

Neuroticism and Health as Individuals Age

Howard S. Friedman
University of California, Riverside

Neuroticism and conscientiousness have emerged as key concepts in understanding health and thriving as individuals age, but various conceptual misunderstandings and methodological deficiencies have impaired progress. Personality traits are not analogous to health threats such as infectious microbes or dangerous behaviors or environmental toxins; rather, they can capture biopsychosocial processes across time. This article examines how healthy neuroticism and unhealthy neuroticism play out in differing environments and how these concepts can help clarify and explain the important variability in health and longevity that emerges in middle age. Progress in utilizing personality to improve public health ultimately will depend on the precise study and full specification of causal models, including pathways across time and clear description of unambiguous outcomes.

Keywords: neuroticism, health, conscientiousness, mortality risk, personality

Beginning at very low levels at age 25, the probability of serious illness and death rises exponentially with age. Mortality risk almost doubles about every 8 years (Gavrilov & Gavrilova, 2011). This exponential rise means that much interesting biopsychosocial variability in health appears around age 45 and diminishes at about age 80. That is, a very large number of individuals become seriously impaired or die in the decades of middle age and early old age, and there is an enormous amount of variation. Because much of this large middle-age variability depends on behavior and social relations, there is the clear opportunity for hugely important disease prevention and health promotion. Although about half of middle-aged individuals will live beyond age 80 (in developed nations), biology dominates after age 80 and the mortality curve (risk of dying) is then almost straight up, with considerably less variation. Thus, the core question of why some people falter or succumb in middle age while others flourish deserves special attention: Which biopsychosocial patterns hold promise to help people thrive through their 50s, 60s, and 70s?

Modern understandings of personality can help us account for this important individual variation in middle-age and early old-age thriving. Personality apprehends a combination of genetic, familial, experiential/behavioral, and sociocultural components, and so, it provides a useful approach to the big picture. Notably, personality helps capture not only the characteristic health-relevant patterns of psychobiological predispositions, health behaviors, and emotional reactions but also the reasons why some people are more likely to be exposed to infectious agents, develop unhealthy habits, and enter stress-inducing situations in the first place. That is, this broader conception goes beyond simply seeing personality as a collection of traits; it incorporates person–situation interactions through the years (Hampson & Friedman, 2008; Shanahan, Hill, Roberts, Eccles, & Friedman, 2014). Some people tend to self-select into toxic environments and also evoke negative reac-

tions from others (Kern, Della Porta, & Friedman, 2014). This cyclical process of self-selection and evocation—and the associated unhealthy behavior patterns and reactions that emerge—can shift individuals onto a trajectory that has been termed *disease-proneness* or the *disease-prone personality* (Friedman & Booth-Kewley, 1987; Kern & Friedman, 2011).

Neuroticism

Neuroticism—perhaps the most complex health-relevant personality factor—involves a pattern of anxiety, worrying, moodiness, and negative emotions, as contrasted to a more calm, contented, accomplished, and stable set of feelings, reactions, and social interactions. Neurotic individuals feel, notice, evince, and report more distress, symptoms, and pain (Goubert, Crombez, & Van Damme, 2004; Smith & Spiro, 2002; Watson & Pennebaker, 1989).

Some conceptions of neuroticism emphasize negative affectivity (a tendency to experience distressing emotions), whereas others emphasize more cognitive aspects (such as worrying or rumination or catastrophizing); still others examine the endocrine and autonomic disruptions in homeostasis (including psychophysiological anxiety and psychobiological “stress”). Finally, some approaches to neuroticism focus on more behavioral or interpersonal tendencies, such as recklessness, self-medication, or hostility (for reviews on these matters, see Widiger, 2017). Although the construct of neuroticism has sufficient reliability, validity, and generality to be useful as a general factor of personality, the application to healthy aging often requires attention to important definitional distinctions and specified causal models.

In this field, imprecision often emerges in measurement as well, with overlapping assessment of personality, well-being, and health. Many assessment tools measuring neuroticism ask individuals if they have frequent mood swings, feel blue, get irritated, often feel uncomfortable or anxious, and worry about things. Related measures of subjective well-being and affect may ask individuals to report on whether the conditions of life are “excellent” and whether they get the most out of life. Measures of depressive tendencies within the broader factor of neuroticism not

Correspondence concerning this article should be addressed to Howard S. Friedman, Department of Psychology, University of California, 900 University Avenue, Riverside, CA 92521. E-mail: Howard.Friedman@ucr.edu

only add in questions about feeling helpless but also move into more behavioral aspects such as disturbed appetite, disrupted sleep, and lethargy. Because many assessments of physical health and thriving likewise rely on reports of distress, illness symptoms (tiredness, loss of appetite), failure to thrive, and pain, there are endless possibilities for confounding. Most notably, subjective well-being and related notions of happiness depend heavily on such reports, whether self-reports of anguish and pain or observer reports of negative emotions and signs of discontent and failures to thrive. Not surprisingly, neuroticism is highly inversely correlated with subjective well-being, especially hedonia (DeNeve & Cooper, 1998; Steel, Schmidt, & Shultz, 2008). Self-reported health also often relies on similar assessments, of accomplishment, pep, and vigor, and it is also inversely correlated with neuroticism, and so, it is easy to assume that neuroticism somehow directly causes poor health and well-being, but it has long been noted that such findings are misleading or even meaningless (Costa & McCrae, 1987; Goodwin & Engstrom, 2002; Smith, Avis, & Assmann, 1999; Watson & Pennebaker, 1989).

As an antidote to these assessment challenges, there is a good theoretical and empirical reason to use multiple validated outcomes in the field of personality and health (Friedman & Kern, 2014). Much clarity is achieved when the following six or so dimensions of healthy aging are distinguished: (a) physical (medical) health as assessed by formal disease diagnosis; (b) subjective well-being and related aspects of happiness and mental health (via self-report and friend report; see also Mahaffey, Watson, Clark, & Kotov, 2016); (c) cognitive function, namely, the ability to think clearly and remember (tested); (d) social competence, that is, successful engagement with others; (e) productive function (contributing to society, via employment, formal volunteer work, and/or significant domestic responsibility); and (f) longevity (Al-dwin, Spiro, & Park, 2006; Baltes & Baltes, 1990; Friedman & Martin, 2011; Fryback et al., 2007). These six health outcomes are highly correlated with each other but understanding *causal* links often depends on distinguishing among outcomes. That is, these various health outcomes share some underlying causes but also differ in some causes and consequences. In particular, subjective well-being (and self-reported health) is a very poor stand-in for physical health and longevity when studying causal relationships, even though all these elements are intercorrelated.

