CHAPTER 7

Contributions of Personality to Health Psychology

Howard S. Friedman
Margaret L. Kern

At a most basic and important level, a key goal of health psychology is to improve health, well-being, and longevity. Reaching this goal means understanding not only the correlates and predictors of health but also the causal processes. Too often, health research uncovers a variable connected to good health but has no way of knowing whether an intervention involving this new variable will lead to better health. For example, the traditional Mediterranean diet, full of nutrient-rich vegetables, fruits, and olive oil, is associated with good health, but should individuals tilt their behavior toward olive and tomato consumption, vitamin and nutrient pills, or sailing in the sunshine-filled Mediterranean? Or might none of these be effective in causing improvements in health? Conversely, unhappy, distressed loners are at high risk for poor health, but should we find them marriage partners, conscript them to church, and feed them antidepressant pills to lower their risk of cancer and heart disease? Or might none of these be effective in reducing disease risk?

In health psychology, the problem of appropriate interventions over the long term is especially complex for two reasons. First, it is often impossible to conduct optimal randomized clinical trials; that is, we cannot randomly assign some adolescents to spend the next 20 years becoming smokers, marathon runners, well-educated professionals, good spouses, sound sleepers, or religious worshippers. Second, there is tremendous individual variation as early individual temperamental predispositions encounter diverse social environments and differing sociobehavioral patterns develop (Friedman, 2007; Hampson & Friedman, 2008). This extensive individual variation then interacts with subsequent threats to health as people grow and age. Understanding the likelihood of disease for the unique individual often turns out to be as important as knowing the general causes of disease.

Modern understanding of personality provides a sophisticated entry into these complex matters. Personality encapsulates a blend of biological, familial, social, and cultural fundamentals. Furthermore, personality not only has a certain temporal stability but it also gradually matures and changes. Thus, "personality"—the individual's biopsychosocial patterns of behavior—is a construct that connects well with biopsychoso-

cial approaches to health, and it is especially well suited to understanding the complex causal pathways to better health and longevity. In fact, modern notions of personality, which include ideas of situation selection and evocative effects, are well matched to the most sophisticated models of healthy development and health promotion (Aldwin, Spiro, & Park, 2006; Bolger & Zuckerman, 1995; Hampson & Friedman, 2008; Roberts, Walton, & Viechtbauer, 2006; Scarr & McCartney, 1983; Suls & Rothman, 2004).

Contemporary personality psychology looks quite different from the personality psychology of half a century ago—it is more nuanced, scientific, and multifaceted. Early personality approaches to health were based primarily on psychoanalytic concepts, which proved impossible to test. For example, neoanalytic psychosomatic theorists proposed vague notions of inner psychological conflicts causing physical symptoms. Ulcers, asthma, heart disease, migraines, and other complex or puzzling conditions were blamed on the inner conflicts of disturbed patients (Alexander, 1950; Dunbar, 1955). Although loosely grounded in the psychophysiological models of Claude Bernard (1880) and the "fight-or-flight" discoveries of Walter Cannon (1932), such approaches were rich in theory and insight but lacking in reliable measurement and empirical validation.

As a counterpoint, empiricists focused attention on quantifying and operationalizing personality variables. For example, medical students at Johns Hopkins University were classified as either slow and solid, rapid and facile, or irregular and uneven. Years later, members of the last category were more likely to develop a serious medical disorder (Betz & Thomas, 1979). Taking empiricism to the extreme, researchers of the Type A behavior pattern purposely disregarded construct validity and psychological theory in an attempt to make the phenomenon of coronary proneness more objective (Chesney & Rosenman, 1985). Type A behavior was seen as a medical syndrome (collection of symptoms) stripped of all conceptual grounding. The actual result, however, was not objectivity but thousands of often meandering and unfocused studies that produced more confusion than clarity—a sad lesson that is still important for current research in this field. Individual differences need not only to be defined and assessed rigorously but also to be framed in a deep conceptual understanding of biopsychosocial patterns.

Humanistic perspectives on personality, and "interactionist perspectives" (seeing behavior as a joint function of person and environment), attempted to repatriate the whole person and social context, even while biological perspectives expanded the reach of the models through new understandings of genetics and temperament. Today, many researchers focus on understanding individual life paths within a complex socioenvironmental framework. This fresh perspective includes aspects of previous approaches, but these are now interwoven in a dynamic, mutually influential fashion that more closely mirrors reality viewed from an interdisciplinary lifespan perspective (Baltes, Lindenberger, & Staudinger, 2006; Conley, 1985; Kuh & Ben-Shlomo, 1997; McCrae et al., 2000; Smith & MacKenzie, 2006). We call this a "lifespan epidemiological personality approach."

In this chapter, we contend that personality, as part of a lifespan developmental model, is an important contributor to our understanding of biopsychosocial processes, health, and disease. Drawing examples from our research and that of others, we illustrate both the direct and indirect pathways between personality and disease. We argue that personality is one of the major constructs that links mental and physical health, and that by using time-dependent techniques grounded in lifespan developmental theories, we can better address the complex health trajectories that people travel during their lives.

Disease-Prone Personalities and Self-Healing Personalities

To provide a comprehensive approach that relies on a full nomological net (Campbell & Fiske, 1959; Cronbach & Meehl, 1955), Friedman and Booth-Kewley (1987) reviewed and meta-analyzed the associations between emotional aspects of personality and chronic diseases (including heart disease) thought to be especially influenced by psychosomatic factors. Two key conclusions emerged. First, the surprisingly similar pattern of associations that appeared between

predictors and multiple disease outcomes contradicted then-prevailing notions of a "coronary-prone personality," a distinct "ulcer-prone personality," and so on. Friedman and Booth-Kewley referred to this broader pattern as pointing to a "disease-prone personality," suggesting that negative traits such as hostility, anxiety, depression, and aggressiveness are markers of increased risk for disease in general.

A second consequence of these analyses was greater appreciation of the importance of employing multiple predictors in the same study. The best studies now employ multiple predictors and several disease and well-being outcomes (Friedman, 2007; Friedman, Kern, & Reynolds, 2010; Smith & Gallo, 2001). In particular, often there is now a primary focus on the five-factor model of personality (the traits of conscientiousness, neuroticism, extraversion, agreeableness, and openness), an advance that we take up later in this chapter.

Another benefit of this broader approach has been a less exclusive focus on negativity and disease-proneness and a more active consideration of the potential health-promoting effects of often salutary traits, such as optimism, extraversion, hardiness, and conscientiousness. Complementing the disease-prone personality, Friedman (1991) suggested the notion of a "self-healing personality," a cluster of characteristics that promotes health and well-being. Although characterized by traits such as hardiness (control, commitment, and challenge; Maddi & Kobasa, 1984) and sociability, the crux of the construct is the match between the person and the environment that will best maintain biopsychosocial balance, thus promoting health and well-being. For example, a driven and competent business executive who may be quite happy and successful with his or her fast-paced lifestyle may become ill and depressed if forced to slow down and take a break. This notion fits well with the lifespan epidemiological personality approach because it simultaneously considers the individual's resources, the socioenvironmental challenges, and the trajectories of change over time.

Moreover, it is now becoming clear that multiple outcomes should be considered. It was decades ago that the World Health Organization (1948) defined health as a multidimensional construct, consisting of physical, mental, social, cognitive, and functional components, but only recently has attention extended beyond the physical health dimension. Length of life is also important because many studies of psychosocial predictors and well-being outcomes rely on measures that share method and definitional variance (i.e., both predictors and outcomes are self-reported measures of the individual's feelings, self-perceived symptoms, complaints, and perceptions of health and well-being). In contrast, longevity offers a valid, reliable health outcome that temporally follows other variables. One good way to combine subjective and objective aspects of health is to use the concept of quality-adjusted life years, which incorporates years of life and the health quality of each year (Diehr & Patrick, 2003; Kaplan, 1994, 2003) and takes into account multiple predictors, multiple pathways, and multiple well-being outcomes (Bogg, Voss, Wood, & Roberts, 2008; Friedman et al., 2010; Gruenewald, Mroczek, Ryff, & Singer, 2008; Hampson, Goldberg, Vogt, & Dubanoski, 2007; Korotkov & Hannah, 2004; Steel, Schmidt, & Shultz, 2008).

Ironically, research on subjective well-being has often stumbled into the same biases in measurement and narrow constructs that plagued the field of personality and health in studies of Type A behavior and negative affect. Claims of the far-reaching health benefits of happiness and optimism permeate the scientific and lay literatures despite mixed evidence (Howell, Kern, & Lyubomirsky, 2007; Lyubomirsky, King, & Diener, 2005; Pressman & Cohen, 2005). It is true that in some cases of challenged individuals, dispositional optimism can speed recovery (e.g., after surgery). But it is also true that optimism can be detrimental if it leads to riskier activities, skipping needed medical treatment, or ignoring health warnings. Furthermore, although it is true that a sense of well-being is associated with health correlates such as better immune function and lower mortality risk, the causal relations are murky. For example, it is not at all clear whether psychoneuroimmunological effects are a key factor in explaining links between personality and health, or whether becoming happier causes better health (Friedman, 2008; Held, 2004; Kemeny, 2007; Segerstrom, 2000, 2005; Segerstrom & Miller, 2004).

