

Personality and Pathways of Influence on Physical Health

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Abstract

Some individuals are prone to illness, decline, and premature mortality while others recover quickly, maintain health, and live long lives. Personality, an individual's biopsychosocial pattern of reactions and behaviors, is related to health across time, but the pathways are complex, with interrelated causal and non-causal links. Causal pathways linking personality and health include: health behaviors and habits; number and quality of social relationships; reactions to challenges and psychophysiological stress; and situation selection and evocation. Important but non-causal (spurious) links include: genes and early experiences; and disease-caused personality changes. Attending to the multiple links between personality and health within a lifespan perspective will aid causal understanding and facilitate the most appropriate interventions.

Keywords: Personality, Health, Longevity, Lifespan Trajectories, Pathways

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It is easy to observe considerable variation among individuals in susceptibility to illness. Some people will contract the flu, repeatedly suffer from headaches, or face life-threatening conditions like cardiovascular disease, while their friends and associates remain healthy. When illness occurs, some individuals recover quickly while others with similar symptoms recover slowly or progress to chronic conditions. Perhaps most importantly, some people live long lives while their peers succumb to death at a younger age. What are the sources of these variations in individual health outcomes?

Fundamentally, these issues are of interest because we would like to be able to prevent illness, encourage rapid recovery, and promote long life. If we are to successfully intervene, we need to understand the *causes* of health and longevity. That is, we would like to know whether certain individual characteristics, behaviors, habits, and reaction patterns affect health and disease, and if so, why. Personality—a person's biopsychosocial patterns of reactions and behaviors—is a useful concept for addressing these issues because it is broad, relatively stable, and multi-faceted. Personality is partly biologically based, develops in a family and cultural environment, guides one onto certain life paths, and is evoked by social and situational forces. For example, a young child may be active and conscientious, live in a hard-working family, and be immersed in competitive sports and outdoor living. She grows up to be a successful executive with a fulfilling marriage. Although an individual will not always behave consistently and may change over time, a fairly stable pattern of behaviors and reactions usually develops,

often maintained by common situations and established relationships. Some people are more conscientious, extraverted, neurotic, intellectual, or agreeable than others. In turn, these basic individual characteristics have long-reaching correlates and consequences, including health outcomes. The question becomes: how and why do these individual differences in personality relate to health?

Historical Perspective

Current approaches to emotions, reactions patterns, and disease were built upon ideas of the ancient Greeks, as the Hippocratic tradition (which continued for many centuries) analyzed individual differences in terms of the balance of four so-called bodily humors. Excessive black bile (or melancholy--splenic sadness) was believed to cause depression, degenerative diseases, and cancer. Yellow bile (or cholera--angry biliousness) was believed to cause hostility and feverish diseases. Phlegm (or apathy--cold dispassion) was believed to cause rheumatism. The sanguine (a blood-based ruddy optimism), balanced with the other humors, epitomized a healthy individual. It was believed that disease arose from an imbalance across these humors, and cures (such as bleeding, forced vomiting, enemas, and baths) aimed at restoring balance. Although the causal explanations were terribly flawed, countless observations have confirmed that emotional-motivational aspects of personality and their imbalances are related to health.

The rise of modern medicine brought a focus on physiological systems, as Claude Bernard (1880) and Walter Cannon (1932) developed notions of psychophysiological homeostasis, suggesting that for sustained health, there needs to be physical and psychological balance within the body—an emotional equilibrium tied to nerves and hormones. This concept of psychophysiological homeostasis became an important part of understanding personality and health. Unfortunately, emotion-health links were often studied in a loose manner, as neo-analytic

psychosomatic theorists proposed theories of inner psychological conflicts causing physical symptoms. Asthma, ulcers, migraines, and heart disease were attributed to inner struggles of disturbed patients (Alexander, 1950). The concepts were so ambiguously described and the causal links were so imprecisely specified that the approach was later abandoned by most medical scientists. As an alternative, two cardiologists proposed the Type A Behavior Pattern. Type A individuals—defined as tense, hostile, aggressive, hurrying, and competitive—were thought to be prone to coronary heart disease. The initial construct was defined as a medical syndrome (with a healthy Type B style viewed as simply the *absence* of Type A), disregarding psychological theory and sound multi-method approaches to the validation of a personality-like construct. The result was not good science but instead thousands of unfocused studies that often produced more uncertainty than insight (Friedman, 2007).