Another threat to understanding neuroticism and health arises from the very common emphasis on particular diseases. Many years ago, Friedman and Booth-Kewley (1987) noted the conceptual dangers and traps of focusing on a single trait such as neuroticism and a single disease outcome, thus ignoring the basic principle of a multitrait multimethod approach to validity (Campbell & Fiske, 1959), but searches for narrow psychological causes of specific diseases continue. (See, e.g., Schapiro et al., 2001, and similar studies showing no association between neuroticism and cancer risk.) If it later emerges that the same single aspect of personality equally predicts other diseases, medical researchers and clinicians may proclaim “comorbidity”—the occurrence of two or more disorders or diseases in the same person, implying the need for distinguishing origins. In fact, it is usually better to approach these matters in terms of a more general disruption in bodily homeostasis, whether by unhealthy behaviors, genomic factors, social disruption, infections, toxins, or some combination thereof (Goodwin & Friedman, 2006).

Beyond these challenges to teasing out the causal influences necessary for designing effective interventions, the study of neuroticism and health is plagued by patient (subject) selection artifacts. Because neurotic individuals are more sensitive to pain and are more likely to complain about it than people who are very content and emotionally stable, neurotics are more likely to have diagnostic tests and be prescribed certain medications. For example, neurotics with chest pain are more likely to have tests such as angiograms (compared with those who are more stoic). With nonneurotics not in the sample, there is bias in the relationship between neuroticism and disease (such as artery occlusion) that emerges (Czajkowski, Chesney, & Smith, 2009; Friedman, 2011). That is, invasive procedures and medical tests are less likely to be done on a noncomplaining sample or a random sample, and so, those with (undiscovered) disease who are low on neuroticism are left out of the study. This can change the observed direction of the relationship between neuroticism and disease from positive to negative, or negative to positive—a classic selection artifact (Czajkowski et al., 2009; Friedman, 2011).

Other serious and often-overlooked analytic threats to understanding the relationship between neuroticism and health come from studies of centenarians. Only a tiny percentage of people live to age 100 and such individuals are unlikely to be relevant to understanding the variations between those who die at age 50 versus age 70. Also, importantly, people change over the decades, and so, a health-relevant personality in the first 5 decades of life is not necessarily the same personality half a century later. In fact, people generally become less neurotic as they age, and so, it is not surprising that studies of very old people tend to find low levels of neuroticism. However, the low neuroticism in old age did not cause them to reach old age. Cross-sectional studies of the extremely old may help uncover some genetic or other biological hints relevant to healthy aging but can be a red herring for understanding personality and health (Carstensen, 2006; Martin et al., 2006; Reed & Carstensen, 2012).

Neuroticism and Health

Neuroticism is *correlated* with (worse) health, especially when health is broadly construed to include psychosocial and subjective well-being aspects but exclude longevity. For example, consider the Midlife Development in the United States Survey, a nationally representative sample of 3,032 adults. On the more mental health side of health, neuroticism was reliably correlated with depression, alcohol abuse, and debilitating anxiety and panic disorders. On the more physical side of health, neuroticism was higher among respondents with skin problems, sciatica, urinary problems, ulcers, asthma/respiratory disease, and other lung problems, compared with those without (Goodwin & Friedman, 2006). In a 4-year study of personality and cumulative illness in patients 65 years and older, higher neuroticism (and lower conscientiousness) was associated with higher average illness burden (Chapman, Roberts, Lyness, & Duberstein, 2013). A longitudinal study that looked across 4 years found that (higher) neuroticism and (lower) conscientiousness predicted the risk of disease onset (Weston, Hill, & Jackson, 2015). In a study of twins, those high in neuroticism earlier in life were more likely to report 13 different physical health conditions (including ulcers, chronic fatigue syndrome, and coronary heart disease) 25 years later (Charles, Gatz, Kato, & Pedersen, 2008). In

that study, familial influences were strongest for conditions related to systemic pain; this points to some genetic influences between neuroticism and these pain experiences, as contrasted to the influences on health that come more from health behaviors such as smoking. A series of projects based on longitudinal study of over 5,000 British adults, with a focus on health behavior, revealed the interactive and reciprocal effects of neuroticism (and other traits) and alcohol, physical activity, obesity, intelligence, and health across decades (Cheng & Furnham, 2013a, 2013b, 2014). Finally, studies on cognitive impairment (an understudied topic but one of the six key outcome criteria noted previously) have shown (higher) neuroticism (and lower conscientiousness) reliably predictive of cognitive decline, independent of key demographic and behavioral controls (Terracciano, Stephan, Luchetti, Albanese, & Sutin, 2017; Terracciano et al., 2014).

Given these findings, when and why is neuroticism causally relevant to health? Core insights have emerged from research on antisocial behavior and conduct disorders (“juvenile delinquents”)—adolescents with deep-seated problems in the self-control of emotions that lead them into significant conflict with social and societal norms. Such persons are usually low on conscientiousness and high on neuroticism and, if not remediated, progress to a wide array of unhealthy outcomes (Clausen, 1991; Jokela, Ferrie, & Kivimäki, 2009; Maughan, Stafford, Shah, & Kuh, 2014). For example, especially when paired with low conscientiousness, neuroticism is a meaningful correlate of psychopathology and substance abuse (Kotov, Gamez, Schmidt, & Watson, 2010).

In a fascinating twist, studies of longevity—usually the most reliable, valid, and important health outcome—find inconsistent links with neuroticism. Some studies and reviews find little or no association with mortality risk (Almada et al., 1991; Batty, Jokela, Kivimäki, & Shipley, 2016; Iwasa et al., 2008; Jokela et al., 2013; Taylor et al., 2009), whereas others find a negative association (Korten et al., 1999; Taga, Friedman, & Martin, 2009; Weiss & Costa, 2005) or a positive association (Christensen et al., 2002; Denollet et al., 1996; Shipley, Weiss, Der, Taylor, & Deary, 2007; Terracciano, Löckenhoff, Zonderman, Ferrucci, & Costa, 2008; Weiss, Gale, Batty, & Deary, 2009; Wilson, Mendes de Leon, Bienias, Evans, & Bennett, 2004). These mixed findings point toward the importance of examining interactions with other personality traits, the stage of life, and the social environments (Shanahan et al., 2014; Smith, Baron, & Grove, 2014), and they reveal the futility of studies that mindlessly look for correlations between personality and health without specifying comprehensive causal models (Friedman & Kern, 2014; Friedman, Kern, Hampson, & Duckworth, 2014). That is, the risks of high neuroticism are not the whole story. There is also substantial evidence that neuroticism can sometimes be health-protective.

