

Long-Term Relations of Personality and Health: Dynamisms, Mechanisms, Tropisms

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ABSTRACT There is now little doubt that individuals who are well-adjusted, socially stable, and well-integrated into their communities are at significantly lower risk for disease and premature mortality than those who are more unstable, impulsive, isolated, and alienated. The reasons for these associations, however, are complex and the pathways insufficiently studied. This article employs a life-span data set to explore how childhood personality relates to health-related growth and development (*dynamisms*), patterns of reactions and health behaviors (*mechanisms*), and movements toward and away from suitable environments (*tropisms*). Illustrations from the 7-decade Terman longitudinal data reveal important areas in which previous, cross-sectional research has misinterpreted associations between personality and health. In particular, Sociability has been overrated as a life-span health risk factor, Conscientiousness has been underrated, and Neuroticism has been confused. Without sufficient attention to the processes underlying the associations between personality and health, significant suboptimal allocations of intervention resources result.

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Introduction

There is a vast amount of evidence documenting that individuals who are mentally well-adjusted, socially stable, and well-integrated into their communities are at significantly lower risk for disease and premature mortality than those who are more unstable, impulsive, isolated, and alienated (Cohen & Williamson, 1991; Friedman, 1990, 1991, 1992; House, Landis, & Umberson, 1988; Kiecolt-Glaser, Glaser, Cacioppo, & Malarkey, 1998; Martin et al., 1995). Although news reporters are still surprised when they encounter a new finding indicating that associations really do exist between psychosocial factors and health and longevity, the serious research has long ago moved on to addressing the causal pathways underlying these associations. Here, many methodological and conceptual challenges and complexities have thwarted any simple explanations.

Failure to consider the broad picture and the complexity of the associations between personality and health has led to less than ideal interventions. For example, there is often attention only to single risk factors and single health outcomes. There may be a focus on people who are aggressive and their incidence of heart disease, or on people who are shy or self-conscious and their overeating. Taken collectively, such narrow studies (even if individually informative) leave us with long lists of psychosocial health predictors and long lists of single habit or disease outcomes, when in fact most people simultaneously have multiple psychosocial risk factors for interdependent health outcomes.

A further significant problem is that disease prevention interventions are often aimed at adults at a single point in time, with little attention to the life-span trajectories along which the individuals are already traveling. For example, adults may be urged by public health campaigns to limit drinking and to stay out of the sun, exhorted by ads to take legal drugs but avoid illegal drugs, advised by their physicians to exercise and lose weight, informed by their newsmagazines to replace steak and pie with tomatoes and broccoli, and pressed by their highway patrol officers to slow down and buckle up. The results often are that people overestimate (as well as underestimate) the risks of common actions (Barsky, 1988; Rothman, Klein, & Weinstein, 1996; Skinner, Kreuter, Kobrin, & Strecher, 1998). Or else they conclude that everything is bad for you and so nothing need be done. Importantly, explanatory models that ignore life trajectories often fail to consider the many different reasons for unhealthy

patterns. All couch potatoes have not come from the same psychosocial field.

Dynamisms

Dynamisms, or processes responsible for development, are the first key element in achieving a more valid understanding of personality and health. Different children set off down different health paths. Their personal characteristics then interact with the psychosocial environments created by their families, their peers, and the broader culture (Tinsley, 1992). For example, consider how food, nutrition, and the formation of eating habits vary among the vegan enclaves of San Francisco, the rural towns of Alabama, and the steak house communities of Chicago. Which food styles will appeal to which children of hippies, farmers, and manufacturers? Or, note how peer drug use varied between the 1950s and 1960s, and how exercise norms shift dramatically across generations, providing changing worlds for an extrovert (wanting to run through the streets in short shorts) or for a neurotic seeking tranquillity.

A good example of these dynamisms is seen in the work of Jack Block and colleagues (Block, Block & Keyes, 1988; Block, Gjerde, & Block, 1991; Funder & Block, 1989; Shedler & Block, 1990). In longitudinal studies of children recruited at age 3, it was discovered that health-relevant factors like delay of gratification, depression, and drug abuse at the teenage years could be predicted from a knowledge of childhood personality and social pressures, but not in any simple way. For example, certain oversocialized, overcontrolled girls later became depressed, but it was impulsive, undercontrolled boys who were at high risk for depression in this time and place. Such findings cannot be understood without a focus on the process of personality development in a certain cultural environment.