A meta-analytic review of subjective well-being as predictor of objective health outcomes included study design, how health outcomes and well-being were operationalized and measured, and various sample characteristics (Howell et al., 2007). Here, again, the relations between health and individual differences in subjective well-being were complex, with bidirectional relationships and psychosocial factors interacting with health and well-being predictors and outcomes. Simple models are insufficient (Friedman, 2007; Suls & Bunde, 2005).

Pathways Linking Personality and Health

Personality and health are linked at multiple levels, including the health-related behaviors in which individuals engage, physiological reactions to stress, situation selection, interactions with other people, and biological aspects of the person (Friedman, 2008; Hampson & Friedman, 2008; Roberts, Walton, & Bogg, 2005; Smith, 2006; Smith & MacKenzie, 2006). In general, health psychology has moved beyond the traditional biomedical or mechanical model of disease, and it is important that work in personality and health do so as well.

The Health Behavioral Model

The health behavioral model postulates that personality causes disease through its effects on habitual unhealthy behavior. The focus here is generally on harmful or risky behaviors such as poor diet, smoking, alcohol abuse, unsafe recreation, unprotected sex, dangerous driving, and lack of physical activity. Increasing evidence suggests personality affects the behaviors in which people engage, which in turn are linked to health, well-being, and mortality risk (e.g., Caspi et al., 1997; Hampson et al., 2007; Markey, Markey, & Tinsley, 2003; U.S. Department of Health and Human Services, 2000).

Research addresses this model in several ways. First, personality predictors of more or less healthy and risky behaviors are assessed. For example, higher levels of extraversion and conscientiousness predict engagement in more physical activity (Rhodes & Smith, 2006). It is important not to stop at this point and assume that health has been assessed. *Predictors* of health—exercise, cholesterol, drinking—are not the same as health. In the second step, health behaviors are tested as mediators; that is, once a link is established between a personality predictor and a health outcome, one or more behaviors are added to the regression model to see whether the personality–health association diminishes. For example, studies have linked conscientiousness to lower mortality risk; the effect is somewhat attenuated when alcohol use and smoking are added to the model, suggesting some behavioral pathways (Bogg & Roberts, 2004; Friedman et al., 1995; Hampson et al., 2007). Third, the relations among the personality trait, the health behavior, and the health outcome are evaluated across long periods of time. Fourth, behavioral modification intervention programs are applied to multiple subgroups (e.g., children, young adults, middle-aged adults, and older adults) to examine age-relevant intervention effects. Finally, it is important to evaluate whether interventions affect the whole sequence—the individual, the behavior, and health. Treating the overeating behavior of a neurotic, obese individual should not be considered effective if he or she later turns to smoking instead.

The Psychophysiological Stress and Coping Model

The internal stress and coping model focuses on how negative traits may trigger and maintain maladaptive chronic stress responses, and how positive traits may either buffer activation from stress or quickly restore balance to the physiological system (Fredrickson, 2001; Pressman & Cohen, 2005). From a life course perspective, change occurs throughout life as both internal and external losses and challenges occur (Aldwin et al., 2006; Baltes et al., 2006; Rook, Charles, & Heckhausen, 2007; Schultz & Heckhausen, 1996). People vary in both how they perceive stressors and how successfully they cope with challenges. For example, when two coworkers lose their jobs, one may view the layoff as an opportunity to start a new career direction or pursue further education, whereas the other may view it as a failure and succumb to a life as an unemployed alcoholic. A certain degree of stress motivates change and growth, but chronically high stress levels become maladaptive, disrupting

physiological processes and increasing susceptibility to illness and disease (Graham, Christian, & Kiecolt-Glaser, 2006; Kemeny, 2007; McEwen, 2006).

Studies addressing this model typically measure personality in concert with physiological markers, such as blood pressure, immune and endocrine function, or cardiovascular reactivity. There may also be reports of chronic stress or acute stressful life events (e.g., Miller, Cohen, Rabin, Skoner, & Doyle, 1999; Puttonen et al., 2008). For example, personality, blood pressure, neuroendocrine, and immune function parameters were assessed in healthy adults under quarantined conditions (Miller et al., 1999). Participants scoring low on agreeableness and extraversion demonstrated increased sympathetic nervous system activity and, for extraversion, higher natural killer cell cytotoxicity, suggesting that personality is associated with basal physiological levels. An assumption of this model is that cross-sectional and short-term associations between personality and physiological function extend to disease outcomes later in life; however, studies have yet to test the entire causal model across long time periods. In one of the few exceptions, links between blood pressure and personality were examined cross-sectionally and longitudinally across a 10-year period (Leclerc, Rahn, & Linden, 2006). Hostility predicted higher systolic blood pressure at baseline and higher diastolic blood pressure 10 years later, but no other consistencies between cross-sectional and longitudinal personality–health relationships were evident. Importantly, there is good evidence that immune disruptions are sometimes a *cause* of psychological distress (rather than vice versa). For example, proinflammatory cytokines may be a partial cause of depression. As Kemeny (2007) put it, "A relationship between a psychological factor and a change in the immune system may be due to the simple impact of the mind on the immune system, the effects of the immune system on the mind, both, or neither" (p. 111).

Underlying Biological (Third-Variable) Models

Third-variable models propose that relations between personality and health stem from an underlying "propensity" (i.e., a genetic or temperamental factor) toward both patterns of responding and health or disease. Personality differences in health and well-being may begin before birth and be influenced by genetic–environmental interactions throughout life (Hampson & Friedman, 2008). For example, prenatal stress predicts infant activity, sleep, and attention at 3 months (Jones, 2008; Wadhwa, 2005). These models are important because they suggest that changing personality will not necessarily have any effect on the likelihood of the associated disease. Personality–health relations are thus sometimes termed "spurious" associations—the correlations are real, but the causality is specious.

Because multiple genetic and biological (prenatal and neonatal) variables may unfold and interact with the early environment to influence personality and health outcomes, this model adds a complex temperamental pathway. Research using laboratory animals, behavioral genetics, and psychoimmunology is increasingly informative of such biological processes (Friedman, 2008). Animal research has been often ignored in personality psychology, but cross-species research suggests that extraversion, neuroticism, agreeableness, dominance, and curiosity (a facet of openness) have correlates across multiple animal species, (Gosling & John, 1999; Mehta & Gosling, 2008). Animal research overcomes several of the limitations of personality and health research: such research does not rely on self-report measures; the short-lived nature of many animals allow consideration of lifespan patterns within a short period of time; and traits can be selected for through trait-specific breeding programs (Cavigelli, 2005). Importantly, individual animals can be assigned to different socio-environmental conditions, and ongoing physiological measures can be obtained.

In humans, twin studies can be informative about pre-natal genetic factors, early experiences that shape subsequent trajectories, and differential genetic effects at different ages across the lifespan. Using a behavior genetic covariance analysis, a study of twins found the familiar five-factor structure in both the phenotype and genotype, suggesting both a strong biological and environmental structure to the five factors (McCrae, Jang, Livesley, Riemann, & Angleitner, 2001). Using data from the Swedish Adoption/Twin Study of Aging study, both genetic and environmental influences on personality appear to

be relatively stable, although environmental effects show increasing variability with age (Pedersen & Reynolds, 1998).

Developments in neuroscience also offer possibilities in studying brain patterns, reactions across different situations, individual characteristics, and health outcomes. For example, using structured magnetic resonance imaging (MRI) scans, higher scores on harm avoidance and other anxiety-prone traits showed a specific relation to the right hippocampus for both males and females (Yamasue et al., 2008). Individual differences in extraversion and neuroticism demonstrate differential activation patterns, which in turn relate to positive or negative attributions, judgments, and memories (Canli, 2004). Such studies may help to untangle cognitive-level mechanisms linking personality and health outcomes.

Disease-Caused Personality Changes

Although personality is often considered a predictor and underlying cause of health outcomes, bidirectional relations can occur. For example, a friendly, easygoing person can slowly become harsh and critical as Alzheimer's disease slowly (and without the person or observer knowing) attacks brain tissue. Later, it may appear that personality (or personality change) caused the disease, when in reality the disease caused the shift in the long-term behavioral patterns of the person. Even outside of pathological cases, evidence suggests that age and time make a difference; for example, people often become more conscientious and less neurotic as they grow older and establish more stable lifestyles (e.g., increasing work responsibilities, stable marriages) (Roberts, Wood, & Caspi, 2008). Both changes and continuity in the internal and external environment impact personality–health linkages.

The Importance of Time

Medical care is organized to take care of acute diseases and acute manifestations of chronic illnesses. The traditional biomedical approach to disease generally works well with such matters: When symptoms appear, one seeks medical care, goes through diagnostic tests, and is prescribed a drug or surgery to address the problem. But many health problem of the 21st century involve chronic conditions that the biomedical models and the accompanying public policies are poorly designed to handle. There is far less than optimal allocation of resources for the long-term prevention of disease and promotion of health (Kaplan, 2007).

Medical research studies typically focus on treating acute manifestations of disease, or sometimes on "secondary prevention"—actions taken once a disease begins to develop. Interventions involving drugs to reduce hypertension or to combat osteoporosis are taking a longer-term perspective but still follow a one-factor approach in a web that demands multifactor, multioutcome designs. It is relatively rare for a study to focus on "primary prevention"—actions designed to prevent illness from developing in the first place. Such studies are costly, unwieldy, and even if feasible, would take a long time. Complex causal linkages tend to be underexplored or even totally overlooked. We know relatively little about effective long-term societal approaches to promote health, healthy aging, and longevity. Here is where personality becomes important, since by nature it considers the individual across time.