Healthy Neuroticism

In a study of over 1,000 Medicare patients and all-cause mortality across 5 years, NEO Five-Factor Inventory (NEO-FFI) neuroticism was protective (Weiss & Costa, 2005). This finding—especially striking because mortality was the outcome—is consistent with other studies that find that more neurotic individuals stay healthier or live longer. For example, in a prospective study of community-dwelling elderly individuals, neuroticism

(from the Eysenck Personality Questionnaire) was protective, especially for men (Korten et al., 1999). A complementary finding emerged from a long-term study of personality and mortality risk, in which neuroticism in young adulthood was significantly associated with decreased mortality risk among men who were later widowed (but not among women or among married men who were not widowed; Taga et al., 2009). Worrying and distress sometimes lead to subsequent beneficial health behaviors, such as adherence to medical care and greater avoidance of substance abuse when facing life change. Other studies find no association between neuroticism and mortality risk, further suggesting that it is overly simplistic and misleading to assume that neuroticism is playing a direct causally harmful role in illness (Huppert & Whittington, 1995; Iwasa et al., 2008; Mosing et al., 2012).

In light of these sorts of findings, Friedman (2000) proposed the concept of a *healthy neuroticism*. If the vigilance and worrying concern of neuroticism are paired in the right circumstances with the prudence and responsibility of being conscientious (or with beneficial attentiveness), then healthy patterns may be the result. Some evidence does indeed suggest that individuals high on both neuroticism and conscientiousness may be less prone to chronic inflammation (as measured by interleukin 6, a potent cytokine; Turiano, Mroczek, Moynihan, & Chapman, 2013). Some of this association was accounted for by adjustment for health behaviors.

It is therefore also important to consider neuroticism in terms of what occurs *after* a disease or special challenge. In one large study many years ago, Type A men followed after a heart attack were less likely to die during the subsequent dozen years (Ragland & Brand, 1988), as perhaps these worried Type A patients worked especially hard at their treatment regimen. Confirming the idea of this sort of healthy neuroticism, high levels of neuroticism (when paired with high levels of conscientiousness) predicted less smoking *after* the onset of a major chronic disease (Weston & Jackson, 2015). Furthermore, a large-scale study of neuroticism and mortality determined that neuroticism was predictive of *lower* mortality risk in those people with fair or poor self-rated health and that higher scores on a facet of neuroticism related to vulnerability and worrying were associated with lower mortality risk (Gale et al., 2017).

Although traits can clearly predict health and traits capture biopsychosocial processes that play a causal role in health, traits are not at all analogous to health threats such as infectious microbes (e.g., the zika virus) or dangerous behaviors (e.g., racing on a rain-slicked highway) or environmental threats (e.g., eating pesticide-contaminated food). Terms such as *toxic trait* endeavor to capture some medical standing but ignore the situational contexts and longitudinal trajectories, thereby misunderstanding the basic idea of a personality trait. Further, there are cultural, sub-cultural, and individual differences in the extent to which anxiety and distress can be seen as appropriate, meaningful, and valuable (Luong, Wrzus, Wagner, & Riediger, 2016). A comparably complex picture plays out in the study of anxiety and subsequent blood pressure, with some studies suggesting that (higher) anxiety predicts lower systolic blood pressure (Tikhonoff et al., 2014). It is, however, very difficult to tease apart all the causal contributors and processes. Although anxiety and especially depression are correlated with and often predict inflammatory markers such as the C-reactive protein, this is often mediated by health behaviors such as smoking (Duivis et al., 2015; see also a review showing smok-

ing as a partial mediator of links between neuroticism and mortality risk: [Graham et al., 2017](#)). Subtle biological processes wax and wane across the months. Screening individuals to find those who are high on neuroticism and low on conscientiousness can be a good first step at finding those who *may* be at a high risk for poor health outcomes as they move through middle age into early old age. However, it is important not to repeat the mistakes of the past and gloss over detailed attention to the mediators—the causal links—between personality and health.

Individuals low on conscientiousness and high on neuroticism are also reminiscent of those troubled, immature people characterized by the Socialization (originally “Delinquency”) scale of the influential California Psychological Inventory ([Gough, 1994](#)). [Vaillant \(2012\)](#), in his 7-decade study of Harvard men from the 1940s, uncovered a kind of motivated maturity he called being “well-integrated and self-driving” (p. 249), which indeed predicted longevity. People who are emotionally stable, agreeable, and conscientious are also those who show a greater investment in family, work, religion, and volunteering ([Lodi-Smith & Roberts, 2007](#)).

Stress

An unfortunate conflation of the popular term *stress* with the scientific definition of stress has often led to misleading and even life-threatening advice. Neurotic individuals score higher on perceived stress, as David Watson and James Pennebaker presciently warned decades ago ([Watson & Pennebaker, 1989](#)). However, the stress that is unhealthy is chronic stress, perhaps better termed *chronic homeostatic disruption*, which often can be measured simultaneously at behavioral, psychological, and biological levels. This distinction has also long been recognized by researchers of the psychobiology of stress, dating back to [Walter Cannon \(1932\)](#) and [Hans Selye](#). Selye discussed “eustress,” namely, the challenges that lead to growth and thriving ([Selye, 1922/2013](#)). More recently, [Bruce McEwen](#) documented why the “stress response” is a component of resilience and not necessarily negative. It is only when brain circuits become chronically overloaded and lose their plasticity that health is threatened ([McEwen, 2006](#); [Karatsoreos & McEwen, 2013](#)).

The Million Women Study and Healthy Aging

One of the most reliable studies of relevant matters is the so-called Million Women Study, a longitudinal investigation of a huge sample ([Liu et al., 2016](#)). Hundreds of thousands of middle-aged women were asked about their levels of relaxation, happiness, and “stress,” and they were then followed for about a decade to see who died. As noted above, mortality outcome is not distorted by self-report and in fact is the best single measure of health, which is why public health organizations around the world focus on life expectancy ([Friedman & Kern, 2014](#)).