Furthermore, as adolescent drug use (in the Block studies) could be predicted from early childhood psychosocial characteristics (dating back to ages 4 to 7), problem drug use is, in this time frame, an outcome rather than a cause of psychological instability and social alienation. Ready availability of addictive drugs, coupled with stress, however, also can lead to psychosocial difficulties even in people not so prone to drug abuse, as variations in drug abuse across times, subcultures, and cultures well illustrate. That is, both causal directions can occur. Although these and other studies suggest drug users are likely to be impulsive and undependable

(unconscientious), moody and distressed (neurotic), and alienated and isolated (unsociable), are these also the correlates of other unhealthy behaviors and reactions? When are they the predictors? Most studies do not ask such questions because (unlike the Block studies) they are focused on a single health-relevant set of outcomes and are not longitudinal.

Consider now an example of what to do about obese young adults. One person might be genetically prone toward obesity and a borderline diabetic; a second might be an exceptionally shy and body-conscious teenage girl; and a third might be from a starch-consuming, beer-drinking, psychologically healthy extended family. Obesity is tremendously heterogeneous in terms of both etiology and effective treatment (Brownell & Fairburn, 1995). We need to take into account where individuals came from, and the *trajectory*, not just where they are now.

Mechanisms

Mechanisms are the mediators between personality and health. These are often usefully divided into: (a) patterns of psychophysiological/emotional reactions, and (b) health behaviors. Studies of psychophysiological reaction patterns usually focus on either cardiovascular reactivity or immune response, both of which are affected by stress. Studies of health behaviors usually examine smoking, drinking, eating, drug abuse, exercise, sexual promiscuity, trauma-prone hobbies (like parachuting), or adherence to prescribed medical treatments. The distinction between psychophysiological reaction patterns and health behaviors is something of an artificial one, since they are usually closely related. For example, stress hormones and cholesterol have intimate ties to glucose levels and other elements of metabolism, which in turn affect and are affected by what, when, and how much one eats and drinks, as well as by exercise. Similarly, levels of nicotine and other drugs in one's body have dramatic effects on one's health behaviors, and smoking and drug-taking affect physiology, and so on. Such matters are important because selection of variables affects which causal models one can and will investigate.

Interestingly, although the functions of the hormonal and immune systems are terrifically complex, much variation relevant to personality and health revolves around a single process, namely the "fight-or-flight" response documented by Cannon (1932) a century ago. The body uses the autonomic nervous system, the hypothalamic-pituitary-adrenal (HPA) axis, and the cardiovascular, metabolic, and immune systems to

respond to stress. When these systems are used *frequently* to help respond to a lot of stress, the body is likely to be damaged. It is important to remember that these are dynamic systems seeking to restore equilibrium after challenge. McEwen (1998) refers to “allostasis”—the ability to achieve stability through change. Time is thus a key variable in any causal understanding.

Health behavior habits appear easier to study than psychophysiology, but surprisingly, there has been relatively little systematic research on early personality and later health behaviors. Although personality is known to be correlated with health behaviors, there is a paucity of predictive study, even with such hot topics as condom use (Sheeran, Abraham, & Orbell, 1999). There is some revealing work on personality predictors of alcohol abuse, smoking, and drug abuse, at least during adolescence (Chassin, Presson, & Sherman, 1995; Petraitis, Flay, & Miller, 1995; Wills, 1998), with people who are more alienated, unstable, isolated, and deviant more likely to abuse.

Obvious health-relevant personality constructs like Type A (Suls & Sanders, 1988) and like impulsivity (Webster & Jackson, 1997) have sometimes been looked at as relevant to other health behaviors. But these studies rarely go on to see whether the personality-influenced behavior leads to disease. In sum, we have very little long-term, mediational information about why certain kinds of people are more likely to develop certain medical conditions and diseases.

Tropisms

Just as phototropic plants move toward a source of light, some individuals grow toward more fulfilling and health-promoting spaces, while other individuals remain subject to darker, health-threatening environments. Understanding the forces that pull some individuals toward rebellious drug abuse, careless drag-racing clubs, violent gangs, or promiscuous cliques while their classmates and peers gravitate toward computer clubs, church groups, track teams, vegetarian restaurants, and scouting remains one of the least-studied areas of personality and health. Yet, once these affiliations are established, the likely consequences for health are well known, as the person-in-situation is pushed into the health-relevant niche.