Tropisms and Cumulative Continuity

"Tropisms" are forces that pull phototropic plants toward a source of light, and pull some individuals toward healthier environments (Friedman, 2000). Personality development begins early in life as temperament encounters environmental pressures and socialization factors. Studies of personality across decades indicate that temperament-related factors in childhood are good predictors of personality traits later on, and that personality traits become more stable with age (Allemand, Zimprich, & Hertzog, 2007; Allemand, Zimprich, & Martin, 2008; Caspi & Silva, 1995; McCrae et al., 2000; Roberts, Helson, & Klohnen, 2002). But they also show that as people move nonrandomly in and out of contexts and environments, aspects of their personalities are altered by these experiences (Srivastava, John, Gosling, & Potter, 2003; Twenge, 2000, 2001). There is a cumulative continuity (Caspi & Bem, 1990; Caspi et al., 1997), in which change occurs but often follows a consistent and predictable pattern. Thus, if we understand the underlying components

and can accurately assess the life path trajectory, we can predict a variety of meaningful health outcomes. An important but often overlooked point is that part of what maintains this continuity is people's frequent selection of their own stressful or unstressful environments (Bandura, 1999; Buss, 1987; Caspi, Roberts, & Shiner, 2005; Scarr & McCartney, 1983), in which they essentially choose or are pulled toward (perhaps unconsciously) the very experiences that will mold and shape them. Extraverted individuals are both subjectively and objectively more likely to do more and to engage in activities that are potentially highly enjoyable and rewarding, whereas neurotic individuals may do less and engage in mundane activities (Bolger & Zuckerman, 1995; Magnus, Diener, Fujita, & Payot, 1993; Roberts, Caspi, & Moffitt, 2003).

Similar issues apply to research involving environmental stressors and their contributions to physical manifestations of disease. These models of stress, coping, and adaptation have typically viewed stressors as random events to which the individual must respond, but many life events may not be random and might instead be evoked by or selected according to characteristics of the individual (Bolger & Zuckerman, 1995; Buss, 1987; Ickes, Snyder, & Garcia, 1997; Magnus et al., 1993; Van Heck, 1997). For example, some people are more likely to select marriages that will end in divorce (Johnson, McGue, Krueger, & Bouchard, 2004; Larson & Holman, 1994; Tucker, Friedman, Wingard, & Schwartz, 1996).

During the past 18 years, we have worked extensively to expand the Terman Life-Cycle Study, an archival study that began in 1922 and has followed over 1,500 individuals prospectively throughout their lives. Participants completed assessments every 5–10 years, offering a picture of many psychosocial aspects of their lives. In this sample, children who experienced parental divorce were both more likely to have their own marriages end in divorce and to face premature mortality than were children who came from stable homes (Schwartz et al., 1995; Tucker et al., 1997). Early life experiences may begin a trajectory of ill-being (or sometimes recovery) that can only be captured in a long-term developmental perspective (Baltes, Saudinger, & Lindenberger, 1999; McCrae et al., 2000; Roberts & Pomerantz, 2004; Rutter, Kim-Cohen, & Maughan, 2006; Sroufe, Carlson, Levy, & Egeland, 1999).

What Time-Sensitive Trajectory Analyses Can Reveal

As new statistical methods have developed, lifespan models that address both individual- and group-level factors across time can now be evaluated more directly. Multilevel modeling techniques can create estimates of an overall average trajectory for a sample (e.g., increasing, remaining steady, decreasing over time), individual variation around this trajectory, and reasons for this variation (Singer & Willett, 2003). Structural equation modeling techniques allow complex relationships across time to be estimated, while they address the problematic issues in classical regression techniques of unreliability in measurement, indirect pathways, correlated error, and mild to moderate violation of regression assumptions (Little, Bovaird, & Slegers, 2006). Other cross-time techniques include cross-lagged panel designs (which allow estimation of lagged and simultaneous effects by two or more variables; Hertzog & Nesselroade, 2003), measurement burst designs (macro- and micro-level linkages are studied by nesting intensive periods of measurement within long-term longitudinal studies; Nesselroade, 1991), joint growth–survival analyses (which combine growth and survival techniques; McArdle, Small, Backman, & Fratiglioni, 2005), and dynamic growth models (which consider the dynamic interplay of two or more variables over time). For example, using data from the Veterans Affairs Normative Aging Study, Mroczek and Spiro (2007) found that change in neuroticism over a 12-year period was important to longevity outcomes; individuals who are high in neuroticism at baseline and become more neurotic with age face a significantly higher mortality risk than do individuals at lower levels or without a late-life increase in neuroticism.

The Five-Factor Approach to Personality

The five-factor model of personality (FFM, or the Big Five) provides a conceptual framework for investigating the relations among personality, health, and longevity (Carver &

Miller, 2006; Duberstein, Seidlitz, Lyness, & Conwell, 1999; Smith, 2006). Although some uncertainty about the best labels and structure remains, the factors—conscientiousness, agreeableness, extraversion, openness to experience, and neuroticism—have been linked to important life outcomes (Goldberg, 1993; Ozer & Benet-Martinez, 2006; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007).

Conscientiousness and Health: Associations and Causal Mechanisms

Conscientiousness includes traits such as organization, thoroughness, perseverance, competence, order, dutifulness, achievement striving, self-discipline, and deliberation. Though often ignored by earlier studies involving Type A behavior, hostility, and health, conscientiousness has clearly been linked to positive health outcomes. In addition to being valued employees and successful in general, conscientious individuals are more likely to have good social relationships, marital stability, more community involvement, and better health and longevity (Barrick & Mount, 1991; Bogg & Roberts, 2004; Gelissen & de Graaf, 2006; Kern & Friedman, 2008; Kern, Friedman, Martin, Reynolds, & Luong, 2009; Ozer & Benet-Martinez, 2006; Roberts et al., 2007; Schmidt & Hunter, 1992).

In our work with the Terman Life-Cycle Study, both child and adult conscientiousness are associated with benefits across multiple domains. Conscientiousness predicted less alcohol abuse, less smoking, more successful careers, stable marriages, and physical and mental health in old age (Friedman et al., 1995, 2010; Kern et al., 2009; Tucker et al., 1996). Most notably, our early studies found that childhood conscientiousness, as rated by parents and teachers in 1922, predicted lower mortality risk across seven decades (Friedman et al., 1993, 1995). Adult conscientiousness was also protective, even when childhood conscientiousness was controlled (Martin & Friedman, 2000; Martin, Friedman, & Schwartz, 2007). Using diverse samples and study designs, others followed up on these intriguing results, all finding support for this protective effect (e.g., Christensen et al., 2002; Deary, Batty, Pattie, & Gale, 2008; Terracciano, Lockenhoff, Zonderman, Ferrucci, & Costa, 2008; Weiss & Costa, 2005; Whiteman, 2006; Wilson, Mendes de Leon, Bienias, Evans, & Bennett, 2004). Meta-analysis confirms that across 20 samples and over 8,900 participants, conscientiousness is indeed protective against mortality risk (Kern & Friedman, 2008).

Simple explanations for this protective effect remain elusive, and the web of causal mechanisms exemplifies the complexity of the personality–health puzzle. Conscientious individual are more likely to engage in health-protective behaviors and to avoid risky behaviors, clearly supporting the behavioral model (Bogg & Roberts, 2004). Yet health behaviors alone do not explain this relationship (Friedman et al., 1995; Hampson et al., 2007; Martin et al., 2007; Weiss & Costa, 2005; Wilson et al., 2004). Successful careers, academic success, and good social relationships all offer protection from mortality risk, suggesting multiple social pathways. Studies with animals, twins, and biological markers show links between conscientiousness-related traits and more stable biological function, suggesting biological pathways (Figueredo et al., 2005; O'Cleirigh, Ironson, Weiss, & Costa, 2007; Williams, Kuhn, et al., 2004). Serotonin is linked to conscientiousness, impulsiveness, and genetic variations of cortisol responses (Carver & Miller, 2006; Evans & Rothbart, 2007; Kusumi et al., 2002; Manuck et al., 1998; Wand et al., 2002).

Agreeableness, Extraversion, and Health: Interpersonal Traits

Agreeableness involves characteristics such as cooperativeness, consideration, empathy, kindness, and generosity. Limited evidence suggests that higher agreeableness may be health protective, although research has linked it more to subjective health status than to objective health outcomes (e.g., Korotkov & Hannah, 2004). In the Midlife Development in the United States Survey (MIDUS), a nationally representative sample of the U.S. population, agreeableness related to higher levels of perceived health (Goodwin & Engstrom, 2002). In some studies, high agreeableness has been weakly related to lower mortality risk (Weiss & Costa, 2005), but others have found no such relationship

(Martin & Friedman, 2000; Wilson et al., 2004). Links among agreeableness, health behaviors, and subsequent health outcomes are stronger for women than for men (Chapman, Duberstein, & Lyness, 2007; Costa, Terracciano, & McCrae, 2001; Jerram & Coleman, 1999). To the extent that agreeableness is a sign or cause of good social relations, social integration, and lack of isolation and depression, it should be a marker of or influence on health. But to the extent that it interacts with life challenges leading to less optimal life pathways, it could have less positive or even negative effects.