In some analyses in this landmark study, the women who already had life-threatening diseases at entry were excluded, because they already had a good reason to report being more stressed and less relaxed. That is, those with preexisting cardiovascular disease, cancer, or lung disease were excluded from core longitudinal analyses, as these are health-impairing and well-being-lowering diseases that together account for more than three quarters of noninjury deaths in middle-aged individuals in Western

societies. Many other statistical adjustments were also done, made possible because of the very large number of participants. Importantly, the study also analyzed subsequent mortality risk as a function of happiness among women reporting being in good or excellent health at baseline. The interquartile age range was 55 to 63, so this is a middle-aged sample approaching old age, well suited for a focus on healthy aging.

The results of this immense prospective cohort study found no evidence that feeling relaxed, feeling unstressed, or happiness itself reduces cardiac risk, cancer risk, or overall mortality across the key years of middle age. The study did confirm the well-documented raw association between subjective well-being and health (i.e., health and happiness are *correlated* at any given time) but points to behavioral patterns and life trajectories as being the place where future efforts should focus (see also [Finch, Baranik, Liu, & West, 2012](#); [Human et al., 2013](#); [Ryan & Deci, 2001](#); [Turiano, Chapman, Gruenewald, & Mroczek, 2015](#)).

Anxiety, Depression, and Health: Reverse Causation and Third Variables

Although many diseases are associated with higher levels of anxiety and depression, the causal pathways are often not as is usually assumed. In many instances, anxiety and/or depression are not only significant correlates of illness but also significant *results* of disruptions of homeostasis. For example, symptoms of traumatic brain injury include irritability, anhedonia, concentration difficulties, sleep irregularities, lethargy, and depression. These same symptoms result from infections (like the flu) and other sources of immune system disruptions with increases of proinflammatory cytokines ([Kemeny, 2011](#)). In such cases, the disease or injury is causing the worrying, anxiety, and depression.

When full causal models are not elaborated, puzzling results often emerge. For example, treating depression in recent heart attack patients does not reduce the risk of death or second heart attack ([Berkman et al., 2003](#); see also [Friedman, 2011](#); [Thombs et al., 2013](#)). A Cochrane database review analyzing randomized trials of psychological interventions in heart disease revealed the anticipated effects on depression (reduced psychological symptoms; [Whalley et al., 2011](#)) but uncovered little indication of interventions affecting the disease process. That is, there was no reduction in the total occurrence of nonfatal infarction or death. Relatedly, a meta-analysis of depression treatments (antidepressants and psychotherapies) for improving secondary event risk among patients with coronary heart disease ([Rutledge, Redwine, Linke, & Mills, 2013](#)) again indicated that mental health treatments did not reduce mortality, although there was a small impact on coronary heart disease events. Overall, it appears that physical health, subjective well-being, and other elements of thriving and longevity are often correlated outcomes that depend on a host of life patterns. Of course, early in life, high levels of neuroticism could be a sign that things are already going wrong, especially when considered in full context ([Moffitt, Belsky, Danese, Poulton, & Caspi, 2016](#)).

Conclusion

What role does personality play in the phenomenon that about half of middle-aged individuals will thrive for several more de-

cedes while the others will falter or succumb? In particular, what is the role of neuroticism? Despite a paucity of solid evidence that interventions to treat “worrying” and negative feelings per se will generally improve health and longevity, such efforts persist, both in psychology and in popular culture. The current zeitgeist often equates worry, negative emotionality, and moodiness with stress and sees this stress as a cause of disease, even in light of considerable documentation that this is a dangerous oversimplification.

We know enough at this point to understand that neuroticism needs to be examined in terms of (a) its interactions with (combinations with) other aspects of personality, (b) the particular situations and biopsychosocial challenges each individual faces, and (c) the overall life trajectory. First, being high on neuroticism but very low on conscientiousness—unhealthy neuroticism—sometimes may be a particularly dangerous combination, leading to risk-taking and to a host of unhealthy behaviors and social disruptions. Second, in terms of the context, it is clear that the effects of neuroticism will depend on the particular situational exigencies facing the individual. Sometimes it is healthy to be worried—for example, about one’s pain or obesity or social losses—and therefore seek appropriate changes or interventions. We often see *healthy neuroticism* (Friedman, 2000), in which vigilance and appropriate worrying are paired in the right circumstances with the prudence and responsibility of being conscientious. Third, apprehension about one’s overall life trajectory can be constructive, as deeper beneficial psychosocial actions might then be forthcoming. On the other hand, neurotic distress (typically termed *anxiety*—with restlessness, irritability, dread) often manifests itself in ways that are known to play a causal role in harming health, including poor sleep, overeating, substance abuse (smoking, drinking, illegal drugs), and impaired social relationships, as well as disruption of psychoneuroimmunological function if the distress is strong and sustained. However, in those cases in which anxiety is associated with poor nutrition, substance abuse, and physical inactivity, then these health habits and behaviors themselves can sometimes be the primary targets for improving health.

That is, if distressful rumination, emotion-focused coping, and social isolation are reactions to a challenge, then interventions that target subjective well-being alone may very well prove ineffective. Instead, full causal models should be specified, so that the most promising pathways can be examined. For example, both epidemiological and experimental studies well document that physical activity will improve both mental health and physical health. On the other hand, if an individual’s anxiety and depression are caused by elevated inflammatory cytokines from chronic infection, or by sleep disturbances, or by brain injury, then antidepressants and psychotherapy for chronic anxiety may again be missing the boat. This issue of reverse causation—in which physical health is affecting personality—is clear when stated this way but is often misinterpreted when the focus is narrowly directed to the correlations between neuroticism and health.

Taken in total, this analysis suggests that life patterns across many years need the most attention to promote healthy aging. Using knowledge of personality to improve health involves changing a course or trajectory (Friedman et al., 2014; Mroczek & Spiro, 2007). We know that adults who are thriving at meaningful work, who are advancing in their maturity and wisdom, and who are well-integrated into healthy personal relationships and healthy

communities are those most likely to stay healthy, productive, and alive (Friedman & Martin, 2011; Vaillant, 2012). The stronger these elements become, the more they reinforce each other and protect against internal or external shocks, but different facets are more important for different individuals. These are the most promising ways to help people thrive through their 50s, 60s, and 70s.