Some of these motivational forces undoubtedly originate in temperamental differences, which themselves derive from combinations of genetics, hormonal exposures, and early experiences. For example, family

studies, twin studies, and adoption studies of alcoholic dependence indicate a significant role for temperament in the development of alcoholism (Bennett & Miller, 1998). Difficulties in self-regulation, plus impulsivity in an unstable, alcohol-modeling environment, pull sons of alcoholics to a fourfold increased risk.

Other tropisms are more clearly environmental, as punishments and rewards push and pull certain children and adolescents toward certain life paths. There is growing evidence that the habits, models, and emotional climate provided by one's adult family members are a key influence on one's subsequent coping and health behaviors (Jessor, 1998; Tinsley, 1992). Furthermore, as Sullivan (1953) noted many years ago, healthy or unhealthy development can be located in relations with one's peers. Jessor's work on adolescents demonstrates that those who like and value school, participate in family and church activities, have good kids as friends, and value health are more likely to engage in healthy behaviors like healthy diet, exercise, and seat-belt use (Jessor, Turbin, & Costa, 1998). Although these conclusions seem eminently sensible when pointed out in this manner, many health promotion efforts are aimed at adults, are not developmentally sensitive, and are based solely on "education."

The development of a healthy person is, however, even more complicated. The temperament (psychophysiological reactivity resulting from genes, early hormonal exposures, and early experiences) is not independent of the environment. For example, neuroticism (a tendency toward anxiety and depression) tends to predict to negative life events (Magnus et al., 1993). That is, it is often *incorrect* to think of personality, located within the individual, as randomly encountering various stressful or unstressful events (Bolger & Zuckerman, 1995; McCartney, Harris, & Bernieri, 1990; Scarr & McCartney, 1984; Van Heck, 1997).

Attending to dynamisms, mechanisms, and tropisms, this article will now focus on three aspects of health-relevant personality—sociability, conscientiousness, and neuroticism. The data and insights are derived from the longest relevant longitudinal study, the Terman Life Cycle Study. Spanning 7 decades, this archive allows a tracing of healthy and unhealthy life pathways, healthy and unhealthy coping and behaviors, associated psychosocial influences, and health outcomes, including mortality risk (age at death). If dynamisms, mechanisms, and tropisms are not understood and taken into account, health interventions will likely be superficial, costly, and ineffective, as they miss the complex causal links.

METHOD

The Terman Data

The Terman Gifted Children Study (later renamed the Terman Life Cycle Study) began in 1921–22 when most of the 1,528 participants were in elementary school. Continuing until the present, it is the longest study of a single cohort ever conducted, and the only such major study with rich data collected regularly throughout the life-span (from childhood to late adulthood and death). We have made major efforts to follow up on and improve the data-set: Data have been collected and refined on the subjects' social relations, education, personality, habits, careers, families, mental health, life stress, physical activities, and physical health; most importantly, we collected death certificates and coded date and cause of death through 1990 (Friedman, Tucker, Schwartz, Tomlinson-Keasey et al., 1995). Until our project began, the study aimed primarily to describe the life course of gifted individuals (Terman, 1925; Terman & Oden, 1947). That is, the study was originally focused on addressing such issues as whether bright children were introverted, sickly eggheads (it turned out that they were not). Few predictive studies using the data had been undertaken, with little or no study of health as a function of individual differences.

Terman's aim was to secure a reasonably random sample of bright California children, and so most public schools in the San Francisco and Los Angeles areas in the 1920s were searched for bright children, nominated by their teachers and tested by Terman. The sample was later characterized as a productive, intelligent segment of 20th-century middle-class American men and women. The average birthdate was 1910. Most were preadolescent when first studied; those still living are now in their 80s or 90s. Most important is the fact that the data are collected prospectively, without any knowledge of the eventual health outcome, thus avoiding several common sources of bias in the data collection phase of such studies. The sample is relatively homogeneous on dimensions of intelligence and social class. An advantage is that these people had the ability to understand medical advice, had a place to exercise, had routine health care, and so on; the sample thus allows a clearer focus on the effects of psychosocial variables. This sample is not representative of the U.S. population as whole. Thus the results are not directly generalizable to other groups, in other times, in other circumstances, but there is little reason to suspect that most relationships analyzed will be strongly influenced by the characteristics of this sample. For example, there is no reason to suspect that the relationship between conscientiousness and longevity is different for bright people than it is for people of average intelligence. (The sample is actually much more representative of the population than the various prospective studies that have followed samples of physicians or nurses.) The homogeneous nature of the sample might restrict the range on the predictor variables; however, our work shows that this is not at all the case; there

