefoot & Schroll, 1996; Kubzansky et al., 1997), premature mortality (Hermann et al., 1998), and reduced survival among persons with established CHD (Barefoot et al., 1996; Januzzi, Stern, Pasternak, & DeSanctis, 2000; Smith & Ruiz, 2002).

Individual differences in optimistic and pessimistic expectations about future events have also been found to predict important health outcomes (Smith & Ruiz, 2004). Compared to persons endorsing pessimistic expectations or hopelessness, optimists experience fewer medical complications following cardiac surgery or angioplasty (Helgeson & Fritz, 1999; Scheier et al., 1999) and survive longer following a diagnosis of breast cancer (Schulz, Bookwala, Knapp, Scheier, & Williamson, 1996). Optimism is also associated with longevity and reduced incidence of cardiovascular disease and death (Kubzansky et al., 1997; Maruta, Colligan, Malinchoc, & Offord, 2000). Optimism is closely (i.e., inversely) associated with neuroticism and negative affectivity (Smith, Pope, Rhodewalt, & Poulton, 1989), and this overlap is often not controlled in studies of the health consequences of optimism. Hence, the unique predictive utility of this trait relative to the broader dimension of neuroticism and negative affectivity has not been clearly established.

Mechanisms Involved in the Association between Personality and Physical Health

Several mechanisms could account for the association between these characteristics and the development of disease. The association between hostility and health may reflect an underlying biological factor that both promotes the development of these behavioral characteristics and confers vulnerability to disease (Williams, 1994). Furthermore, potential psychophysiological mechanisms include heightened cardiovascular and neuroendocrine responses to potentially stressful events during daily life. Hostile persons evidence heightened physiological reactivity across a variety of methodologies (for a review, see Smith, Glazer, et al., 2004). Chronic symptoms of anxiety and depression are associated with suppressed immune

functioning (Cohen & Herbert, 1996; McGuire, Kiecolt-Glaser, & Glaser, 2002), increasing the likelihood of infectious illness and cancer (Rabin, 1999); whereas optimism is associated with better immune functioning (Segerstrom, Taylor, Kemeny, & Fahey, 1998) and lower levels of ambulatory blood pressure (Raikkonen, Katainen, Keskivaara, & Keltikangas-Jarvinen, 2000). Heightened sympathetically mediated physiological stress responses and decreased parasympathetic activity associated with anxiety and depression could contribute to the development and progression of atherosclerosis, as well as the later emergence of manifestations of CHD (Kop, 1999).

These traits are also associated with differential exposure to interpersonal conflict and social support. Hostility is associated with increased exposure to unhealthy social contexts (i.e., low support, high conflict), which could contribute to the health consequences of hostility (Smith, Glazer, et al., 2004) and also reflect the interpersonal or transactional consequences of the hostile person's cynical thinking and antagonistic actions (Smith, 1992; Smith, Glazer, et al., 2004). Similarly neuroticism and negative affect are also associated with low levels of support and high levels of interpersonal conflict, and this psychosocial vulnerability could reflect transactional processes through which chronically dysphoric persons create stress and undermine support in their social networks (Smith & Ruiz, 2004). In contrast, optimists experience greater social support (Brissette, Scheier, & Carver, 2002).

Finally, these characteristics may operate through negative or positive health behaviors (Carney, Freedland, Rich, & Jaffe, 1995). For instance, hostility is associated with negative health behaviors such as smoking, excessive alcohol intake, and physical inactivity, and some studies have indicated that these health behaviors account for the association between hostility and subsequent cardiovascular disease (Everson et al., 1997). Optimism is associated with more effective participation in medical care (Strack, Carver, & Blaney, 1987).