The concept of neuroticism thus offers both opportunities and warnings for studying and implementing improvements to health as people age. Because personality is clearly influenced by biological, psychological, and social components and experiences, neuroticism fits nicely with emerging biopsychosocial approaches to health interventions. Until we better understand which aspects of neuroticism, at which times in life, and in which circumstances are most important to health and thriving, we can proceed in ways that simultaneously test the interventions and refine the concepts. One promising place to start is with societal programs already thought to improve both character and adaptation, such as community gardens, neighborhood improvement initiatives, charitable and organized-volunteer groups, theater and arts societies, 12-step self-help groups, and amateur sports teams and leagues. With experimental and quasi-experimental research designs in the short term, paired with longitudinal studies with careful observational tracking of individuals across the years, the core targets for improvement can be discerned. That is, when these common societal programs “work” and produce better health, we need to distill which elements and patterns are key.

A promising complementary research technique combines existing and newly refined longitudinal data from different data sets to utilize personality concepts to help distill healthy pathways across the decades. For example, one analysis integrated data from the Terman Life Cycle Study and the Hawaii Personality and Health Longitudinal Study (two long-term archival prospective studies) to show how samples from different cohorts and ages can be linked to examine life span theories of personality and health (Graham et al., 2017; see also Kern, Hampson, Goldberg, & Friedman, 2014).

The role of individual differences in health is complicated but that does not at all mean that it is unwieldy. Knowing that someone is high on neuroticism and low on conscientiousness may be quite informative from both a public health and medical care perspective but not necessarily as a traditional risk factor needing psychotherapy or permanent medication. In fact, often the opposite will be true, as interventions to increase physical activity, reduce substance abuse, improve social and community ties, and increase self-control and executive function will also lessen the detrimental aspects of neuroticism.

The temptation always exists to reduce psychosocial aspects of health to a biomedical analysis, even though the biopsychosocial approach came to prominence to address the serious deficiencies of a narrow biomedical approach. As I have repeatedly argued, health researchers and clinicians often think they are asking the question “Why do people become ill?” when they are really studying “Who becomes ill?” There is astounding variability in susceptibility to illness and in the likelihood of recovery, but personality is not a “health risk factor” such as smoking. Fortunately, we have many of the tools to address these matters.

References

- 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. Schaie (Eds.), *Handbook of the psychology of aging* (6th ed., pp. 85–104). New York, NY: Elsevier. <http://dx.doi.org/10.1016/B978-012101264-9/50008-2>
- Almada, S. J., Zonderman, A. B., Shekelle, R. B., Dyer, A. R., Daviglius, M. L., Costa, P. T., Jr., & Stamler, J. (1991). Neuroticism and cynicism and risk of death in middle-aged men: The Western Electric Study. *Psychosomatic Medicine*, *53*, 165–175. <http://dx.doi.org/10.1097/00006842-199103000-00006>
- Baltes, P. B., & Baltes, M. M. (1990). Psychological perspectives on successful aging: The model of selective optimization with compensation. In P. B. Baltes & M. M. Baltes (Eds.), *Successful aging: Perspectives from the behavioral sciences* (pp. 1–34). New York, NY: Cambridge University Press. <http://dx.doi.org/10.1017/CBO9780511665684.003>
- Batty, G. D., Jokela, M., Kivimaki, M., & Shipley, M. (2016). Examining the long-term association of personality with cause-specific mortality in London: Four decades of mortality surveillance in the original Whitehall Smoking Cessation Trial. *American Journal of Epidemiology*, *184*, 436–441. <http://dx.doi.org/10.1093/aje/kwv454>
- Berkman, L. F., Blumenthal, J., Burg, M., Carney, R. M., Catellier, D., Cowan, M. J., . . . the Enhancing Recovery in Coronary Heart Disease Patients Investigators (ENRICH). (2003). Effects of treating depression and low perceived social support on clinical events after myocardial infarction: The Enhancing Recovery in Coronary Heart Disease Patients (ENRICH) Randomized Trial. *Journal of the American Medical Association*, *289*, 3106–3116. <http://dx.doi.org/10.1001/jama.289.23.3106>
- Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, *56*, 81–105. <http://dx.doi.org/10.1037/h0046016>
- Cannon, W. B. (1932). *Wisdom of the body*. New York, NY: W. W. Norton.
- Carstensen, L. L. (2006). The influence of a sense of time on human development. *Science*, *312*, 1913–1915. <http://dx.doi.org/10.1126/science.1127488>
- Chapman, B. P., Roberts, B., Lyness, J., & Duberstein, P. (2013). Personality and physician-assessed illness burden in older primary care patients over 4 years. *The American Journal of Geriatric Psychiatry*, *21*, 737–746. <http://dx.doi.org/10.1016/j.jagp.2012.11.013>