Although the proper scientific framework for good measurement and validation of personality constructs is now well established, it has slowly been systematically applied to health research. In 1987, Friedman and Booth-Kewley meta-analyzed hundreds of studies linking personality and diseases and suggested a *disease-prone personality*, in which chronic negative emotionality (especially hostility and depression) increase risk for disease in general, rather than for specific diseases (such as a coronary-prone, cancer-prone, asthma-prone, or ulcer-prone personality). This analysis emphasized the importance of simultaneously utilizing multiple characteristics as predictors of disease. This is now more commonly done, with personality-health research increasingly dominated by the five-factor model of personality. The five main factors are typically labeled conscientiousness (orderly, achievement-motivated, responsible); agreeableness (cooperative, kind, generous); extraversion (sociable, assertive, active); neuroticism (anxious, depressive, distressed); and intellect/openness (imaginative, creative,

intellectual). Although the five-factor model has some limitations, it offers a consistent framework for studies on personality and health (Smith & Williams, 1992).

Because the traditional biomedical model views health as simply the absence of disease and disruption, research in this field has focused mostly on negative emotional traits—such as neuroticism, cynicism, pessimism, and hostility—as causes of disease, and more positive traits—such as optimism, hardiness, extraversion and conscientiousness—as buffers against decline. For example, optimism has been linked to better psychological adjustment and self-reported health, not surprising given the method and conceptual overlaps. But evidence is mixed for a causal role involving immune function and objective health outcomes (Carver, Scheier, & Segerstrom, 2010; Rasmussen, Scheier, & Greenhouse, 2009). Hardiness, characterized by control, commitment, and challenge, likewise has been linked to more adaptive coping styles, better social relationships, and fewer symptom reports (Maddi, 2002), but here again there are inconsistencies in measurement and under-specified causal models (Ouellette & DiPlacido, 2001).

Important progress has been made studying conscientiousness. Meta-analysis clearly links higher levels of conscientiousness to the key outcome of lower mortality risk (Kern & Friedman, 2008). In fact, the predictive value of a conscientious, dependable personality on health and longevity appears stronger than many established psychosocial risk factors, including SES and intelligence (Roberts et al., 2007). Further work is still needed, however, on simultaneously considering multiple sorts of health outcomes (physical, mental, cognitive, social, and functional components of health) and how positive traits combine with other traits across various situations.

Over the past 20 years, we have refined data from the unique Terman Life Cycle Study to examine life pathways toward health and longevity or illness and death. Beginning in 1921 as children, over 1,500 intelligent individuals have been followed throughout their lives and into

death, offering a full lifespan perspective. Our findings suggest that a more differentiated approach to measuring both personality and health may be informative, providing insight into the processes linking personality and health across the lifespan. For example, when we examined the personality predictors of health and longevity outcomes across four decades of adulthood, neuroticism was most predictive of subjective well-being (a subjective measure of health) but least predictive of longevity (the most objective measure of health) (Friedman, Kern, & Reynolds, 2010). Extraversion predicted social competence, whereas conscientiousness predicted physical health, productivity, and longevity.

The history of personality and health research yields two important lessons for current understanding. First, it is vital that assessments of both individual differences and health outcomes are well grounded in solid psychological theory and valid multi-trait, multi-method measurement. Second, we need to precisely specify and measure the causal links and mechanisms relating individual differences to health and disease.

Causal Mechanisms Linking Personality and Health

Individuals cannot be randomly assigned to personality or to long-term social patterns. Thus, we need to study differential relations between aspects of personality, the social context, and multiple components of health across long periods of time. Most likely, causal links entail multiple pathways (Friedman, 2008; Hampson & Friedman, 2008; Smith, 2006).