Personality and Health Risk across Adult Development

Across these three personality risk factors, developmental processes could moderate the strength of their associations with health outcomes or the underlying mechanisms through which they influence health (Smith & Spiro, 2002). First, despite the considerable stability (Costa & McCrae, 1994) in personality traits, there are also differences across development. For instance, declines are seen from young to middle adulthood in hostility, with potential increases in late adulthood (Barefoot, Beckham, Haney, Siegler, & Lipkus, 1993). There is a potential curvilinear relationship between negative affect and depression, with the highest scores occurring during young and late adulthood (Gatz, Kasl-Godley, & Karel, 1996). In addition to

these age patterns in personality across individuals, there is also considerable intraindividual change in personality traits (Mroczek & Spiro, 2003). Second, even traditional risk factors have a changing pattern of association with health outcomes with increasing age (Kaplan, Haan, & Wallace, 1999). Several important diseases (e.g., cancer, CHD) have complex etiologies that involve multiple mechanisms that differ as they progress (Cohen, Kaplan, & Manuck, 1994; Rabin, 1999). Hence, the association of age with stage of disease virtually guarantees changing levels of association between personality characteristics and disease outcomes and mechanisms with increasing age. For example, pathophysiological processes involved in the initiation and progression of atherosclerosis differ from those involved in the emergence of CHD or ischemic stroke among persons with advanced atherosclerosis, and the medical course of CHD and stroke involves still other mechanisms. Any given personality trait could influence these stages of disease differently if they are distinctly related to the varying mechanisms.

Third, if a psychosocial risk factor influences the initial development and progression of a potentially fatal disease, then with increasing age of a study sample, survivor effects may weaken the association between the trait and health outcomes (Williams, 2000); that is, a risk factor may contribute to the elimination of vulnerable persons from the potential sample through mortality. Those persons scoring high on this risk factor who survive without developing disease may be resilient in some way that is not typical of the general population. This general issue of changing effects and mechanisms with increasing age has only recently been studied, and initial results suggest that such effects are important (Aldwin, Spiro, Levenson, & Cupertino, 2001; Duberstein et al., 2003).

Social Functioning as Risk

Social functioning, as assessed via a wide variety of measures, is associated with a multitude of positive health outcomes, including reduced risk for cardiovascular disease, cancer, infectious illness, functional decline, and lower risk of mortality (see Rook, Mavandadi, Sorkin, & Zettel, Chapter 14, this volume; Berkman, 1995; House, Landis, & Umberson, 1988; Uchino, Cacioppo, & Kiecolt-Glaser, 1996). Social functioning represents many facets of the social environment, including both the amount of interaction within the network, the structure of an individual's social network (i.e., group membership or familial ties), as well as the function served by the network (i.e., emotional vs. instrumental support; Krause, 2001; Uchino, 2004). Although studies have examined the separate contribution of these facets to understanding health, they clearly coexist in daily life. For instance, individuals who are more socially active are likely to experience a larger social network and to derive multiple functions

from the support provided (Krause, 2001). In fact, older individuals who experience the greatest physical health problems may be those who experience risk across the different facets of social support (Bosworth & Schaie, 1997). The literature has traditionally conceptualized social functioning as a risk factor leading to poorer health. However, poorer physical health could also limit one's ability to engage in productive social activities, reflecting a more transactional nature of the relationship. In this chapter we allude to these transactional relationships in the next section; a full treatment of social functioning and aging is beyond the space limitations in this chapter.

"Social activity" refers to the frequency of one's social contacts or interactions, and has been associated with positive emotional and physical outcomes (Uchino et al., 1996). In a longitudinal study, Menec (2003) found that participation in social and productive activities was associated with happiness, reduced physical and cognitive functional decline, and reduced mortality over a 6-year time span, whereas participation in several solitary activities was associated with happiness only. A social activation program aimed at increasing activity levels in the elderly was associated with improved neuroendocrine responses and maintenance of height (Arnetz, Theorell, Levi, & Kallner, 1983). Carstensen (1987) suggested that because physical activity and social activity go hand in hand in daily life, it is impossible to attribute findings linking social activity with successful aging to psychosocial variables alone.

Studies of the structure of the social network examine the existence, extensiveness, and interconnections of social ties, assessing the existence of a spouse, parents, siblings, other family relationships, and friends among the most common social network members (Uchino, 2004). In a meta-analysis of the relationship between physiological processes and social support Uchino and colleagues (1996) found that structural measures of support were associated as strongly with health outcomes as were functional measures of support, suggesting that the structure of the social network is as important to physical health as the actual functional support received from social ties.