- 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. <http://dx.doi.org/10.1037/0278-6133.27.3.369>
- Cheng, H., & Furnham, A. (2013a). Correlates of adult binge drinking: Evidence from a British cohort. *PLoS ONE*, *8*, e78838. <http://dx.doi.org/10.1371/journal.pone.0078838>
- Cheng, H., & Furnham, A. (2013b). Personality traits, education, physical exercise, and childhood neurological function as independent predictors of adult obesity. *PLoS ONE*, *8*, e79586. <http://dx.doi.org/10.1371/journal.pone.0079586>
- Cheng, H., & Furnham, A. (2014). The associations between parental socio-economic conditions, childhood intelligence, adult personality traits, social status and mental well-being. *Social Indicators Research*, *117*, 653–664. <http://dx.doi.org/10.1007/s11205-013-0364-1>
- Christensen, A. J., Ehlers, S. L., Wiebe, J. S., Moran, P. J., Raichle, K., Ferneyhough, K., & Lawton, W. J. (2002). Patient personality and mortality: A 4-year prospective examination of chronic renal insufficiency. *Health Psychology*, *21*, 315–320. <http://dx.doi.org/10.1037/0278-6133.21.4.315>
- Clausen, J. S. (1991). Adolescent competence and the shaping of the life course. *American Journal of Sociology*, *96*, 805–842. <http://dx.doi.org/10.1086/229609>
- Costa, P. T., Jr., & McCrae, R. R. (1987). Neuroticism, somatic complaints, and disease: Is the bark worse than the bite? *Journal of Personality*, *55*, 299–316. <http://dx.doi.org/10.1111/j.1467-6494.1987.tb00438.x>
- Czajkowski, S. M., Chesney, M. A., & Smith, A. W. (2009). Adherence and placebo effect. In S. A. Shumaker, J. K. Ockene, & K. A. Rieker (Eds.), *The handbook of health behavior change* (3rd ed., pp. 713–734). New York, NY: Springer.
- 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. <http://dx.doi.org/10.1037/0033-2909.124.2.197>
- Denollet, J., Sys, S. U., Stroobant, N., Rombouts, H., Gillebert, T. C., & Brutsaert, D. L. (1996). Personality as independent predictor of long-term mortality in patients with coronary heart disease. *Lancet*, *347*, 417–421. [http://dx.doi.org/10.1016/S0140-6736\(96\)90007-0](http://dx.doi.org/10.1016/S0140-6736(96)90007-0)
- Duivis, H. E., Kupper, N., Vermunt, J. K., Penninx, B. W., Bosch, N. M., Riese, H., . . . de Jonge, P. (2015). Depression trajectories, inflammation, and lifestyle factors in adolescence: The tracking adolescents' individual lives survey. *Health Psychology*, *34*, 1047–1057. <http://dx.doi.org/10.1037/hea0000210>
- Finch, J. F., Baranik, L. E., Liu, Y., & West, S. G. (2012). Physical health, positive and negative affect, and personality: A longitudinal analysis. *Journal of Research in Personality*, *46*, 537–545. <http://dx.doi.org/10.1016/j.jrp.2012.05.013>
- Friedman, H. S. (2000). Long-term relations of personality and health: Dynamisms, mechanisms, tropisms. *Journal of Personality*, *68*, 1089–1107. <http://dx.doi.org/10.1111/1467-6494.00127>
- Friedman, H. S. (2011). Personality, disease, and self-healing. In H. S. Friedman (Ed.), *The Oxford handbook of health psychology* (pp. 215–240). New York, NY: Oxford University Press. <http://dx.doi.org/10.1093/oxfordhb/9780195342819.001.0001>
- Friedman, H. S., & Booth-Kewley, S. (1987). The “disease-prone personality.” A meta-analytic view of the construct. *American Psychologist*, *42*, 539–555. <http://dx.doi.org/10.1037/0003-066X.42.6.539>
- Friedman, H. S., & Kern, M. L. (2014). Personality, well-being, and health. *Annual Review of Psychology*, *65*, 719–742. <http://dx.doi.org/10.1146/annurev-psych-010213-115123>
- Friedman, H. S., Kern, M. L., Hampson, S. E., & Duckworth, A. L. (2014). A new life-span approach to conscientiousness and health: Combining the pieces of the causal puzzle. *Developmental Psychology*, *50*, 1377–1389. <http://dx.doi.org/10.1037/a0030373>
- Friedman, H. S., & Martin, L. R. (2011). *The longevity project: Surprising discoveries for health and long life from the landmark eight-decade study*. New York, NY: Hudson Street Press.
- Fryback, D. G., Dunham, N. C., Palta, M., Hanmer, J., Buechner, J., Cherepanov, D., . . . Kind, P. (2007). US norms for six generic health-related quality-of-life indexes from the National Health Measurement study. *Medical Care*, *45*, 1162–1170. <http://dx.doi.org/10.1097/MLR.0b013e31814848f1>
- Gale, C. R., Čukić, I., Batty, G. D., McIntosh, A. M., Weiss, A., & Deary, I. J. (2017). When is higher neuroticism protective against premature death? Findings from the U.K. Biobank. *Psychological Science*, *28*, 1345–1357. <http://dx.doi.org/10.1177/0956797617709813>
- Gavrilov, L. A., & Gavrilova, N. S. (2011). Mortality measurement at advanced ages. *North American Actuarial Journal*, *15*, 432–447. <http://dx.doi.org/10.1080/10920277.2011.10597629>
- Goodwin, R., & Engstrom, G. (2002). Personality and the perception of health in the general population. *Psychological Medicine*, *32*, 325–332. <http://dx.doi.org/10.1017/S0033291701005104>
- Goodwin, R. D., & Friedman, H. S. (2006). Health status and the five-factor personality traits in a nationally representative sample. *Journal of Health Psychology*, *11*, 643–654. <http://dx.doi.org/10.1177/1359105306066610>