Extraversion includes traits such as sociability, assertiveness, dominance, and energy/activity. Like agreeableness, extraversion has been inconsistently linked to health—there are both positive and negative health outcomes. For example, in one study, moderate levels of extraversion predicted better self-assessed health, whereas very high levels, especially in combination with neuroticism, predicted worse health outcomes (Williams, O'Brien, & Colder, 2004). Evidence suggests that extraverted individuals are more likely to engage in risky health behaviors, such as smoking, drinking, and risky driving, but other studies suggest protective effects, such as staying physically active. Not surprisingly, this trait has been inconsistently linked to mortality risk (Cloninger, 2005; Wilson et al., 2004, 2005).

Conflicting findings involving agreeableness, extraversion, and health illustrate and confirm the importance of considering multiple causal life pathways. Extraversion has both strong biological and interpersonal components, and its implications are susceptible to situational influences. For example, the extraverted individual who likes adventure and often goes to parties may also smoke, abuse alcohol, and engage in risky hobbies in certain cultures, creating a behavioral risk to health. At the same time, social individuals may have more friends and health-supportive social contacts. Likewise, a highly agreeable person may develop a strong social network offering protective effects, but he or she may also be taken advantage of, leading to ill-being. Extraversion and agreeableness quite possibly work in combination with other traits and social factors, such that when considered alone, personality–health links wash out.

Openness, Intelligence, and Health

Openness to experience includes characteristics such as being imaginative, creative, tolerant, and intelligent. It is the least distinct trait within the FFM. Although the overall openness factor has shown few consistent health outcomes, the intellect facet does predict health. Across several well-controlled studies, intelligence predicts lower rates of morbidity and mortality (Batty et al., 2009; Deary et al., 2008; Deary, Whiteman, Starr, Whalley, & Fox, 2004; Hemmingsson, Essen, Melin, Allebeck, & Lundberg, 2007; O'Toole, 1990; Whalley & Deary, 2001).

Intelligence is often correlated with other protective psychosocial factors. Intelligent individuals are often better educated, come from a moderate to high socioeconomic level, have the ability to understand medical advice, engage in more health-protective and fewer risky health behaviors, and are better equipped to draw on social resources as needed (Batty, Deary, & Gottfredson, 2007; Batty, Deary, Schoon, & Gale, 2007; Beier & Ackerman, 2003; Hart et al., 2004; Taylor et al., 2003). In turn, each of these factors relates to better health and longevity. Aside from intelligence, openness has not been clearly linked to mortality risk (Roberts et al., 2007). In the Terman sample, all participants had an IQ of 135 or greater, but despite this high level of intelligence, participants varied dramatically across most biopsychosocial variables, including health behaviors, social activities, work status, and health and longevity outcomes (Friedman, 2000; Friedman & Markey, 2003; Schwartz et al., 1995; Tucker et al., 1996). Attempts to make individuals smarter will not necessarily produce health benefits, unless the relevant mediating mechanisms are identified and changed.

Neuroticism and Health

Among the most difficult issues to untangle are the relations between neuroticism and health. Neuroticism includes proneness to anxiety and depression, emotional instability, and a tendency to experience the world as distressful. There is no doubt that anxiety, depression, and hostility are linked to illness, but controversies about validity and causality abound.

For many of the reasons described earlier, it is not at all clear whether "treating" neuroticism promotes better health. One basic issue involves subjective versus objective health outcomes. Neuroticism clearly relates to lower levels of perceived health and subjective well-being (Costa & McCrae, 1987; DeNeve & Cooper, 1998; Smith & Gallo, 2001; Watson & Pennebaker, 1989), leading some researchers to declare that it is simply a noninformative marker of psychopathology (Guarino, Roger, & Olason, 2007; Ormel, Rosmalen, & Farmer, 2004). Objective evidence is mixed, with some studies reporting more physical symptoms and increased mortality risk (Charles, Gatz, Kato, & Pedersen, 2008; Friedman & Booth-Kewley, 1987; Neupert, Mroczek, & Spiro, 2008; Suls & Bunde, 2005; Terracciano et al., 2008), others reporting no relation; and still others suggesting a protective effect (Korten et al., 1999; Taga, Friedman, & Martin, 2009; Weiss & Costa, 2005). In the Western Electric Study, neuroticism was unrelated to mortality risk, after researchers controlled for cynicism, blood pressure, cholesterol, smoking, and alcohol use (Almada et al., 1991). A population-based study in Australia found no effect of neuroticism on mortality risk for females and a protective effect for males, when other demographic and psychosocial variables were controlled for (Korten et al., 1999). In a group of frail older adults, neuroticism was protective (Weiss & Costa, 2005).

Furthermore, there are multiple causal linkages between neuroticism and health. Neuroticism is associated with cardiovascular disease (Suls & Bunde, 2005) and with eating disturbances/obesity, lack of exercise, and various measures of stress, but in the Enhancing Recovery in Coronary Heart Disease (ENRICHD; 2003) study, it was surprising to the investigators that treating depression in patients who previously had a heart attack did not impact the likelihood of subsequent heart attacks. Notably, disease can predict subsequent increased anxiety and anger, and proinflammatory cytokines may be a partial cause of depression (Kemeny, 2007; Räikkönen, Matthews, & Kuller, 2002).

There is also evidence of a biological third variable here. There may be common genetic vulnerability to depression and to coronary artery disease (Bondy, 2007; McCaffrey et al., 2006). To the extent that such a relation holds, the ordinary risk factor intervention ("treat depression") will fail. To the extent that both depression and coronary heart disease develop from genetically based vulnerability in the serotonin and dopamine systems, or in prenatal experiences, interventions to affect hostility or depression will not have expected effects on disease risk (see also Barker, Osmond, Forsén, Kajantie, & Eriksson, 2005).

In the Terman sample, we examined neuroticism (measured in 1940 when the participants were in their 30s) as a predictor of older adults' health (measured in 1986, when participants were in their 70s) and mortality risk through 2007 (Friedman et al., 2010). As expected, high levels of neuroticism predicted lower subjective well-being and, to a lesser extent, physical health. For mortality, however, a different picture emerged. For males, neuroticism was somewhat protective. In particular, neuroticism was protective for widowed men, again suggesting that neuroticism may in certain cases become protective (Taga et al., 2009). In stressful times, neurotic individuals, despite reporting more health distress, may be the most resilient, with their tendency to worry possibly leading to better self-care, regular doctor visits, or better health behaviors. Neuroticism predicts increased susceptibility to pain, which may influence reports and experiences of poor health (Charles et al., 2008), but other pathways may include negative self-stereotypes, an altered stress response, and changed interactions with others (Moor, Zimprich, Schmitt, & Kliegel, 2006; Neupert et al., 2008; Terracciano et al., 2008).

Nonlinear Relationships, Moderating Effects, and Trait Interactions

The picture of the relations between personality and health is further complicated by nonlinear relationships and trait interactions (Aldwin, Spiro, Levenson, & Cupertino, 2001; Cloninger, 2005; MacKinnon, & Luecken, 2008; Smith & MacKenzie, 2006; Suls & Bunde, 2005; Vollrath & Torgersen, 2008). For example, in a 20-year follow-up study of a nationally representative sample, there was a nonlinear relationship between psychological distress (neuroticism) and mortality risk for men, such that moderate amounts of distress were protective, whereas

high levels substantially increased risk (Ferraro & Nuriddin, 2006). In a student sample, there was a nonlinear relation between extraversion and symptom reporting, such that more symptoms were reported, both retrospectively and concurrently, only for individuals high on extraversion compared to those at moderate or low levels (Williams, O'Brien, & Colder, 2004). In the Medicare Demonstration Study, when conscientiousness was trichotomized, there was a significant predictive effect of mortality for high conscientiousness but not moderate or low levels of conscientiousness (Weiss & Costa, 2005). In the Terman sample, conscientiousness moderated an association between career success and longevity, such that conscientiousness made little difference for successful individuals but attenuated the negative effect of an unsuccessful career (Kern et al., 2009).

Although the FFM suggests intriguing relations between personality and health, lower-order trait-level analyses, using more narrowly defined traits (e.g., "self-control," "energy/activity," "anxious distress"), may be more predictive (Adams & Mowen, 2005; Brown, Cober, Kane, Levy, & Shalhoop, 2006; Crant, 2000; Erdogan & Bauer, 2005; Greven, Chamorro-Premuzic, Arteche, & Furnham, 2008; O'Connor & Paunonen, 2007; Seibert, Crant, & Kraimer, 1999; Watson & Hubbard, 1996; Zweig & Webster, 2004). Studies that address these more nuanced relationships within and between traits are in their infancy but provide an area ripe for future research.

Implications for Interventions and Interventional Research

A key goal of health psychology is to find ways to improve people's health and well-being across the lifespan. If we are to intervene effectively in some way to change lives, we must understand the causal paths: What influences health outcomes, how, for whom, and when (MacKinnon & Luecken, 2008)? Longitudinal studies have clearly shown that personality is a key factor, answering the "what" question, yet the mix of findings and mechanisms underscores the challenges ahead.