Literature examining the relationship between social support and health also relies heavily on the quality or function of social relationships. A high amount of perceived support is seen as a positive aspect of a relationship and is associated with positive health outcomes (Uchino, 2004). Functional social support, such as emotional support, is related to lower cardiovascular mortality (Case, Moss, Case, McDermott, & Eberly, 1992; Orth-Gomer & Johnson, 1987), as well as all cause mortality (Uchino, 2004). In older adults, Blazer (1982) and Berkman and Syme (1979) found that low levels of perceived social support predicted negative health outcomes, whereas the level of social activity did not, suggesting that quality of relationships may be more important than quantity of contacts.

Mechanisms of the Association between Social Functioning and Health

Several mechanisms may operate to account for the relationship between social support and physical health. First, social support may reduce the pathological effects of stress through appraisal processes that dampen the sympathetic-adrenomedullary (SAM) and hypothalamic-pituitary-adrenocortical (HPA) responses to stress (Lepore, 1998; Uchino et al., 1996). The amount of perceived emotional support may be a key feature in understanding reduced cardiovascular reactivity and immune function (Lepore, 1995). Although social support may also provide individuals with the encouragement to engage in less risky behaviors and seek treatment earlier (Berkman, 1995), such mechanisms do not seem to be largely responsible for the link between social support and physical health (Uchino et al., 1996).

Social Functioning and Health Risk across Adult Development

The findings we have reviewed linking social support and measures of health must be understood in the context of normative developmental changes in the social network of adults across the lifespan. Multiple theories have been advanced to account for the general finding that as individuals age, both the frequency of social activity and size of the social network decline (Antonucci, 2001). Disengagement theory describes the narrowing of the social world as a normative process whereby elders and society jointly disengage as a preparatory response to death (Cumming & Henry, 1961). In contrast, activity theory (Lemon, Bengtson, & Peterson, 1972) asserts that optimal aging involves continued social engagement in late life, and that a reduction in social interaction is a result of declining health, reduction in the number of social roles, and the death of friends and relatives. Most current accounts rely on Carstensen's socioemotional selectivity theory (1987, 1991), which posits that the reduction in social interactions is an adaptive effort to control physiological and psychological reactivity by retaining energy for the most significant and emotionally satisfying relationships in late life. Research indicates that although social network sizes are reduced in very old age, individuals retain contact with persons to whom they are emotionally close in the network (Lang, Staudinger, & Carstensen, 1998). Therefore, quality of social relationships may be even more salient for healthy aging. As the social environment is actively narrowed, emotional closeness in significant relationships increases.

In this section we have reviewed the evidence linking personality and social support to indicators of physical health across the lifespan. We have alluded to a transactional process whereby these factors are not separate, but are inextricably connected (Smith, Glazer, et al., 2004; Smith & Spiro, 2002). For instance, hostile individuals and those displaying high neuroticism were described as being at risk because of not only their individual dif-

ference characteristics but also of the poor social support systems (high in conflict and small in number) that they experience. Recent risk profile analyses have revealed that individuals at greatest risk for aging unsuccessfully experience multiple psychosocial risk factors (Lang, Rieckmann, & Baltes, 2002; Smith & Baltes, 1999). In addition to personality and social functioning, these profile analyses indicate that cognitive function is a crucial variable in understanding risk and resilience (see also Gottfredson & Deary, 2004; Seeman et al., 2001). We now present a developmental framework that links these multiple risk factors together to understand the process whereby individuals can age successfully or unsuccessfully in terms of physical, cognitive, and social function.

DEVELOPMENTAL FRAMEWORK FOR UNDERSTANDING RISK AND RESILIENCE IN PHYSICAL, COGNITIVE, AND SOCIAL FUNCTION

The developmental framework advanced here is consistent with broad theoretical lifespan principles put forth by Baltes, Lindenberger, and Staudinger (1998). Development is viewed as a lifelong process whereby events in child development are important in informing trajectories of physical health, cognitive functioning, and social integration across the lifespan. Although early temperamental predispositions and family systems provide the foundation for understanding trajectories of resilience versus risk for health (Repetti, Taylor, & Seeman, 2002), there is plasticity across lifespan development in terms of alterations in these trajectories (Aldwin et al., 2001; Siegler, Costa, et al., 2003). Furthermore, lifespan development occurs through age-graded (e.g., puberty, parenthood, menopause), history-graded (e.g., obesity epidemic, rise in divorce rate), and non-normative (e.g., development of chronic illness, early death of spouse) events.