is a more than adequate range of individual differences and environmental stressors. Nevertheless, caution is obviously needed in generalizing from any single sample, especially when social or cultural variables are likely to affect a particular relation or finding.

Overall, the data are remarkably complete. A low attrition rate of only 6% applies to most longevity analyses. Those lost from the sample did not differ on any of the personality measures used in our studies.

The Childhood Personality Measures

In 1922, each participant's teacher and parents (usually the mother, or both parents together) rated the subject (on 13-point scales) on trait dimensions chosen to measure intellectual, volitional, moral, emotional, aesthetic, physical, and social functioning. The scales used are remarkably modern in their appearance. Several other rated variables from the 1922 assessment were also chosen for their similarity to some of the 25 trait ratings. The full matrix of ratings intercorrelations was computed and studied, with an eye towards making best use of the available data to capture the relevant dimensions; items were also factor analyzed using iterative principal-factoring methods (Friedman et al., 1993).

Sociability was defined in terms of: fondness for large groups, popularity, leadership, preference for playing with several other people, and preference for social activities such as parties ($\alpha = .65$). Conscientiousness/social responsibility was defined in terms of four variables: prudence/forethought, freedom from vanity/egotism, conscientiousness, and truthfulness ($\alpha = .76$). Childhood Neuroticism involved a single item: permanency of moods.

Fortunately, the vast Terman archives also allowed us to construct many other relevant measures. Friendships, marriages, divorces, careers, and mental health, as well as adult personality and other measures are available. These cannot all be described here, but they are drawn upon as necessary to explicate the themes of this article.

The Terman Archive

It is important to understand the nature of the Terman archive, from both a theoretical and practical point of view. If one thinks about what it would be like to keep a lifelong record of the important psychosocial, behavioral, and demographic events of one's own family, one can begin to imagine the vastness and ambiguity of the data task. Terman and his colleagues and followers gathered a mix of qualitative and quantitative, objective and self-reported facts, feelings, and observations for 7 decades. These raw observations, in turn, have been and

are continually being turned into indexes and other measures more amenable to systematic analysis.

Gordon Allport (1955) often asked, "How shall a life history be written?" Our work with the Terman data suggests that patterns of life pathways to health can be distilled and understood.

RESULTS AND DISCUSSION

To illustrate the interplay of dynamisms, mechanisms, and tropisms, three important health-relevant aspects of personality will now be examined.

Sociability

As noted, a large amount of evidence documents that people with various personal and community ties, usually termed *social support*, are generally healthier (Cohen, 1991). It thus seems sensible that more sociable people would be healthier, and that development of sociability should be encouraged. In fact, popular health magazines often advise "get married" and "make friends" as a health tip. But it turns out that there is little evidence that sociability itself predicts health and longevity. This is confirmed by the Terman data.

The Terman children who were rated by their parents and teachers as popular, fond of large groups and social activities, and so on did not live longer than their unsociable peers (Friedman et al., 1993). There was simply no evidence that sociable children were healthier or lived longer across many decades. In fact, sociable children were somewhat more likely to grow up to smoke and drink (Tucker et al., 1995).

To confirm this finding, we also examined Terman's own grouping of the men in the sample into "scientists and engineers" versus "businessmen and lawyers." Terman found marked personality differences, with the former group much more unsociable and less interested in social relations at school and in young adulthood. When we analyzed mortality risk, however, we found the scientist and engineer group at slightly *less* risk of premature mortality (Friedman et al., 1994). Examination of the dynamisms and tropisms suggests that these studious men often wound up in the well-adjusted, socially stable, and well-integrated positions well known to be healthy.