Personality, Coping, Psychophysiology, and Health

According to Cannon (1932), the body has a series of systems that are maintained under varying conditions, including a margin of safety for contingencies in times of stress. That is, our bodies are prepared for challenge. This robust internal regulation—the wisdom of the body to self-correct—is built around the hypothalamic-pituitary-adrenal system, but extends to systems

throughout the body, including the autonomic nervous system and immune function. Although Cannon suggested a psychophysiological core, he also saw that the body exists in a social milieu, and asserted that the larger issues of coping with socio-environmental challenge should not be ignored.

Extending this work, McEwen (1993) and others have developed the concept of allostasis—the body’s ability to maintain balance across time while facing a constant barrage of internal and external stressors. The body is resilient, but as wear and tear increases (due to increased challenge or ineffective coping), balance becomes harder to re-establish, reserves become exhausted, and the body becomes increasingly susceptible to breakdown and illness. Personality may influence experiences of stress, as individuals vary in how they appraise and cope with stressors (Carver & Connor-Smith, 2010). For example, in a study of 700 community members, personality moderated the experience of stress on health behaviors (Korotkov, 2008). Under low stress conditions, personality made little difference, but under high stress conditions, emotionally stable, introverted, or conscientious individuals were more likely to engage in healthy behaviors. Similarly, after a family member dies, some individuals reach out to others or quickly work through their emotions, others live in a world of hurt and pain for years, and still others face little distress at all (Wortman & Boerner, 2007).

According to this perspective, certain personality patterns trigger chronically elevated stress responses, which in turn lead to pathological breakdown, chronic illness, and increased mortality risk (Graham, Christian, & Kiecolt-Glaser, 2006). Studies typically examine how personality traits, emotional responses to stressors, and social interactions impact and change physiological markers of stress in the body, such as cortisol, immune function, heart rate, blood pressure, and body temperature. For example, chronic stress predicts lowered resistance to

infection (Cohen et al., 1998) and chronic negative emotionality has been linked to both impaired cortisol function and to diseases such as heart disease (Rugulies, 2002; Suls & Bunde, 2005). However, the causal chain remains uncertain. Cortisol has not been proven to be the mediating mechanism.

It is more challenging, yet perhaps more informative, to examine chronic stress levels and coping measured across multiple assessments and long time periods. It may be that some individuals have a strong immediate stress response but then quickly recover, whereas others experience a muted yet chronically elevated response--and these responses may have very different implications for disease outcomes. Empirical studies that examine the entire process (i.e., personality leads to impaired physiological stress responses, which lead to serious illness and early mortality) are sorely needed. The question remains open as to how the pieces fit together--for different individuals, within different contexts, moderated by different coping responses and mediated by different physiologies—to impact health across the lifespan.

Personality, Health Behavior, and Health

The most obvious causal link between personality and health involves risky behaviors such as smoking, substance abuse, and unprotected sex; and protective behaviors such as proper nutrition, weight control, physical activity, sleep, immunizations, safe driving, and regular physical and dental examinations. The strongest associations are for smoking and tobacco use (Mokdad, Marks, Stroup, & Gerberding, 2004). Other personality-relevant health behaviors demonstrate a less straightforward relation to health. For example, physical activity has been linked to better physical and mental well-being, better control of chronic conditions, and lower mortality risk (US Department of Health and Human Services, 2008), but individuals who are

healthier and better-situated socio-economically are more likely to engage in exercise and other health-promoting behaviors.

Behavioral influences on chronic conditions, such as heart disease and many forms of cancer, contribute over the course of many years, and so lifestyles—the *accumulation of habits*—are especially important. An occasional double cheeseburger and fries will not cause heart disease, but is not a recommended daily diet. Analogously, although physical activity is beneficial, it may be continued, long-term activity that is truly beneficial—an active lifestyle, rather than occasional bouts of exercise. Additionally, health behaviors are often plainly classified as “good” or “bad,” and studies often focus too narrowly on simple links between a food or behavior and impaired functioning, leaving a confusing array of advice in which eggs, caffeine, alcohol, fats, carbohydrates, and supplements either represent the royal road to health, or should be avoided at all costs. Most likely, moderation across common habits and behaviors is sufficient for most people, except for some highly risky behaviors—tobacco use, promiscuous unprotected sex, and illicit drug abuse—that have very clear and severe health perils and deserve significant attention.