- Goubert, L., Crombez, G., & Van Damme, S. (2004). The role of neuroticism, pain catastrophizing and pain-related fear in vigilance to pain: A structural equations approach. *Pain, 107*, 234–241. <http://dx.doi.org/10.1016/j.pain.2003.11.005>
- Gough, H. G. (1994). Theory, development, and interpretation of the CPI Socialization Scale. *Psychological Reports, 75*, 651–700. <http://dx.doi.org/10.2466/pr0.1994.75.1.651>
- Graham, E. K., Rutsohn, J. P., Turiano, N. A., Bendayan, R., Batterham, P. J., Gerstorf, D., . . . Mroczek, D. K. (2017). Personality predicts mortality risk: An integrative data analysis of 15 international longitudinal studies. *Journal of Research in Personality, 70*, 174–186. <http://dx.doi.org/10.1016/j.jrp.2017.07.005>
- Hampson, S., & Friedman, H. S. (2008). Personality and health: A life span perspective. In O. P. John, R. W. Robins, & L. Pervin (Eds.), *The handbook of personality* (3rd ed., pp. 770–794). New York, NY: Guilford Press.
- Human, L. J., Biesanz, J. C., Miller, G. E., Chen, E., Lachman, M. E., & Seeman, T. E. (2013). Is change bad? Personality change is associated with poorer psychological health and greater metabolic syndrome in midlife. *Journal of Personality, 81*, 249–260. <http://dx.doi.org/10.1111/jopy.12002>
- Huppert, F. A., & Whittington, J. E. (1995). Symptoms of psychological distress predict 7-year mortality. *Psychological Medicine, 25*, 1073–1086. <http://dx.doi.org/10.1017/S0033291700037569>
- Iwasa, H., Masui, Y., Gondo, Y., Inagaki, H., Kawaai, C., & Suzuki, T. (2008). Personality and all-cause mortality among older adults dwelling in a Japanese community: A five-year population-based prospective cohort study. *The American Journal of Geriatric Psychiatry, 16*, 399–405. <http://dx.doi.org/10.1097/JGP.0b013e3181662ac9>
- Jokela, M., Batty, G. D., Nyberg, S. T., Virtanen, M., Nabi, H., Singh-Manoux, A., & Kivimäki, M. (2013). Personality and all-cause mortality: Individual-participant meta-analysis of 3,947 deaths in 76,150 adults. *American Journal of Epidemiology, 178*, 667–675. <http://dx.doi.org/10.1093/aje/kwt170>
- Jokela, M., Ferrie, J., & Kivimäki, M. (2009). Childhood problem behaviors and death by midlife: The British National Child Development Study. *Journal of the American Academy of Child and Adolescent Psychiatry, 48*, 19–24. <http://dx.doi.org/10.1097/CHL.0b013e31818b1c76>
- Karatsoreos, I. N., & McEwen, B. S. (2013). Annual research review: The neurobiology and physiology of resilience and adaptation across the life course. *The Journal of Child Psychology and Psychiatry, 54*, 337–347. <http://dx.doi.org/10.1111/jcpp.12054>
- Kemeny, M. E. (2011). Psychoneuroimmunology. In H. S. Friedman (Ed.), *The Oxford handbook of health psychology* (pp. 138–161). New York, NY: Oxford Press University.
- Kern, M. L., Della Porta, S. S., & Friedman, H. S. (2014). Lifelong pathways to longevity: Personality, relationships, flourishing, and health. *Journal of Personality, 82*, 472–484. <http://dx.doi.org/10.1111/jopy.12062>
- Kern, M. L., & Friedman, H. S. (2011). Personality and differences in health and longevity. In T. Chamorro-Premuzic, A. Furnham, & S. von Stumm (Eds.), *The Wiley-Blackwell handbook of individual differences* (pp. 461–490). Chichester, United Kingdom: Wiley-Blackwell. <http://dx.doi.org/10.1002/9781444343120.ch17>
- Kern, M. L., Hampson, S. E., Goldberg, L. R., & Friedman, H. S. (2014). Integrating prospective longitudinal data: Modeling personality and health in the Terman Life Cycle and Hawaii Longitudinal Studies. *Developmental Psychology, 50*, 1390–1406. <http://dx.doi.org/10.1037/a0030874>
- Korten, A. E., Jorm, A. F., Jiao, Z., Letenneur, L., Jacomb, P. A., Henderson, A. S., . . . Rodgers, B. (1999). Health, cognitive, and psychosocial factors as predictors of mortality in an elderly community sample. *Journal of Epidemiology and Community Health, 53*, 83–88. <http://dx.doi.org/10.1136/jech.53.2.83>
- Kotov, R., Gamez, W., Schmidt, F., & Watson, D. (2010). Linking “big” personality traits to anxiety, depressive, and substance use disorders: A meta-analysis. *Psychological Bulletin, 136*, 768–821. <http://dx.doi.org/10.1037/a0020327>
- Liu, B., Floud, S., Pirie, K., Green, J., Peto, R., & Beral, V., & the Million Women Study Collaborators. (2016). Does happiness itself directly affect mortality? The prospective U.K. Million Women Study. *The Lancet, 387*, 874–881. [http://dx.doi.org/10.1016/S0140-6736\(15\)01087-9](http://dx.doi.org/10.1016/S0140-6736(15)01087-9)
- Lodi-Smith, J., & Roberts, B. W. (2007). Social investment and personality: A meta-analysis of the relationship of personality traits to investment in work, family, religion, and volunteerism. *Personality and Social Psychology Review, 11*, 68–86. <http://dx.doi.org/10.1177/1088868306294590>
- Luong, G., Wrzus, C., Wagner, G. G., & Riediger, M. (2016). When bad moods may not be so bad: Valuing negative affect is associated with weakened affect–health links. *Emotion, 16*, 387–401.
- Mahaffey, B. L., Watson, D., Clark, L. A., & Kotov, R. (2016). Clinical and personality traits in emotional disorders: Evidence of a common framework. *Journal of Abnormal Psychology, 125*, 758–767. <http://dx.doi.org/10.1037/abn0000187>
- Martin, P., Da Rosa, G., Siegler, I. C., Davey, A., MacDonald, M., Poon, L. W., & Georgia Centenarian Study. (2006). Personality and longevity: Findings from the Georgia Centenarian Study. *Age, 28*, 343–352.
- Maughan, B., Stafford, M., Shah, I., & Kuh, D. (2014). Adolescent conduct problems and premature mortality: Follow-up to age 65 years in a national birth cohort. *Psychological Medicine, 44*, 1077–1086. <http://dx.doi.org/10.1017/S0033291713001402>
- McEwen, B. S. (2006). Protective and damaging effects of stress mediators: Central role of the brain. *Dialogues in Clinical Neuroscience, 8*, 367–381.
- Moffitt, T. E., Belsky, D. W., Danese, A., Poulton, R., & Caspi, A. (2016). The longitudinal study of aging in human young adults: Knowledge gaps and research agenda. *The Journals of Gerontology, Series A, Biological Sciences and Medical Sciences, 72*, 210–215.
- Mosing, M. A., Medland, S. E., McRae, A., Landers, J. G., Wright, M. J., & Martin, N. G. (2012). Genetic influences on life span and its relationship to personality: A 16-year follow-up study of a sample of aging twins. *Psychosomatic Medicine, 74*, 16–22. <http://dx.doi.org/10.1097/PSY.0b013e3182385784>
- Mroczek, D. K., & Spiro, A., III. (2007). Personality change influences mortality in older men. *Psychological Science, 18*, 371–376. <http://dx.doi.org/10.1111/j.1467-9280.2007.01907.x>
- Ragland, D. R., & Brand, R. J. (1988). Type A behavior and mortality from coronary heart disease. *The New England Journal of Medicine, 318*, 65–69. <http://dx.doi.org/10.1056/NEJM198801143180201>
- Reed, A. E., & Carstensen, L. L. (2012). The theory behind the age-related positivity effect. *Frontiers in Psychology, 3*, 339. <http://dx.doi.org/10.3389/fpsyg.2012.00339>
- Rutledge, T., Redwine, L. S., Linke, S. E., & Mills, P. J. (2013). A meta-analysis of mental health treatments and cardiac rehabilitation for improving clinical outcomes and depression among patients with coronary heart disease. *Psychosomatic Medicine, 75*, 335–349. <http://dx.doi.org/10.1097/PSY.0b013e318291d798>
- Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology, 52*, 141–166. <http://dx.doi.org/10.1146/annurev.psych.52.1.141>
- Schapiro, I. R., Ross-Petersen, L., Saelan, H., Garde, K., Olsen, J. H., & Johansen, C. (2001). Extroversion and neuroticism and the associated risk of cancer: A Danish cohort study. *American Journal of Epidemiology, 153*, 757–763. <http://dx.doi.org/10.1093/aje/153.8.757>
- Selye, H. (2013). *Stress in health and disease*. Oxford, United Kingdom: Butterworth-Heinemann. (Original work published 1922)