Perhaps the most striking evidence, however, about social relations and mortality risk in the Terman data comes from our examination of mechanisms, using marriage data (Tucker et al., 1996). Numerous epidemiological studies have found that married individuals, especially married men, have a significantly lower mortality risk than single and especially than divorced individuals, and it has usually been assumed that this is a protective effect of marriage. For example, perhaps a spouse serves as a buffer against stress. Some investigators have called for studies of causal mechanisms, but this has been difficult without access to a lifelong study.

The association between marital history at midlife (in 1950) and mortality (as of 1991) was therefore studied ($N = 1,077$) in our sample of participants. Results confirmed that consistently married people (especially men) live longer than those who have experienced marital breakup but suggested that this is not necessarily due to the protective effects of marriage itself. Individuals who were currently married, but had previously experienced a divorce, were at significantly higher mortality risk compared with consistently married individuals. As both groups were currently married, the marriage itself could not be the protective factor. This divorce effect may dissipate over time, as some of those who erred the first time around settle into stable remarriages, and their mortality risk declines (Tucker, Schwartz, Clark, & Friedman, 1999). Furthermore, individuals who had not married by midlife were not at higher mortality risk compared with consistently married individuals.

Interestingly, part of the relationship between marital history and mortality risk may be explained by childhood psychosocial variables, which were associated with both future marital history and mortality risk. Some people evidently are poor bets both for stable marriage and a long life. It may also be the case that the divorce sometimes resulted from (unhealthy) environmental stress. In sum, it seems likely that the stress of divorce and its concomitants, coupled with selection into stable or unstable married roles, seem more important mechanisms than the sustenance provided by marriage itself.

The implications are: first, that common popular advice to “get married” and “make friends” to improve health may be misguided; second, that unsociable children do not necessarily need health interventions; and third, that a main pathway to a healthy adulthood is not through sociability. An incorrect causal inference might be drawn from simple observation of the association between marriage and health.

Conscientiousness

With all the attention to the psychophysiological correlates of Type A competition and emotional struggle, it is perhaps not surprising that the most important personality predictor of health has long been overlooked. Conscientiousness—a tendency to be prudent, planful, persistent, dependable—is not highly related to the personality measures typically used in health research (Booth-Kewley & Vickers, 1994; Friedman, Tucker, & Reise, 1995; Marshall et al., 1994). But it turns out to be highly relevant to pathways to health.

Our project first tested whether variables representing major dimensions of personality, in statistical survival analyses in 1,178 males and females, could predict longevity across the life span (Friedman et al., 1993). Conscientiousness in childhood was clearly related to survival in middle to old age. This finding was the first to establish that childhood personality is related to survival decades into the future, and pointed to likely and unlikely pathways linking personality to health. In a follow-up study (Friedman, Tucker, Schwartz, Martin, et al., 1995), possible behavioral mechanisms for this robust association were examined by gathering cause of death information and by considering the possible mediating influences of drinking alcohol, smoking, and overeating. Survival analyses suggested that the protective effect of conscientiousness is not primarily due to accident avoidance (although injury deaths do tend to be higher among the unconscientious) and cannot be mostly explained by abstinence from unhealthy substance intake. Conscientiousness seems to have more far-reaching and general effects. Analyses indicate that childhood unconscientiousness probably predicts a host of unhealthy mechanisms and tropisms, including adult smoking, adult alcohol consumption, and less social and work stability and accomplishment.

Subsequent studies (by others) during the 1990s confirm the health importance of conscientiousness. For example, a study of conscientiousness and renal deterioration in patients with diabetes found that time to renal failure was much longer in those with high conscientiousness scores on the NEO-PI-R (Brickman et al., 1996). A number of cross-sectional or short-term studies corroborate a likely major mechanism—that conscientiousness is associated with healthier behaviors (e.g., Christensen, Moran, & Wiebe, 1999; J. Hogan, 1989; Ingledew & Brunning, 1999; Lemos-Giraldez & Fidalgo-Aliste, 1997; Siegler, Feaganes, & Rimer, 1995).