Successful Aging Begins Early in Life

Our framework traces the traditional risk factors associated with poor health in late adulthood to early personality predispositions, ways of interacting with the social world, and physiological stress responses that occur early in childhood. The view that successful aging begins early in life is consistent with recent biobehavioral models of the social and emotional processes that occur in risky families that may contribute to disruptions in stress regulatory systems, social competence, and negative health behaviors (Repetti et al., 2002; Ryff, Singer, Wing, & Love, 2001). Repetti et al. (2002) argue that in families characterized by anger and aggression, children who may already be predisposed for risk in social competence and physiological stress responses (because of the genetic predisposition for

these same personality characteristics) may experience a cascade of risk. These families provide a context in which the development of normal emotion regulation (Eisenberg & Morris, 2002) and social skills (Coie & Dodge, 1998) may not occur and may lead to disruptions in SAM and HPA reactivity leading to the development of major chronic illness (e.g., hypertension, CHD) and death. Our framework traces how these early vulnerabilities may place individuals on particular trajectories of risk across the lifespan (Smith & Spiro, 2002), and how plasticity in these trajectories may also occur.

As reviewed earlier, personality is one important factor in understanding the trajectory of health that occurs across the lifespan (Aldwin et al., 2001; Siegler, Costa, et al., 2003). Neuroticism and hostility have been implicated in the incidence of illness such as CHD disease, coping with illness, and adherence to specific medical regimens (Smith & Ruiz, 2004; Spiro, Aldwin, Ward, & Mroczek, 1995). These personality characteristics can be traced in part to early patterns of temperament displayed in infancy and childhood that reflect relatively stable patterns of the quality and intensity of one's emotional reactions to events (Caspi & Silva, 1995; Rääkkönen et al., 2000). Rääkkönen et al. found that child's temperament and mother's child-rearing practices predicted hostile attitudes during preadolescence 9 years later. Furthermore, Keltikanagas-Jarvinen and Heinonen (2003) found that components of Type A behavior (i.e., impatience, aggression) predicted cognitive (cynicism and paranoid ideation) and emotional (irritation) components of hostility in adulthood 15 years later. Thus, evidence is accumulating that early childhood temperament and personality may be a precursor to the display of personality traits in adulthood that place individuals at risk for poor physical and health outcomes.

These early temperamental and personality characteristics hold important implications for the social and academic competence of children, and the types of social support networks on which children can draw to deal with stressful life events. Aggressive children process social situations with a hostile attribution bias that contributes to these hostile strategies in social problem-solving settings, leading to reduced quality and size of social networks (Coie & Dodge, 1998). These children experience difficulties at school due to numerous concomitant factors (attention difficulties, behavior problems, etc.) that compromise their cognitive functioning as well (Huesmann, Eron, & Yarmel, 1987). Such children enter a developmental trajectory toward poor social functioning, cognitive abilities, and physical health (Grunbaum, Vernon, & Clasen, 1997; Repetti et al., 2002).

Developmental Trajectories of Successful and Unsuccessful Aging

An extensive literature demonstrates high relative stability (rank-order stability estimates average around .60 across many longitudinal studies) of

personality characteristics from young adulthood through late adulthood (Costa & McCrae, 1994; Roberts & DelVecchio, 2000). Normative changes have been found such that during young adulthood, mean-level declines occur for neuroticism, extraversion, and openness to experience and increases for conscientiousness and agreeableness (Caspi & Roberts, 1999; Srivastava, John, Gosling, & Potter, 2003), whereas declines are seen later in middle-adulthood for hostility, with potential increases in late adulthood (Barefoot et al., 1993). Developmental trajectories that go against these normative trends appear to be particularly damaging to health outcomes. For instance, Siegler, Costa, et al. (2003) found that an increase in hostility from young to middle adulthood was particularly detrimental for a range of health risk factors.