- Shanahan, M. J., Hill, P. L., Roberts, B. W., Eccles, J., & Friedman, H. S. (2014). Conscientiousness, health, and aging: The life course of personality model. *Developmental Psychology, 50*, 1407–1425. <http://dx.doi.org/10.1037/a0031130>
- Shipley, B. A., Weiss, A., Der, G., Taylor, M. D., & Deary, I. J. (2007). Neuroticism, extraversion, and mortality in the U.K. Health and Lifestyle Survey: A 21-year prospective cohort study. *Psychosomatic Medicine, 69*, 923–931. <http://dx.doi.org/10.1097/PSY.0b013e31815abf83>
- Smith, K. W., Avis, N. E., & Assmann, S. F. (1999). Distinguishing between quality of life and health status in quality of life research: A meta-analysis. *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation, 8*, 447–459. <http://dx.doi.org/10.1023/A:1008928518577>
- Smith, T. W., Baron, C. E., & Grove, J. L. (2014). Personality, emotional adjustment, and cardiovascular risk: Marriage as a mechanism. *Journal of Personality, 82*, 502–514. <http://dx.doi.org/10.1111/jopy.12074>
- Smith, T. W., & Spiro, A., III. (2002). Personality, health, and aging: Prolegomenon for the next generation. *Journal of Research in Personality, 36*, 363–394. [http://dx.doi.org/10.1016/S0092-6566\(02\)00014-4](http://dx.doi.org/10.1016/S0092-6566(02)00014-4)
- Steel, P., Schmidt, J., & Shultz, J. (2008). Refining the relationship between personality and subjective well-being. *Psychological Bulletin, 134*, 138–161. <http://dx.doi.org/10.1037/0033-2909.134.1.138>
- 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. <http://dx.doi.org/10.1111/j.1467-6494.2009.00561.x>
- Taylor, M. D., Whiteman, M. C., Fowkes, G. R., Lee, A. J., Allerhand, M., & Deary, I. J. (2009). Five factor model personality traits and all-cause mortality in the Edinburgh Artery Study cohort. *Psychosomatic Medicine, 71*, 631–641. <http://dx.doi.org/10.1097/PSY.0b013e3181a65298>
- Terracciano, A., Löckenhoff, C. E., Zonderman, A. B., Ferrucci, L., & Costa, P. T. Jr. (2008). Personality predictors of longevity: Activity, emotional stability, and conscientiousness. *Psychosomatic Medicine, 70*, 621–627. <http://dx.doi.org/10.1097/PSY.0b013e31817b9371>
- Terracciano, A., Stephan, Y., Luchetti, M., Albanese, E., & Sutin, A. R. (2017). Personality traits and risk of cognitive impairment and dementia. *Journal of Psychiatric Research, 89*, 22–27. <http://dx.doi.org/10.1016/j.jpsychires.2017.01.011>
- Terracciano, A., Sutin, A. R., An, Y., O'Brien, R. J., Ferrucci, L., Zonderman, A. B., & Resnick, S. M. (2014). Personality and risk of Alzheimer's disease: New data and meta-analysis. *Alzheimer's and Dementia, 10*, 179–186. <http://dx.doi.org/10.1016/j.jalz.2013.03.002>
- Thombs, B. D., Roseman, M., Coyne, J. C., de Jonge, P., Delisle, V. C., Arthurs, E., . . . Ziegelstein, R. C. (2013). Does evidence support the American Heart Association's recommendation to screen patients for depression in cardiovascular care? An updated systematic review. *PLoS ONE, 8*, e52654. <http://dx.doi.org/10.1371/journal.pone.0052654>
- Tikhonoff, V., Hardy, R., Deanfield, J., Friberg, P., Kuh, D., Muniz, G., . . . the NSHD scientific and data collection teams. (2014). Symptoms of anxiety and depression across adulthood and blood pressure in late middle age: The 1946 British birth cohort. *Journal of Hypertension, 32*, 1590–1599. <http://dx.doi.org/10.1097/HJH.0000000000000244>
- Turiano, N. A., Chapman, B. P., Gruenewald, T. L., & Mroczek, D. K. (2015). Personality and the leading behavioral contributors of mortality. *Health Psychology, 34*, 51–60. <http://dx.doi.org/10.1037/hea0000038>
- Turiano, N. A., Mroczek, D. K., Moynihan, J., & Chapman, B. P. (2013). Big 5 personality traits and interleukin-6: Evidence for “healthy Neuroticism” in a US population sample. *Brain, Behavior, and Immunity, 28*, 83–89. <http://dx.doi.org/10.1016/j.bbi.2012.10.020>
- Vaillant, G. E. (2012). *Triumphs of experience: The men of the Harvard Grant Study*. Cambridge, MA: Belknap Press. <http://dx.doi.org/10.4159/harvard.9780674067424>
- Watson, D., & Pennebaker, J. W. (1989). Health complaints, stress, and distress: Exploring the central role of negative affectivity. *Psychological Review, 96*, 234–254. <http://dx.doi.org/10.1037/0033-295X.96.2.234>
- Weiss, A., & Costa, P. T., Jr. (2005). Domain and facet personality predictors of all-cause mortality among medicare patients aged 65 to 100. *Psychosomatic Medicine, 67*, 724–733. <http://dx.doi.org/10.1097/01.psy.0000181272.58103.18>
- Weiss, A., Gale, C. R., Batty, G. D., & Deary, I. J. (2009). Emotionally stable, intelligent men live longer: The Vietnam Experience Study cohort. *Psychosomatic Medicine, 71*, 385–394. <http://dx.doi.org/10.1097/PSY.0b013e318198de78>
- Weston, S. J., Hill, P. L., & Jackson, J. J. (2015). Personality traits predict the onset of disease. *Social Psychological and Personality Science, 6*, 309–317. <http://dx.doi.org/10.1177/1948550614553248>
- Weston, S. J., & Jackson, J. J. (2015). Identification of the healthy neurotic: Personality traits predict smoking after disease onset. *Journal of Research in Personality, 54*, 61–69. <http://dx.doi.org/10.1016/j.jrp.2014.04.008>
- Whalley, B., Rees, K., Davies, P., Bennett, P., Ebrahim, S., Liu, Z., . . . Taylor, R. S. (2011). Psychological interventions for coronary heart disease. *Cochrane Database of Systematic Reviews*, CD002902.
- Widiger, T. A. (2017). (Ed.), *Oxford handbook of the five factor model*. New York, NY: Oxford University Press.
- 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, Series B, Psychological Sciences and Social Sciences, 59B*, P110–P116. <http://dx.doi.org/10.1093/geronb/59.3.P110>