A wonderful example of the pervasive effects of conscientiousness on health comes from a study of treatment adherence after a myocardial infarction (Horwitz et al., 1990). Patients who did not adhere to their prescribed treatment regimen (that is, who took less than 75% of the prescribed medication) were 2.6 times more likely than cooperative, good adherers to die within a year of follow-up. Most interestingly, the unconscientious adherers (poor adherers) had an increased risk of death whether they were on the beta-blocker propranolol (odds ratio = 3.1) or placebo (odds ratio = 2.5). This effect was not accounted for by the severity of the myocardial infarction, marital status, education, smoking, or social isolation. Thus, in this rare case in which a randomized clinical trial of disease intervention controlled for this powerful individual difference, conscientious cooperation with treatment (even if with a placebo) emerged as a more important predictor of mortality risk than the medication.

Note that being prudent and dependable cannot explain decreased mortality risk by any known direct biological mechanism. Rather, the Terman children, in their time and place, set off down pathways that proved to be healthy ones.

Neuroticism

The most controversy in the field of personality and health has revolved around the relation of neuroticism to health and longevity. Overall, the evidence for a causal role for neuroticism (versus emotional stability) in disease has been mixed. Although there is incontrovertible evidence that many diseases are associated with higher levels of hostility, anxiety, and depression (Friedman & Booth-Kewley, 1987), such ties do not always appear in prospective studies. There is also good evidence that neurotic people are more likely to feel and report symptoms and that disease can cause distress (Costa & McCrae, 1987; Watson & Pennebaker, 1989). Hence some links of neuroticism to disease are correlational, artifactual, or reverse causal. Many converging factors need to be teased apart.

In terms of dynamisms, the most evidence probably concerns the Type A pattern, which sometimes leads to heart disease. There is evidence that patterns of Type A competition and hostility arise in childhood from temperamental and parental influences, and the Type A pattern is maintained in certain psychosocial environments (Matthews & Woodall, 1988); but studies that simply attempt to assess Type A behavior and predict disease produce mixed results (Houston & Snyder, 1988;

Sieglman & Dembroski, 1989). For example, some people thrive on competition, and so there are “healthy Type As” (Friedman, Hall & Harris, 1985). Long-term processes need to be examined.

In terms of mechanisms, there is good evidence that chronic sympathetic arousal is associated with anxiety and hostility, and that depression is associated with cortisol dysregulation. Such disruptions are in turn linked to problems in lipid metabolism (Orth-Gomer & Schneiderman, 1996). There are also ties between aspects of neuroticism and hypertension and cardiovascular reactivity, although here too there are sometimes failures to replicate. In terms of behavioral mechanisms, there are various important examples, such as anxiety being linked to smoking and drinking, and depression being linked to unhealthy eating patterns. Interestingly, little research pits psychophysiological mechanisms against behavioral mechanisms to see which are stronger mediators between personality and health, and indeed such a comparison may be conceptually unsound as well as impractical. Overall, however, it is clear that cycles of anxiety, depression, stress, substance use, overeating, and risk taking are not the royal road to health.

Last but not least, there is the force of tropism. There is increasing evidence that people high in neuroticism experience more daily problems and are more likely to react to them with distress emotions like anger (Bolger & Zuckerman, 1995; Magnus et al., 1993). Those worriers who expect ill health may create a self-fulfilling prophecy.

When do these neurotic reaction patterns lead to more illness and greater risk of premature mortality? Analyses of the dynamisms, mechanisms, and tropisms in the longitudinal Terman data suggest the necessity of a new way of thinking about neuroticism and health. In the Terman data, we have found hints of neuroticism as a risk factor, but more importantly, we have begun to unravel reasons for some of the confusion and mixed findings. There appear to be two aspects of neuroticism that are relevant.

Neuroticism can lead people down at least two very different pathways. The first is a pessimism, resentment, and anxiety that can lead one to give up on medical regimens, turn to substance abuse, and avoid interpersonal assistance that can help protect health. With frustration, it can turn into chronic anger. These people may have depressive affect and symptoms, stress, poor self-esteem, dissatisfaction with life, and low positive affect (Denollet, 1998). The developmental pathways, the health behaviors, the physiological reaction patterns, and the environments become increasingly negative.

Consider now a classic Woody Allen type neuroticism, however, which leads one to be very vigilant about germs, symptoms needing attention, medical developments, and cooperation with treatment. Such a (health nut) neurotic might remain very healthy. Yet, this is a fragile balance, which can be overwhelmed by stress. Indeed, among the Terman children, those neurotics who grew up in stable families were not more or less prone to premature mortality; but those neurotics who faced parental divorce were at increased risk (Clark & Friedman, 2000).