Personality characteristics and social support have been associated with both cognitive and health outcomes. Results from several longitudinal studies (Arbuckle, Moag, Pushkar, & Chaikelson, 1998; Field, Schaie, & Leino, 1998; Gold et al., 1995; Schaie, 1996) suggest that early adulthood neuroticism and rigidity are associated with poorer cognitive function in late life, whereas introversion is associated with better cognitive function. The role of personality in understanding lifetime intellectual development is typically interpreted by understanding how personality may provide a characteristic way of adapting to the environment and selecting intellectual environments. For instance, introverts are thought to show better cognitive function in late life through a lifetime of greater reflection and processing of information (Gold et al., 1995). Neuroticism is thought to affect cognitive functioning through anxiety, and the resources that anxiety may draw from central working memory as individuals process information (Wetherell, Reynolds, Gatz, & Pedersen, 2002). Hostility may affect cognitive function through the effect of elevations in blood pressure on cognitive performance (Elias et al., 2001; Waldstein & Katzel, 2001) or the effect of development of CHD on cognitive function (Hertzog, Schaie, & Gribbin, 1978). Although little work has explicitly examined the link between social support and cognitive function, recent work indicates that the amount of social support, and particularly emotional support received predicts less longitudinal decline in cognitive function (Seeman et al., 2001).

Numerous critical events may provide further impetus for promoting an individual's trajectory toward successful or unsuccessful aging, or changes in this trajectory. One important event, marriage, promises to be particularly influential, because the vast majority of adults enter marriage at some point during adulthood (Fields & Cesper, 2001). Individuals choose mates that are more like them in physical characteristics, cognitive abilities, and personality traits (Epstein & Guttman, 1984). Furthermore, shared experiences within the marriage may play an important role in maintaining similarities in personality across time for spouses (Caspi, Herbener, & Ozer, 1992). Shared experiences within the marriage also may

be responsible for the finding that couples become more similar across time in their cognitive functioning (Gruber-Baldini, Schaie, & Willis, 1995) and are at increased risk of having the same disease (Hippisley-Cox, Coupland, Pringle, Crown, & Hammersley, 2002). Disruptions in marriage, such as experiencing marital difficulties, divorce, or widowhood, may be associated with changes in these trajectories. For example, divorce is associated with personality changes in both men and women (Costa, Herbst, McCrae, & Siegler, 2000; Mroczek & Spiro, 2003) and reductions in health. Other non-normative events such as chronic illness and job loss may also be associated with changes in developmental trajectories (Aldwin et al., 2001).

These personality-based differences in adulthood continue to be associated with particular patterns of social interaction, social skills, and social support, as was true during childhood (Gallo & Smith, 1999; Mischel & Shoda, 1995). Perceived social support is associated with several personality characteristics, important in understanding health outcomes such as neuroticism and hostility (Costa, Zonderman, McCrae, & Williams, 1986). Similar to the literature we mentioned earlier on aggressive children, hostile individuals perceive other individuals with a hostile lens (Allred & Smith, 1991) and are perceived by others as less socially skilled. Thus, hostile or emotionally unstable individuals may perpetuate social environments that are unhealthy during adulthood, because they are unable to interact skillfully with others (Smith, 1992; Smith, Glazer, et al., 2004). Experiencing difficult interpersonal relationships may cross social relationships (e.g., family, friends), leaving the older adult with fewer social resources (Krause & Rook, 2003).