Overall, the full model (i.e., personality leads to health behavior, which subsequently leads to health or disease) has been partially supported. Health behaviors do mediate personality-health links to some extent, but significant variation remains, indicating that other pathways are also relevant. For example, in the Terman sample, heavy alcohol use and smoking predicted increased mortality risk, and explained part, but not all, of the relation between child conscientiousness and longevity (Friedman et al., 1995). In the Hawaii Personality and Health Cohort Study, conscientiousness predicted better health at midlife, with smoking partially mediating this relation (Hampson, Goldberg, Vogt, & Dubanosky, 2006). In the Veterans Affairs Normative

Aging Study, smoking explained forty percent of the variance linking neuroticism and mortality risk, leaving much variance to be explained by other behaviors and pathways (Mroczek, Spiro, & Turiano, 2009).

Personality, Situation Selection, Lifestyle Patterns, and Health

A very important but often overlooked pathway linking personality and health is through the situations that people select, evoke, or are drawn toward, and their resulting lifestyle patterns. Personality is a stable part of the individual partially due to our tendency to choose environments, healthy or unhealthy situations, and relationships that maintain our persona (Buss, 1987; Caspi, Roberts, & Shiner, 2005; Friedman, 2000; Ickes, Snyder, & Garcia, 1997). In turn, these processes can influence health and well-being outcomes. For example, for the Terman study males, high conscientiousness attenuated the mortality risk associated with unsuccessful careers (Kern et al., 2009). And, conscientious individuals were more likely to remain consistently married and report higher levels of marital satisfaction, suggesting that they select and maintain more health-promoting relationships (Tucker, Friedman, Wingard, & Schwartz, 1996).

That is, personality influences the quality and quantity of social relationships, socially-dependent health behaviors, and associated health outcomes. Conscientious individuals are more likely to have stable careers and marriages, which in turn enhance their health and their levels of subsequent conscientiousness (Roberts & Bogg, 2004; Roberts, Caspi, & Moffitt, 2003). Happy, optimistic individuals both objectively and subjectively engage in a greater quantity and quality of enjoyable activities than neurotic, pessimistic individuals (Bolger & Zuckerman, 1995; Magnus, Diener, Fujita, & Payot, 1993). Depressed individuals are more likely to avoid social situations, but then experience more loneliness and associated risks, including further depression, increased symptom reports, fewer health-promoting behaviors, and increased mortality risk

(Kemeny, 2007). In turn, the quantity and quality of meaningful relationships influence the behaviors that people engage in, adherence to prescribed medical regimes, success of treatments, quality of life, physical health, and mortality risk (Taylor, 2007).

Although personality is typically conceptualized as a relatively stable and consistent aspect of the person, people do change over time, with a tendency to become more conscientious, agreeable, dominant, open, and emotionally stable as one ages (Lüdtke, Trautwein, & Husemann, 2009; Roberts & Del Vecchio, 2000). In addition, meaningful turning points--experiences that require one to adapt to challenge (Clausen, 1995)—can alter otherwise consistent developmental patterns. For example, men who served in the military during World War II saw the experience as an important turning point that redirected their thoughts, perspective, emotions, and social lives (Elder, Gimbel, & Ivie, 1991). Important life events may relate to family (e.g., marriage, starting a family), education (e.g., starting or graduating from college), work (e.g., starting a career, promotions, retirement), social transitions (e.g., death of a loved one), health (e.g., the onset of a major illness or injury), and historic events (e.g., military experiences, natural disasters), and may vary by gender and the amount of choice (Ronkä, Oravala, & Pulkkinen, 2003).

The extent to which such experiences can disrupt otherwise steady trajectories toward health or disease is unknown. Future research should consider the role that personality plays in important life events, including how such events are moderated by or change personality, and how changes in personality and life experiences together impact subsequent health outcomes. Such long-term trajectories cannot be fully understood through cross-sectional or short-term studies; a lifespan perspective is needed.