In traditional approaches to health promotion, insufficient consideration is given to the trajectories individuals are following—where they come from (in a biopsychosocial sense); the contemporary biopsychosocial context (with its challenges and stress buffers); and future paths, goals, and aspirations. When personality is measured as part of a study or assessment, it is a snapshot of the person within his or her unique personal trajectory. Personality research suggests that one size does not fit all: An intervention may be quite effective but only for certain people, at certain times, under certain conditions. As we begin to understand the causal mechanisms, including the contexts in which a particular relationship holds, meaningful and enduring change becomes a greater possibility. Adding even a few questions to major health studies can be costly, but core aspects of personality can be simply and powerfully measured and should be incorporated into investigations and interventions. A side benefit is that as we better understand relations of health and personality, we better understand the nature of personality itself.

Conclusions

Health psychology has clearly established that long-term biopsychosocial processes are important to understanding and predicting health, well-being, and longevity. Such processes are a crucial complement to the traditional biomedical focus on treating acute disease and managing chronic illness, but there must be a new emphasis on preventing disease and promoting health throughout the lifespan. Interventions for this purpose have often been hard to imagine and difficult to study and implement due to the psychosocial complexity of human behavior and development. Modern understanding of personality provides a valuable tool with which to approach these multifaceted health issues.

Personality encapsulates a blend of the crucial elements. Personality has a biological base, revealed in studies of genetics, temperament, and psychophysiology. Personality is shaped by early intimate and family experiences, by socialization processes, and by later social relations. Personality emerges in a culture, which shapes behaviors, situations, and trajectories. Furthermore, personality has a certain temporal stability, yet it matures and changes. Thus, many of the fundamentals of the needed causal models and interventions are illuminated by a deeper understanding of personality and health.

The individual travels certain life courses or trajectories that have implications for health promotion. All in all, personality approaches suggest that there are multiple causal pathways between earlier psychosocial behavior patterns and later health and longevity, but they can gradually be teased apart. The same recommendations are not appropriate for each individual, but sensible and effective interventions will likely be available in the foreseeable future.

Acknowledgments

Preparation of this chapter was supported in part by National Institute on Aging Grant No. AG027001. Opinions expressed are those of the authors and not necessarily those of the National Institute on Aging.

Further Reading

Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: Stability and change. *Annual Review of Psychology, 56*, 453–484.

Friedman, H. S. (2007). Personality, disease, and self-healing. In H. S. Friedman & R. C. Silver (Eds.), *Foundations of health psychology* (pp. 172–199). New York: Oxford University Press.

Friedman, H. S. (2008). The multiple linkages of personality and disease. *Brain, Behavior, and Immunity, 22*, 668–675.

Hampson, S. E., & Friedman, H. S. (2008). Personality and health: A lifespan perspective. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *The handbook of personality: Theory and research* (3rd ed., pp. 770–794). New York: Guilford Press.

Roberts, B. W., Kuncel, N. R., Shiner, R., Caspi, A., & Goldberg, L. R. (2007). The power of personality: The comparative validity of personality traits, socioeconomic status, and cognitive ability for predicting important life outcomes. *Perspectives on Psychological Science, 2*, 313–345.

Smith, T. W., & MacKenzie, J. (2006). Personality and risk of physical illness. *Annual Review of Clinical Psychology, 2*, 435–467.

Suls, J., & Bunde, J. (2005). Anger, anxiety, and depression as risk factors for cardiovascular disease: The problems and implications of overlapping affective dispositions. *Psychological Bulletin, 131*, 260–300.

References

Adams, T. B., & Mowen, J. C. (2005). Identifying the personality characteristics of healthy eaters and exercisers: A hierarchical model approach. *Health Marketing Quarterly, 23*, 21–42.

Aldwin, C. M., Spiro, A., Levenson, M. R., & Cupertino, A. P. (2001). Longitudinal findings from the Normative Aging Study: III. Personality, individual health trajectories, and mortality. *Psychology and Aging, 16*, 450–465.

Aldwin, C. M., Spiro, A., & Park, C. L. (2006). Health, behavior, and optimal aging: A life span developmental perspective. In J. E. Birren & K. W. Schaire (Eds.), *Handbook of the psychology of aging* (6th ed., pp. 85–104). Amsterdam: Elsevier.

Alexander, F. (1950). *Psychosomatic medicine: Its principles and applications*. New York: Norton.

Allemand, M., Zimprich, D., & Hertzog, C. (2007). Cross-sectional age differences and longitudinal age changes of personality in middle adulthood and old age. *Journal of Personality, 75*, 323–358.

Allemand, M., Zimprich, D., & Martin, M. (2008). Long-term correlated change in personality traits in old age. *Psychology and Aging, 23*, 545–557.

Almada, S. J., Zonderman, A. B., Shekelle, R. B., Dyer, A. R., Daviglus, M. L., Costa, P. T., Jr., et al. (1991). Neuroticism and cynicism and risk of death in middle-aged men: The Western Electric Study. *Psychosomatic Medicine, 53*, 165–175.

Baltes, P. B., Lindenberger, U., & Staudinger, U. M. (2006). Life span theory in developmental psychology. In R. M. Lerner & W. Damon (Eds.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (6th ed., pp. 569–664). Hoboken, NJ: Wiley.

Baltes, P. B., Staudinger, U. M., & Lindenberger, U. (1999). Lifespan psychology: Theory and application to intellectual functioning. *Annual Review of Psychology, 50*, 471–507.

Bandura, A. (1999). Social cognitive theory of personality. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 154–196). New York: Guilford Press.

Barker, D. J. P., Osmond, C., Forsén, T. J., Kajantie, E., & Eriksson, J. G. (2005). Trajectories of growth among children who have coronary events as adults. *New England Journal of Medicine, 353*, 1802–1809.

Barrick, M. R., & Mount, M. K. (1991). The Big Five personality dimensions and job performance: A meta-analysis. *Personality Psychology, 44*, 1–26.

Batty, G. D., Deary, I. J., & Gottfredson, L. S. (2007). Premorbid (early life) IQ and later mortality risk: Systematic review. *Annals of Epidemiology, 17*, 278–288.

Batty, G. D., Deary, I. J., Schoon, I., & Gale, C.

R. (2007). Childhood mental ability in relation to food intake and physical activity in adulthood: The 1970 British Cohort Study. *Pediatrics, 119*, E38–E45.

Batty, G. D., Wennerstad, K. M., Smith, G. D., Gunnell, D., Deary, I. J., Tynelius, P., et al. (2009). IQ in early adulthood and mortality by middle age: Cohort study of 1 million Swedish men. *Epidemiology, 20*, 100–109.

Beier, M. E., & Ackerman, P. L. (2003). Determinants of health knowledge: An investigation of age, gender, abilities, personality, and interests. *Journal of Personality and Social Psychology, 84*, 439–448.

Bernard, C. (1880). *Leçons de pathologie expérimentale: Et leçons sur les propriétésde la moelle épinière* [Lessons of experimental pathology: And lessons on the properties of the spinal cord]. Paris: Librarie J.-B. Baillière.

Betz, B., & Thomas, C. (1979). Individual temperament as a predictor of health or premature disease. *John Hopkins Medical Journal, 44*, 81–89.

Bogg, T., & Roberts, B. W. (2004). Conscientiousness and health-related behaviors: A meta-analysis of the leading behavioral contributors to mortality. *Psychological Bulletin, 130*, 887–919.

Bogg, T., Voss, M. W., Wood, D., & Roberts, B. W. (2008). A hierarchical investigation of personality and behavior: Examining neo-socioanalytic models of health-related outcomes. *Journal of Research in Personality, 42*, 183–207

Bolger, N., & Zuckerman, A. (1995). A framework for studying personality in the stress process. *Journal of Personality and Social Psychology, 69*, 890–902.

Bondy, B. (2007). Common genetic factors for depression and cardiovascular disease. *Dialogues in Clinical Neuroscience, 9*, 19–28.

Brown, D. J., Cober, R. T., Kane, K., Levy, P. E., & Shalhoop, J. (2006). Proactive personality and the successful job search: A field investigation with college graduates. *Journal of Applied Psychology, 91*, 717–726.

Buss, D. M. (1987). Selection, evocation, and manipulation. *Journal of Personality and Social Psychology, 53*, 1214–1221.

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait–multimethod matrix. *Psychological Bulletin, 56*, 81–105.

Canli, T. (2004). Functional brain mapping of extraversion and neuroticism: Learning from individual differences in emotion processing. [Special issue]. *Journal of Personality, 72*, 1105–1132.

Cannon, W. B. (1932). *Wisdom of the body*. New York: Norton.

Carver, C. S., & Miller, C. J. (2006). Relations of serotonin function to personality: Current views and a key methodological issue. *Psychiatry Research, 144*, 1–15.

Caspi, A., Begg, D., Dickson, N., Harrington, H., Langley, J., Moffitt, T. E., et al. (1997). Personality differences predict health-risk behaviors in young adulthood: Evidence from a longitudinal study. *Journal of Personality and Social Psychology, 73*, 1052–1063.

Caspi, A., & Bem, D. J. (1990). Personality continuity and change across the life course. In L. Pervin (Ed.), *Handbook of personality: Theory and research* (pp. 549–575). New York: Guilford Press.

Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: Stability and change. *Annual Review of Psychology, 56*, 453–484.

Caspi, A., & Silva, P. A. (1995). Temperamental qualities at age 3 predict personality traits in young adulthood: Longitudinal evidence from a birth cohort. *Child Development, 66*, 486–498.

Cavigelli, S. A. (2005). Animal personality and health. *Behaviour, 142*, 1223–1244.