In late life, the frequency and chronicity of health and cognitive losses may potentially boost the predictive utility of psychosocial risk factors in understanding successful physical and cognitive functioning. Social support may be particularly important for older adults experiencing serious, chronic health conditions (Seeman & Chen, 2002) and cognitive dysfunction (Gurung, Taylor, & Seeman, 2003). The size and activity of one's social network may protect against physical and cognitive decline, because such ties may facilitate engaging in productive activities that may prevent such decline (i.e., "Use it or lose it"; Hultsch, Hertzog, Small, & Dixon, 1999), and boost self-efficacy and reduce depression (Seeman et al., 1996). Consistent with the transactional quality of our model, the ability to maintain an active social network may be affected by one's lifelong pattern of interacting with the world that has been linked to basic personality characteristics (e.g., hostility, neuroticism). This means that individuals experiencing depression and/or hostility may interpret their social world more negatively and receive less benefit from it (Krause & Rook, 2003). The tight connections among physical health, cognitive function, and social support in late life may allow for more distinct clusters or profiles of "successful" or "un-

successful" aging, illuminating the role of the aggregation of a lifetime of psychosocial risk (Smith & Baltes, 1999).

A Window into the Developmental Process: Physical and Cognitive Function in the Context of Marriage

The most direct support for the developmental processes outlined in this chapter has been with respect to the links between hostility, social support, and physical health (Repetti et al., 2002; Smith, Gallo, & Ruiz, 2002). As mentioned previously, hostility, which encompasses chronic anger, hostile beliefs and attitudes, and aggressive interpersonal behavior, is associated with increased risk of CHD, decreased longevity (see Friedman & Martin, Chapter 9, this volume; Smith, Orleans, et al., 2004), and death. One of the mechanisms underlying the poorer health outcomes of hostile individuals is a decrease in the quality of their social interactions (Smith, 1992). Hostile individuals experience more frequent and severe interpersonal stressors, such as conflicts at work and home, and they respond to related stressors (e.g., disagreement, provocation) with more reactive cardiovascular and neuroendocrine responses (Smith, Glazer, et al., 2004). The cumulative effects of more frequent and severe reactivity displayed by hostile persons is believed to contribute to the development of CHD and other threats to health and longevity (Williams, Barefoot, & Shekelle, 1985).

As mentioned previously, marriage is an important context for lifespan development and a particularly relevant social context for hostile individuals, who experience more marital distress and greater cardiovascular responses to stressful marital interactions (Newton & Kiecolt-Glaser, 1995; Smith, Pope, Sanders, Allred, & O'Keefe, 1988) than less hostile individuals. Marriage generally has beneficial effects on cardiovascular risk and longevity, but marital distress and disruption can have negative impacts (see Kiecolt-Glaser & Newton, 2001). Furthermore, unlike their more agreeable counterparts, hostile persons do not display attenuated physiological stress responses when they receive social support (Lepore, 1995; Smith, Uno, Uchino, & Ruiz, 2000). Thus, hostile individuals are likely to experience greater interpersonal distress in the marriage, greater cardiovascular reactivity when distressed, and are less likely to receive the positive benefits of being married.

Hostile persons may also not experience the socially productive activities that are important for maintaining cognitive function in late life, particularly within the context of the marital relationship. Collaboration during everyday problem solving (e.g., how to complete one's taxes, decisions regarding supplemental insurance, running errands) becomes increasingly important in later life, because it allows individuals to adapt to new demands and compensate for changes in cognitive functioning (Dixon & Gould, 1996). The spouse is a particularly important collaborator in daily problem

solving among older adults (Berg, Johnson, Meegan, & Strough, 2003; Meegan & Berg, 2002). Compared to working alone, collaboration with the spouse can produce increased memory and problem-solving performance among older adults (Meegan & Berg, 2002). Effective collaboration requires cooperation, guidance, and mutual understanding. Critical or controlling behavior can impede progress and produce poorer cognitive outcomes (Berg et al., 2003). Given the increased marital distress and antagonistic marital interactions associated with hostility, collaborative interactions are likely to be both more stressful and less effective for hostile persons—and for those married to hostile persons. Chronically hostile individuals may be somewhat less likely to engage in such collaboration, because the necessary interactions would be emotionally negative and antagonistic. Thus, hostility may undermine everyday cognitive performance by disrupting interactions that are most conducive to cognitive adaptation among older adults. This represents a secondary cost of hostility that is particularly relevant to later life.