Complexity within the Five-Factor Model

The links between personality and health may depend on the particular trait, the facets (or subsets) of the trait, combinations with other traits, and the social context. Conscientiousness demonstrates the clearest pattern, with the broad factor showing important health benefits, including lower mortality risk (Kern & Friedman, 2008). Conscientious individuals tend to engage in more health protective behaviors and fewer risky behaviors, achieve more educational and career success, and follow other healthy patterns (Bogg & Roberts, 2004; Friedman, 2008).

Intellect/openness also predicts healthy outcomes, but benefits seemingly stem from the intellect component. Intelligent individuals tend to understand and follow sound medical advice, pursue more educational opportunities, engage in more health-promoting behaviors and fewer risky behaviors, establish stable jobs and social relationships, and face lower morbidity and mortality risk (Batty, Deary, & Gottfredson, 2007; Beier & Ackerman, 2003). However, individuals high on the creative and artistic side, or those who are intelligent but surrounded by unhealthy social circles, may be more likely to try drugs, alcohol, risky sex, and other risky behaviors that increase risk of poor outcomes.

Extraversion and agreeableness have been inconsistently linked to behavior and health (Cloninger, 2005; Roberts et al., 2007), possibly due to their social nature. Behavior and subsequent health outcomes are often driven by a combination of the individual and the social context in which he or she resides. Extraverted individuals may be especially drawn to social settings where alcohol, risky sex, and risky driving behavior are the norm, and may subsequently develop a hazardous lifestyle. For example, in the Terman sample, cheerful children were more likely to engage in risky health behaviors, which in turn increased their risk of early mortality (Martin et al., 2002). Conversely, extraverted individuals tend to have stronger social networks, which are typically protective against negative health outcomes (Taylor, 2007). For

agreeableness, links to health and behavior may depend on gender and the quality of interpersonal relationships. Hostility and disagreeableness predict higher stress reactivity and poor social relationships (Smith & Gallo, 2001). In the Terman sample, agreeableness predicted better older age physical health and subjective well-being for men, but not women (Friedman et al., 2010). Agreeable individuals often establish strong social relationships and are liked by others, but health may suffer if the individual consistently puts his or her own needs aside for the sake of others.

Neuroticism's role in health is the least understood. Although it is commonly believed that neuroticism leads to negative health outcomes (and people are blithely advised to "stop worrying"), the findings are inconsistent. Here especially the facet level and the combination of neurotic tendencies with other personality traits may be relevant. Friedman (2000) proposed that there are two types of neurotic patterns. Some neurotic individuals are characterized by emotional instability, a pessimistic worldview, and a hostile interpersonal style, which can indeed lead to unhealthy behaviors and negative health outcomes (Suls & Bunde, 2005). Other neurotic individuals are anxious and especially worried and watchful about their health; although they may report lower well-being, they are objectively healthier and live longer (Friedman et al., 2010). For example, in a study of adolescent attachment styles and adjustment, hostility and depression mediated links between attachment styles and risky behaviors, whereas anxiety suppressed effects such that the suppressive effect of anxiety offset the meditational effect of hostility, and by lumping the two together the differences were null (Cooper, Shaver, & Collins, 1998). Similarly, being both conscientious and vigilantly anxious may be especially health protective. A more differentiated conception of neuroticism may help us better understand its influence on health.

An important unanswered question for neuroticism is the extent to which it increases social disruptions and actual psychophysiological stress processes versus subjective experiences of distress. In the Terman sample neurotic individuals were more likely to report later relationship conflict and lower subjective well-being in older age (Friedman et al., 2010). Neuroticism predicts susceptibility to pain and reports of illness (Charles, Gatz, Kato, & Pedersen, 2008; Costa & McCrae, 1987), but inconsistently predicts more objective outcomes (Chida & Hamer, 2008; Suls & Bundy, 2005). Part of this inconsistency may depend on the social context. For example, in a study of trauma experiences, social support was beneficial for those who were low on neuroticism, but it was harmful for those who were high on neuroticism (Borja, Callahan, & Rambo, 2009). In the Terman sample, neurotic men who experienced the death of their spouse lived longer than less neurotic men, suggesting that for some neurotic individuals, major life experiences may trigger a previously unobserved resilience (Taga, Friedman, & Martin, 2009). Few clear answers are apparent at this time, but the mix of findings confirm that a simple “negative is bad” perspective limits our understanding and is unfounded practical advice (Friedman & Martin, 2011).