Chapman, B., Duberstein, P., & Lyness, J. M. (2007). Personality traits, education, and health-related quality of life among older adult primary care patients. *Journals of Gerontology B: Psychological Sciences and Social Sciences, 62*, P343–P352.

Charles, S. T., Gatz, M., Kato, K., & Pedersen, N. L. (2008). Physical health 25 years later: The predictive ability of neuroticism. *Health Psychology, 27*, 369–378.

Chesney, M. A., & Rosenman, R. H. (Eds.). (1985). *Anger and hostility in cardiovascular and behavioral disorders*. Washington, DC: Hemisphere.

Christensen, A. J., Ehlers, S. L., Wiebe, J. S., Moran, P. J., Raichle, K., Ferneyhough, K., et al. (2002). Patient personality and mortality: A 4-year prospective examination of chronic renal insufficiency. *Health Psychology, 21*, 315–320.

Cloninger, C. R. (2005). How does personality influence mortality in the elderly? *Psychosomatic Medicine, 67*, 839–840.

Conley, J. J. (1985). Longitudinal stability of personality traits: A multitrait–multimethod–multioccasion analysis. *Journal of Personality and Social Psychology, 49*, 1266–1282.

Costa, P. T., & McCrae, R. R. (1987). Neuroticism, somatic complaints, and disease: Is the bark worse than the bite? [Special issue]. *Journal of Personality, 55*, 299–316.

Costa, P. T., Terracciano, A., & McCrae, R. R. (2001). Gender differences in personality traits across cultures: Robust and surprising findings. *Journal of Personality and Social Psychology, 81*, 322–331.

Crant, J. M. (2000). Proactive behavior in organizations. *Journal of Management, 26*, 435–462.

Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin, 52*, 281–302.

Deary, I., Batty, G. D., Pattie, A., & Gale, C. R. (2008). More intelligent, more dependable children live longer: A 55-year longitudinal study of a representative sample of the Scottish nation. *Psychological Science, 19*, 874–880.

Deary, I. J., Whiteman, M. C., Starr, J. M., Whalley, L. J., & Fox, H. C. (2004). The impact of childhood intelligence on later life: Following up the Scottish Mental Surveys of 1932 and 1947. *Journal of Personality and Social Psychology, 86*, 130–147.

DeNeve, K. M., & Cooper, H. (1998). The happy personality: A meta-analysis of 137 personality traits and subjective well-being. *Psychological Bulletin, 124*, 197–229.

Diehr, P., & Patrick, D. L. (2003). Trajectories of health for older adults over time: Accounting fully for death. *Annuals of Internal Medicine, 139*, 416–420.

Duberstein, P. R., Seidlitz, L., Lyness, J. M., & Conwell, Y. (1999). Dimensional measures and the five-factor model: Clinical implications and research directions. In E. Rosowsky, R. C. Abrams, & R. A. Zweig (Eds.), *Personality disorders in older adults: Emerging issues in diagnosis and treatment* (pp. 95–117). Mahwah, NJ: Erlbaum.

Dunbar, F. (1955). *Mind and body: Psychosomatic medicine* (2nd ed.). New York: Crown.

ENRICHD Investigators. (2003). Effects of treating depression and low perceived social support on clinical events after myocardial infarction: The Enhancing Recovery in Coronary Heart Disease Patients (ENRICHD) randomized trial. *Journal of the American Medical Association, 289*, 3106–3116.

Erdogan, B., & Bauer, T. N. (2005). Enhancing career benefits of employee proactive personality: The role of fit with jobs and organizations. *Personnel Psychology, 58*, 859–891.

Evans, D. E., & Rothbart, M. K. (2007). Developing a model for adult temperament. *Journal of Research in Personality, 41*, 868–888.

Ferraro, K. F., & Nuriddin, T. A. (2006). Psychological distress and mortality: Are women more vulnerable? *Journal of Health and Social Behavior, 47*, 227–241.

Figueredo, A. J., Vásquez, G., Brumbach, B. H., Sefcek, J. A., Kirsner, B. R., & Jacobs, W. J. (2005). The K-factor: Individual differences in life history strategy. *Personality and Individual Differences, 39*, 1349–1360.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist, 56*, 218–226.

Friedman, H. S. (1991). *The self-healing personality*. New York: Holt.

Friedman, H. S. (2000). Long-term relations of personality, health: Dynamisms, mechanisms, and tropisms. *Journal of Personality, 68*, 1089–1107.

Friedman, H. S. (2007). Personality, disease, and self-healing. In H. S. Friedman & R. C. Silver (Eds.), *Foundations of health psychology* (pp. 172–199). New York: Oxford University Press.

Friedman, H. S. (2008). The multiple linkages of personality and disease. *Brain, Behavior, and Immunity, 22*, 668–675.

Friedman, H. S., & Booth-Kewley, S. (1987). The "disease-prone personality": A meta-analytic view of the construct. *American Psychologist, 42*, 539–555.

Friedman, H. S., Kern, M. L., & Reynolds, C. A. (2010). Personality and health, subjective well-being, and longevity as adults age. *Journal of Personality, 78*, 179–215.

Friedman, H. S., & Markey, C. N. (2003). Paths to longevity in the highly intelligent Terman cohort. In C. E. Finch, J.-M. Robine, & Y. Christen (Eds.), *Brain and longevity* (pp. 165–175). New York: Springer.

Friedman, H. S., Tucker, J. S., Schwartz, J. E., Martin, L. R., Tomlinson-Keasey, C., Wingard, D., et al. (1995). Childhood conscientiousness and longevity: Health behaviors and cause of death. *Journal of Personality and Social Psychology, 68*, 696–703.

Friedman, H. S., Tucker, J. S., Tomlinson-Keasey, C., Schwartz, J. E., Wingard, D. L., & Criqui, M. H. (1993). Does childhood personality predict longevity? *Journal of Personality and Social Psychology, 65*, 176–185.

Gelissen, J., & de Graaf, P. M. (2006). Personality, social background, and occupational career success. *Social Science Research, 35*, 702–726.

Goldberg, L. R. (1993). The structure of phenotypic personality traits. *American Psychologist, 48*, 26–34.

Goodwin, R., & Engstrom, G. (2002). Personality and the perception of health in the general population. *Psychological Medicine, 32*, 325–332.

Gosling, S. D., & John, O. P. (1999). Personality dimensions in nonhuman animals: A cross-species review. *Current Directions in Psychological Science, 8*, 69–75.

Graham, J. E., Christian, L. M., & Kiecolt-Glaser, J. K. (2006). Stress, age, and immune function: Toward a lifespan approach. *Journal of Behavioral Medicine, 29*, 389–400.

Greven, C., Chamorro-Premuzic, T., Arteche, A., & Furnham, A. (2008). A hierarchical integration of dispositional determinants of general health in students: The Big Five, trait emotional intelligence and humour styles. *Personality and Individual Differences, 44*, 1562–1573.

Gruenewald, T. L., Mroczek, D. K., Ryff, C. D., & Singer, B. H. (2008). Diverse pathways to positive and negative affect in adulthood and later life: An integrative approach using recursive partitioning. *Developmental Psychology, 44*, 330–343.

Guarino, L., Roger, D., & Olason, D. T. (2007). Reconstructing N: A new approach to measuring emotional sensitivity. *Current Psychology, 26*, 37–45.

Hampson, S. E., & Friedman, H. S. (2008). Personality and health: A lifespan perspective. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *The handbook of personality: Theory and research* (3rd ed., pp. 770–794). New York: Guilford Press.

Hampson, S. E., Goldberg, L. R., Vogt, T. M., & Dubanoski, J. P. (2007). Mechanisms by which childhood personality traits influence adult health status: Educational attainment and healthy behaviors. *Health Psychology, 26*, 121–125.

Hart, C. L., Taylor, M. D., Smith, G. D., Whalley, L. J., Hole, D. J., Wilson, V., et al. (2004). Childhood IQ and cardiovascular disease in adulthood: Prospective observational study linking the Scottish Mental Survey 1932 and the midspan studies. *Social Science and Medicine, 59*, 2131–2138.

Held, B. B. (2004). The negative side of positive psychology. *Journal of Humanistic Psychology, 44*, 9–46.

Hemmingsson, T., Essen, J. V., Melin, B., Allebeck, P., & Lundberg, I. (2007). The association between cognitive ability measured at ages 18–20 and coronary heart disease in middle age among men: A prospective study using the Swedish 1969 conscription cohort. *Social Science and Medicine, 65*, 1410–1419.

Hertzog, C., & Nesselroade, J. R. (2003). Assessing psychological change in adulthood: An overview of methodological issues. *Psychology and Aging, 18*, 639–657.

Howell, R., Kern, M. L., & Lyubomirsky, S. (2007). Health benefits: Meta-analytically determining the impact of well-being on objective health outcomes. *Health Psychology Review, 1*, 83–136.

Ickes, W., Snyder, M., & Garcia, S. (1997). Personality influences on the choice of situations. In R. Hogan, J. Johnson, & S. Briggs (Eds.), *Handbook of personality psychology* (pp. 165–195). San Diego, CA: Academic Press.

Jerram, K. L., & Coleman, P. G. (1999). The Big Five personality traits and reporting of health problems and health behaviour in old age. *British Journal of Health Psychology, 4*, 181–192.