A developmental perspective is critical to understanding the social-psychophysiological mechanisms linking hostility and health in marital interactions, because of both the negative health effects of hostility that likely accrue over the course of many years, and the nature of marital interaction and adjustment changes across middle and late adulthood (Levenson, Carstensen, & Gottman, 1993). Compared to marriages of middle-aged couples, older couples' marriages involve less potential for conflict (Levenson et al., 1993), less negative and more affectionate behavior during conflict discussions (Carstensen, Gottman, & Levenson, 1995), and less reactive physiological responses to conflict. The increased affectionate behavior of long-term marriages in late life may be due to many factors, including cohort, the exit of children from the home, the attrition of older adults who divorced and were unsatisfied from the pool, and so on. Whatever the reason, these changes suggest "conflict" may not be as important an interpersonal stress for chronically hostile older adults as opposed to middle-aged adults. Instead, interpersonal stress may occur in the context of everyday problem solving that involves daily decisions and stressors (e.g., regarding health, finances, and interpersonal conflicts). To the extent that everyday problem solving revolves around problems with other people and involvement with others (Berg, Strough, Calderone, Sansone, & Weir, 1998; Strough, Berg, & Sansone, 1996), these collaborative interactions may be particularly stressful for chronically hostile individuals.

In summary, within the marital context we can see the effects of the traditional risk factors (e.g., hostility, social support) on physical and cognitive functioning. The cumulative effects of less satisfying social interactions and heightened reactivity displayed by hostile persons contribute to the development of CHD and other threats to health and longevity (Williams et al., 1985). In addition, chronically hostile individuals may be less

likely to benefit from collaborative problem solving as an adaptation to cognitive demands in late adulthood (Dixon & Gould, 1996). Through disrupted social interactions and less frequent productive collaboration with the spouse, hostility may undermine cognitive performance and physical functioning among older adults.

SUMMARY AND CONCLUSIONS

The developmental approach to psychosocial risk and successful aging illustrates the lifetime connection among personality, social support, and cognitive and physical functioning. The model indicates that successful aging may begin early in life as individuals, with their various temperamental predispositions, adapt to and shape their cognitive and social environments. This inextricable link between psychosocial risk and successful aging is maintained during adult development as individuals enter new social relationships such as marriage and adapt to changing cognitive demands. These psychosocial risk factors may become particularly important during late adulthood, when the balance is tipped toward adapting to losses as opposed to gains across the lifespan (Baltes et al., 1998).

We began this chapter with the question, "What are the processes whereby risk factors operate over the course of a lifespan to affect physical and cognitive outcomes?" This question assumes that physical health and cognition are outcomes, and personality and social support are risk factors that predict these end points. However, the transactional nature of our framework for successful aging breaks down the traditional assignment of risk factors as antecedents, and cognitive and physical functioning as end points. Rather than focusing only on the linear effects of risk factors predicting outcomes, the developmental process is likely to be much more dynamic and recursive. Adequate physical health may be needed in order for older adults to engage in the types of social activities that may be important in maintaining cognitive function. High cognitive function may allow for a lifetime of greater skills in handling difficult social and health situations that promote positive health practices and adherence to difficult medical regimens (Gottfredson & Deary, 2004). A greater understanding of the dynamic relations among these variables drawn from recent systems and transactional theories of human development is needed and will advance the construct of successful aging.

The lifespan nature of our developmental approach assumes greater importance as work in behavioral medicine begins to acknowledge the early precursors to poor health in late adulthood (Keltikangas-Jarvinen & Heinonen, 2003; Repetti et al., 2002; Siegler, Bosworth, & Merrill, 2003; Smith, Orleans, et al., 2004). The long-standing nature of the characteristic ways that individuals interact with their social world and the intricate con-

nections among cognitive, physical, and social factors may pose challenges to beginning the process to change adaptations. Change may be more likely at particular transition points across the adult lifespan (e.g., marriage, divorce, serious health incidents). The importance of the marital relationship as a context for development may suggest that marriage could be targeted for change that may affect health, social engagement, and cognitive functioning (Ewart, Taylor, Kraemer, & Agras, 1984). Assisting individuals in aging successfully is important because an ever-increasing number of adults are expected to live into advanced old age (85+). It is likely that the answer to the question "How does one age successfully?" has its roots in early development and occurs via a complex transactional process.

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