Other Models: Spurious Relations

Personality is usually assumed to influence health, but important and often-overlooked links between personality and health are through changes caused by disease and through underlying third variables—changing or reversing the expected directions of influence.

Disease-Caused Personality Change

As Alzheimer’s, Parkinson’s, and many other brain or central nervous system diseases begin to develop, changes in personality appear. Family members often notice the personality changes first and the disease is only discovered later, after additional medical and cognitive tests

are performed. Thus, it appears that personality influenced the health decline, when in reality the causal arrow is reversed. Similarly, prescription drugs (used in treating disease) can cause major changes in personality, but these changes often occur slowly and are masked by other side effects of medications (Balsis, Carpenter, & Storandt, 2005). Even immune system changes (such as in response to chronic infection) affect mood and personality (Kemeny, 2007).

In these cases of disease- or drug-related personality changes, modifying personality will do little for health, as the underlying biological change is affecting the character. It is important to keep in mind such potential bidirectional influences; although personality is typically considered a stable part of the person, it can and does change in response to disease or medication.

Temperament, Genetics, Early Experience, and Health

An often overlooked but important link between personality and health involves genetic or other biological predispositions and early socialization experiences. Underlying biological variables may influence *both* personality and health outcomes (or, genetic and environment aspects may interact to influence both personality and health), making it (erroneously) appear that personality causally leads to health or disease (Bouchard & Loehlin, 2001; South & Krueger, 2008). For example, basal serotonin, an important neurotransmitter that helps regulate mood, eating, sleeping, and some cognitive and intestinal functions, appears linked to higher levels of conscientiousness, less impulsiveness, and changes in cortisol responses (Carver & Miller, 2006). Twin designs, animal studies, and further work with genotypes and molecular genetics may be particularly informative for defining and understanding biological influences on both personality and health (Gosling & John, 1999).

A fetus exposed to high levels of alcohol may develop fetal alcohol syndrome. The alcohol damages the brain and other neural structures; the individual may become impulsive and unconscientious, have a poor memory, and develop a variety of neurological, cardiac, and other physical health problems. Improving the memory or conscientiousness of such a person (in adolescence or adulthood) will usually have little effect on these alcohol-induced health problems. Similarly, the early social environment and the interaction between a child's temperament and the parent's style subsequently impacts personality *and* later health outcomes (McCrae et al., 2000; Roberts & Pomerantz, 2004). In the Terman sample, experiencing parental divorce during childhood predicted riskier health habits, poor social relationships as adults (including their own divorce), more mental and physical health problems, and increased mortality risk (Martin, Friedman, Clark, & Tucker, 2005; Tucker et al., 1997). Early experiences may begin a trajectory toward health and resilience or toward illness, dysfunction, and stagnation.

Overall, because such biological and socialization influences are underlying third variables, they have important but often-missed implications for causal models. In such cases, an intervention that targets personality change, such as increasing conscientious traits or decreasing neurotic depression and hostility, will not necessarily impact health outcomes, unless the underlying biological or meditational causes are also affected. Later experiences matter within the context of particular trajectories. Personality-health research would benefit from incorporating a lifespan developmental perspective.

Conclusion

Personality influences the habits we form, the behaviors we engage in, the relationships we develop, our appraisals and experiences of stressful challenges, the situations we commonly choose, the reactions we evoke in others, and the lifelong pathways that we follow. Personality

itself is influenced by genetics, early experiences, life changes, maturation, illness, and social and cultural relationships across time. These various pathways in turn link to health outcomes, including physical fitness and long life, or decline and premature death.

Life trajectories begin early and are altered by a complex array of influences across the lifespan. Personality plays an important role in understanding who gets sick and who stays healthy, but links are neither straightforward nor simple. Multiple pathways are clearly relevant; the need now is for more vigorous empirical investigation of these multiple causal pathways and interactive effects. Only by being cognizant of the complex nature of personality's relations to health can we distill valid models, and then intervene appropriately.

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