In short, it appears that there are two distinct sorts of health-related outcomes that result from neuroticism, and so the strength of any causal role for neuroticism in disease is difficult to ascertain. Interestingly, in the study of renal deterioration mentioned above (Brickman et al., 1996), patients moderate in neuroticism did better than patients who were either high or low in neuroticism. Analogously, a paradox was found in the well-known Western Collaborative Group study of Type A and heart disease, in which Type A clearly predicted heart disease; but *after* a heart attack, Type A patients (male) were less likely to die during the subsequent dozen years (Ragland & Brand, 1988). It may be that these Type A victims worked especially hard at their treatment regimen for recovery. This again is the healthy aspect of neuroticism in operation. Note also that understanding such dynamisms and mechanisms necessitates a longitudinal study design.

Finally, it should be noted that conflicting aspects of neuroticism sometimes lead to unusual research results due to selection artifacts. That is, as (healthy) neurotics are more likely to feel distress and to complain, they are more likely to undergo invasive tests (such as for coronary artery disease). This tropism may produce an inverse relation between neuroticism and disease (high neurotics seemingly with no disease), even though neurotics, at the same time, actually may be more likely to develop organic disease. Healthy neurotics are a confound to be reckoned with.

The Constructs in Broader Context

Around 1940, Terman classified a subsample of 150 of his male participants as “Most successful” (e.g., the men who had attained a listing in *Who’s Who*), and 150 as “Least successful” (e.g., ordinary civil service jobs despite high intelligence). Although all the participants had an IQ greater than 134 and most were high achievers in childhood, the former

group went on to get much more education, they earned more, and so on. It turned out that even in this limited subsample of 300 men, the most successful had been rated in childhood as more prudent, self-confident, and persevering. These traits launched these men down multifaceted successful pathways in 20th-century Californian society.

These patterns are reminiscent of another powerful conception of personality development. From a more sociological perspective, there is a key scale of the California Psychological Inventory, termed *Socialization*, which was developed to classify people along a continuum of prosocial, normative behavior (Gough, 1994). It differentiates those willing and able to adopt the norms of society from those more deviant or delinquent. Low scorers tend to have trouble imagining and setting long-term goals and being prudent and moderate in their behavior. They are more likely to end up as substance abusers, have unstable relations, and commit anti-social and illegal acts. But, as we have now seen, this does not necessarily mean that they were unsociable or neurotic in childhood, or unmarried in adulthood. There is evidence that some people grow up lacking impulse control and wind up in unhealthy situations with unhealthy habits (Zuckerman, 1991). So-called good character often (but not always) seems relevant to good health.

CONCLUSION

In sum, going beyond the substantial evidence that well-adjusted, socially stable, and well-integrated people are at significantly lower risk for disease, the past decade has provided significant evidence that a conscientious, dependable personality, in stable psychosocial environments, is a key predictor and may be a central underlying causal factor. This is not because there is a disease-prone personality with simple, direct links to ill health, but rather primarily because certain people wind up with unhealthy habits and behaviors, an unbalanced socioemotional and psychophysiological style, and environments not conducive to good health.

What are the relations among dynamisms, mechanisms, and tropisms? In many cases, there is overlap, as dynamisms lead into mechanisms and tropisms, or as tropisms affect dynamisms and then make certain mechanisms more likely, and so on. A fully elaborated, comprehensive model of personality and health has not yet been achieved. Still, if these three processes are fully attended to in any given explanatory or interventional study, a truer model of the causal processes is likely to be derived.

Examination of targeted health inventions shows many of them to be inherently weak. Our health promotion efforts and our public health system are too often built around a pathology model, derived from traditional conceptions of “treating” disease. Thus we encounter a litany of health advice—do’s and don’ts relevant to the proximal causes of ill health but ignorant of the long-term causal patterns. The sad result often resembles a fad diet, as some people lose weight in January, stop drinking in February, eat broccoli in March, gulp vitamins in April, and smear on sunscreen in May. In June, they may be guzzling beer in the waves at the beach barbecue. Even more ironic is that the health advice is often best heard and most followed by those who least need to hear it. The present article argues that the broader pictures of life paths need to be taken into account in constructing a causal model and in designing health relevant interventions.

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