Johnson, W., McGue, M., Krueger, R. J., & Bouchard, T. J., Jr. (2004). Marriage and personality: A genetic analysis. *Journal of Personality and Social Psychology, 86*, 285–294.

Jones, S. M. (2008). Maternal cortisol as a mediator of prenatal stress and infant regulation development. *Dissertation Abstracts International B: Sciences and Engineering, 69*, 681.

Kaplan, R. M. (1994). The Ziggy theorem: Toward an outcomes-focused health psychology. *Health Psychology, 13*, 451–460.

Kaplan, R. M. (2003). The significance of quality of life in health care. *Quality of Life Research, 12*, 3–16.

Kaplan, R. M. (2007). Uncertainty, variability, and resource allocation in the health care decision process. In H. S. Friedman & R. C. Silver (Eds.), *Foundations of health psychology* (pp. 358–383). New York: Oxford University Press.

Kemeny, M. E. (2007). Psychoneuroimmunology. In H. S. Friedman & R. C. Silver (Eds.), *Foundations of health psychology* (pp. 92–116). New York: Oxford University Press.

Kern, M. L., & Friedman, H. S. (2008). Do conscientious individuals live longer?: A quantitative review. *Health Psychology, 27*, 505–512.

Kern, M. L., Friedman, H. S., Martin, L. R., Reynolds, C. A., & Luong, G. (2009). Conscientiousness, career success, and longevity: A lifespan analysis. *Annals of Behavioral Medicine, 37*, 154–163.

Korotkov, D., & Hannah, T. E. (2004). The five-factor model of personality: Strengths and limitations in predicting health status, sick-role and illness behaviour. *Personality and Individual Differences, 36*, 187–199.

Korten, A. E., Jorm, A. F., Jiao, Z., Letenneur, L., Jacomb, P. A., Henderson, A. S., et al. (1999). Health, cognitive, and psychosocial factors as predictors of mortality in an elderly community sample. *Journal of Epidemiology and Community Health, 53*, 83–88.

Kuh, D., & Ben-Shlomo, Y. (Eds.). (1997). *A life course approach to chronic disease epidemiology*. New York: Oxford University Press.

Kusumi, I., Suzuki, K., Sasaki, Y., Kameda, K., Sasaki, T., & Koyama, T. (2002). Serotonin 5-HT_{2A} receptor gene polymorphism, 5-HT_{2A} receptor function and personality traits in healthy subjects: A negative study. *Journal of Affective Disorders, 68*, 235–241.

Larson, J. H., & Holman, T. B. (1994). Premarital predictors of marital quality and stability. *Family Relations: Interdisciplinary Journal of Applied Family Studies, 43*, 228–237.

Leclerc, J., Rahn, M., & Linden, W. (2006). Does personality predict blood pressure over a 10-year period? *Personality and Individual Differences, 40*, 1313–1321.

Little, T. D., Bovaird, J. A., & Slegers, D. W. (2006). Methods for the analysis of change. In D. K. Mroczek & T. D. Little (Eds.), *Handbook of personality development* (pp. 181–211). Mahwah, NJ: Erlbaum.

Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin, 131*, 803–855.

MacKinnon, D. P., & Luecken, L. J. (2008). How and for whom?: Mediation and moderation in health psychology. *Health Psychology, 27*, S99–S100.

Maddi, S. R., & Kobasa, S. C. (1984). *The hardy executive: Health under stress*. Chicago: Dow Jones-Irwin.

Magnus, K., Diener, E., Fujita, F., & Payot, W. (1993). Extraversion and neuroticism as predictors of objective life events: A longitudinal analysis. *Journal of Personality and Social Psychology, 65*, 1046–1053.

Manuck, S. B., Flory, J. D., McCaffery, J. M., Matthews, K. A., Mann, J. J., & Muldoon, M. F. (1998). Aggression, impulsivity, and central nervous system serotonergic responsivity in a nonpatient sample. *Neuropsychopharmacology, 19*, 287–299.

Markey, C. N., Markey, P. M., & Tinsley, B. J. (2003). Personality, puberty, and preadolescent girls' risky behaviors: Examining the predictive value of the five-factor model of personality. *Journal of Research in Personality, 37*, 405–419.

Martin, L. R., & Friedman, H. S. (2000). Comparing personality scales across time: An illustrative study of validity and consistency in life-span archival data. *Journal of Personality, 68*, 85–110.

Martin, L. R., Friedman, H. S., & Schwartz, J. E. (2007). Personality and mortality risk across the lifespan: The importance of conscientiousness as a biopsychosocial attribute. *Health Psychology, 26*, 428–436.

McArdle, J. J., Small, B. J., Backman, L., & Fratiglioni, L. (2005). Longitudinal models of growth and survival applied to early detection of Alzheimer's disease. *Journal of Geriatric Psychiatry and Neurology, 18*, 234–241.

McCaffrey, J. M., Frasure-Smith, N., Dubé, M. P., Théroux, P., Rouleau, G. A., Duan, Q., et al. (2006). Common genetic vulnerability to depressive symptoms and coronary artery disease: A review and development of candidate genes related to inflammation and serotonin. *Psychosomatic Medicine, 68*, 187–200.

McCrae, R. R., Costa, P. T., Jr., Ostendorf, F., Angleitner, A., Hrebickova, M., Avia, M. D., et al. (2000). Nature over nurture: Temperament, personality, and lifespan development. *Journal of Personality and Social Psychology, 78*, 173–186.

McCrae, R. R., Jang, K. L., Livesley, W. J., Riemann, R., & Angleitner, A. (2001). Sources of structure: Genetic, environmental, and artifactual influences on the covariation of personality traits. *Journal of Personality, 69*, 511–535.

McEwen, B. S. (2006). Protective and damaging effects of stress mediators: Central role of the brain. *Dialogues in Clinical Neuroscience, 8*, 283–293.

Mehta, P. H., & Gosling, S. D. (2008). Bridging human and animal research: A comparative approach to studies of personality and health. *Brain, Behavior, and Immunity, 22*, 651–661.

Miller, G. E., Cohen, S., Rabin, B. S., Skoner, D. P., & Doyle, W. J. (1999). Personality and tonic cardiovascular, neuroendocrine, and immune parameters. *Brain, Behavior, and Immunity, 13*, 109–123.

Moor, C., Zimprich, D., Schmitt, M., & Kliegel, M. (2006). Personality, aging self-perceptions, and subjective health: A mediation model. *International Journal of Aging and Human Development, 63*, 241–257.

Mroczek, D. K., & Spiro, A., III. (2007). Personality change influences mortality in older men. *Psychological Science, 18*, 371–376.

Nesselroade, J. R. (1991). The warp and woof of the developmental fabric. In R. Downs, L. Liben, & D. Palarmo (Eds.), *Visions of development, the environment, and aesthetics: The legacy of Joachim F. Wohlwill* (pp. 213–240). Hillsdale, NJ: Erlbaum.

Neupert, S. D., Mroczek, D. K., & Spiro, A., III. (2008). Neuroticism moderates the daily relation between stressors and memory failures. *Psychology and Aging, 23*, 287–296.

O'Cleirigh, C., Ironson, G., Weiss, A., & Costa, P. T. (2007). Conscientiousness predicts disease progression (CD4 number and viral load) in people living with HIV. *Health Psychology, 26*, 473–480.

O'Connor, M. C., & Paunonen, S. V. (2007). Big Five personality predictors of post-secondary academic performance. *Personality and Individual Differences, 43*, 971–990.

Ormel, J., Rosmalen, J., & Farmer, A. (2004). Neuroticism: A non-informative marker of vulnerability to psychopathology. *Social Psychiatry and Psychiatric Epidemiology, 39*, 906–912.

O'Toole, B. I. (1990). Intelligence and behaviour and motor vehicle accident mortality. *Accident Analysis and Prevention, 22*, 211–221.

Ozer, D. J., & Benet-Martinez, V. (2006). Personality and the prediction of consequential outcomes. *Annual Review of Psychology, 57*, 401–421.

Pedersen, N. L., & Reynolds, C. A. (1998). Stability and change in adult personality: Genetic and environmental components. *European Journal of Personality, 12*, 365–386.

Pressman, S. D., & Cohen, S. (2005). Does positive affect influence health? *Psychological Bulletin, 131*, 925–971.

Puttonen, S., Elovainio, M., Kivimäki, M., Koskinen, T., Pulkki-Råback, L., Viikari, J. S.

A., et al. (2008). Temperament, health-related behaviors, and autonomic cardiac regulation: The cardiovascular risk in young Finns study. *Biological Psychology, 78*, 204–210.

Räikkönen, K., Matthews, K. A., & Kuller, L. H. (2002). The relationship between psychological risk attributes and the metabolic syndrome in healthy women: Antecedent or consequences? *Metabolism, 51*, 1573–1577.

Rhodes, R. E., & Smith, N. E. I. (2006). Personality correlates of physical activity: A review and meta-analysis. *British Journal of Sports Medicine, 40*, 958–965.

Roberts, B. W., Caspi, A., & Moffitt, T. (2003). Work experiences and personality development in young adulthood. *Journal of Personality and Social Psychology, 84*, 582–593.

Roberts, B. W., Helson, R., & Klohnen, E. C. (2002). Personality development and growth in women across 30 years: Three perspectives. *Journal of Personality, 70*, 79–102.

Roberts, B. W., Kuncel, N. R., Shiner, R., Caspi, A., & Goldberg, L. R. (2007). The power of personality: The comparative validity of personality traits, socioeconomic status, and cognitive ability for predicting important life outcomes. *Perspectives on Psychological Science, 2*, 313–345.

Roberts, B. W., & Pomerantz, E. M. (2004). On traits, situations, and their integration: A developmental perspective. *Personality and Social Psychology Review, 8*, 402–416.

Roberts, B. W., Walton, K. E., & Bogg, T. (2005). Conscientiousness and health across the life course. *Review of General Psychology, 9*, 156–168.

Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the lifespan: A meta-analysis of longitudinal studies. *Psychological Bulletin, 132*, 1–25.

Roberts, B. W., Wood, D., & Caspi, A. (2008). The development of personality traits in adulthood. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *The handbook of personality: Theory and research* (3rd ed., pp. 375–398). New York: Guilford Press.

Rook, K. S., Charles, S. T., & Heckhausen, J. (2007). Aging and health. In H. S. Friedman & R. C. Silver (Eds.), *Foundations of health psychology* (pp. 234–262). New York: Oxford University Press.

Rutter, M., Kim-Cohen, J., & Maughan, B. (2006). Continuities and discontinuities in psychopathology from childhood to adult life. *Journal of Child Psychology and Psychiatry, 47*, 276–295.

Scarr, S., & McCartney, K. (1983). How people make their own environments: A theory of genotype → environment effects. *Child Development, 54*, 424–435.

Schmidt, F. L., & Hunter, J. E. (1992). Development of a causal model of processes determining job performance. *Current Directions in Psychological Science, 1*, 89–92.

Schultz, R., & Heckhausen, J. (1996). A life span model of successful aging. *American Psychologist, 51*, 702–714.

Schwartz, J. E., Friedman, H. S., Tucker, J. S., Tomlinson-Keasey, C., Wingard, D. L., & Criqui, M. H. (1995). Sociodemographic and psychosocial factors in childhood as predictors of adult mortality. *American Journal of Public Health, 85*, 1237–1245.

Segerstrom, S. C. (2000). Personality and the immune system: Models, methods, and mechanisms. *Annals of Behavioral Medicine, 22*, 180–190.

Segerstrom, S. C. (2005). Optimism and immunity: Do positive thoughts always lead to positive effects? *Brain, Behavior, and Immunity, 19*, 195–200.

Segerstrom, S. C., & Miller, G. E. (2004). Psychological stress and the human immune system: A meta-analytic study of 30 years of inquiry. *Psychological Bulletin, 104*, 601–630.

Seibert, S. E., Crant, J. M., & Kraimer, M. L. (1999). Proactive personality and career success. *Journal of Applied Psychology, 84*, 416–427.

Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. Oxford, UK: Oxford University Press.

Smith, T. W. (2006). Personality as risk and resilience in physical health. *Current Directions in Psychological Science, 15*, 227–231.

Smith, T. W., & Gallo, L. C. (2001). Personality traits as risk factors for physical illness. In A. Baum, T. Revenson, & J. Singer (Eds.), *Handbook of health psychology* (pp. 139–172). Hillsdale, NJ: Erlbaum.

Smith, T. W., & MacKenzie, J. (2006). Personality and risk of physical illness. *Annual Review of Clinical Psychology, 2*, 435–467.

Srivastava, S., John, O. P., Gosling, S. D., & Potter, J. (2003). Development of personality in early and middle adulthood: Set like plaster or persistent change? *Journal of Personality and Social Psychology, 84*, 1041–1053.

Sroufe, L. A., Carlson, E. A., Levy, A. K., & Egeland, B. (1999). Implications of attachment theory for developmental psychopathology. *Development and Psychopathology, 11*, 1–13.

Steel, P., Schmidt, J., & Shultz, J. (2008). Refining the relationship between personality and subjective well-being. *Psychological Bulletin, 134*, 138–161.

Suls, J., & Bunde, J. (2005). Anger, anxiety, and depression as risk factors for cardiovascular disease: The problems and implications of

overlapping affective dispositions. *Psychological Bulletin, 131*, 260–300.

Suls, J., & Rothman, A. (2004). Evolution of the biopsychosocial model: Prospects and challenges for health psychology. *Health Psychology, 23*, 119–125.

Taga, K. A., Friedman, H. S., & Martin, L. R. (2009). Early personality traits as predictors of mortality risk following conjugal bereavement. *Journal of Personality, 77*, 669–690.

Taylor, M. D., Hart, C. L., Davey Smith, G., Starr, J. M., Hole, D. J., Whalley, L. J., et al. (2003). Childhood mental ability and smoking cessation in adulthood: Prospective observational study linking the Scottish Mental Survey 1932 and the Midspan studies. *Journal of Epidemiology and Community Health, 57*, 464–465.

Terracciano, A., Lockenhoff, C. E., Zonderman, A. B., Ferrucci, L., & Costa, P. T. (2008). Personality predictors of longevity: Activity, emotional stability, and conscientiousness. *Psychosomatic Medicine, 70*, 621–627.

Tucker, J. S., Friedman, H. S., Schwartz, J. E., Criqui, M. H., Tomlinson-Keasey, C., Wingard, D. L., et al. (1997). Parental divorce: Effects on individual behavior and longevity. *Journal of Personality and Social Psychology, 73*, 381–391.

Tucker, J. S., Friedman, H. S., Wingard, D. L., & Schwartz, J. E. (1996). Marital history at midlife as a predictor of longevity: Alternative explanations to the protective effect of marriage. *Health Psychology, 15*, 94–101.

Twenge, J. M. (2000). The age of anxiety?: Birth cohort change in anxiety and neuroticism, 1952–1993. *Journal of Personality and Social Psychology, 79*, 1007–1021.

Twenge, J. M. (2001). Birth cohort changes in extraversion: A cross-temporal meta-analysis, 1966–1993. *Personality and Individual Differences, 30*, 735–748.

U.S. Department of Health and Human Services. (2000). *Healthy People 2010: Understanding and improving health* (2nd ed.). Washington, DC: U.S. Government Printing Office.

Van Heck, G. (1997). Personality and physical health: Toward an ecological approach to health-related personality research. *European Journal of Personality, 11*, 415–443.

Vollrath, M. E., & Torgersen, S. (2008). Personality types and risky health behaviors in Norwegian students. *Scandinavian Journal of Psychology, 49*, 287–292.

Wadhwa, P. D. (2005). Psychoneuroendocrine processes in human pregnancy influence fetal development and health. *Psychoneuroendocrinology, 30*, 724–743.

Wand, G. S., McCaul, M., Yang, X., Reynolds, J., Gotjen, D., Lee, S., et al. (2002). The mu-opinid receptor gene polymorphism (A118G) alters HPA axis activation induced by opioid receptor blockade. *Neuropsychopharmacology, 26*, 106–114.

Watson, D., & Hubbard, B. (1996). Adaptational style and dispositional structure: Coping in the context of the five-factor model. *Journal of Personality, 64*, 737, 774.

Watson, D., & Pennebaker, J. W. (1989). Health complaints, stress, and distress: Exploring the central role of negative affectivity. *Psychological Review, 96*, 234–254.

Weiss, A., & Costa, P. T. (2005). Domain and facet personality predictors of all-cause mortality among Medicare patients aged 65 to 100. *Psychosomatic Medicine, 67*, 724–733.

Whalley, L. J., & Deary, I. J. (2001). Longitudinal cohort study of childhood IQ and survival up to age 76. *British Medical Journal, 322*, 819–822.

Whiteman, M. C. (2006). Personality, cardiovascular disease and public health. In M. E. Vollrath (Ed.), *Handbook of personality and health* (pp. 13–34). Hoboken, NJ: Wiley.

Williams, P. G., O'Brien, C. D., & Colder, C. R. (2004). The effects of neuroticism and extraversion on self-assessed health and health-relevant cognition. *Personality and Individual Differences, 37*, 83–94.

Williams, R. B., Kuhn, C. M., Helms, M. J., Siegler, I. C., Barefoot, J. C., Ashley-Kocy, A., et al. (2004). *Central nervous system (CNS) serotonin function and NEO-PI personality profiles*. Presented at the 62nd Annual Meeting of the American Psychosomatic Society, Orlando, FL.

Wilson, R. S., Krueger, K. R., Gu, L., Bienias, J. L., Mendes de Leon, C. F., & Evans, D. A. (2005). Neuroticism, extraversion, and mortality in a defined population of older persons. *Psychosomatic Medicine, 67*, 841–845.

Wilson, R. S., Mendes de Leon, C. F., Bienias, J. L., Evans, D. A., & Bennett, D. A. (2004). Personality and mortality in old age. *Journals of Gerontology B: Psychological Sciences and Social Sciences, 59*, P110–P116.

World Health Organization. (1948). Preamble to the constitution of the World Health Organization as adopted by the International Health Conference. *Official Records of the World Health Organization, 2*, 100.

Yamasue, H., Abe, O., Suga, M., Yamada, H., Inoue, H., Tochigi, M., et al. (2008). Gender-common and -specific neuroanatomical basis of human anxiety-related personality traits. *Cerebral Cortex, 18*, 46–52.

Zweig, D., & Webster, J. (2004). What are we measuring?: An examination of the relationships between the Big-Five personality traits, goal orientation, and performance intentions. *Personality and Individual Differences, 36*, 1693–1708.