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Psychological Predictors of Heart Disease

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Glossary

Coronary heart disease (CHD) Blockage and hardening of the coronary arteries that supply blood to the heart muscle, due to buildup of fatty plaques on the artery wall.

Fight-or-flight response The body's physiological response to significant challenge, involving activation of the sympathetic nervous system and the release of stress hormones.

Hostility Negative thoughts and beliefs about others, including cynicism, mistrust, and denigration.

Self-healing personality A psychosocial reaction pattern that leads to good physical health, characterized by an enthusiastic, positive emotional style, an alert, energetic motivation, and secure, constructive interpersonal relations.

Social support Emotional, informational, or tangible resources provided by family or friends.

Type A behavior pattern (TABP) An emotional and behavioral style characterized by a chronic aggressive struggle to accomplish more and more in the shortest possible time period.

There is substantial evidence that psychological factors predict heart disease and premature mortality. However, the precise causal pathways and causal mechanisms are less clear. Many people assume that stress increases the likelihood of heart disease – a blockage (occlusion) of a coronary artery or an irregular heartbeat (arrhythmia). There is relatively little surprise among observers when a heart attack victim is a stressed-out 50-year-old obese businessman who is known for his habit of chain-smoking cigarettes and compulsively devouring doughnuts while simultaneously screaming into two telephones. The scientific challenge comes in separating fact from stereotype – that is, in discerning which psychological and behavioral patterns predict increased likelihood of heart disease, and why.

There are three basic ways in which psychology and heart disease may be linked. First, psychosocial factors can play a direct causal role in the initiation and progression of coronary disease. That is, specific emotional, cognitive, behavioral, and social aspects of the individual directly and indirectly alter physiological process and cause disease. Second, disease may cause psychological problems. For example, depression may follow a heart attack. In such cases, psychological interventions will obviously not affect health risk unless the factors are also tied through other pathways. Third, underlying (third) variables such as certain genetic patterns can produce both distinctive psychological profiles and elevated disease risk. In such cases, psychological patterns are associated with disease but interventions to affect the psychological factors may or may not have any effect on the likelihood of disease; it depends on the causal paths. All three of these ties between psychological factors and heart disease exist, thus making explanation and simple amelioration a challenge. Nevertheless, much is known about healthier and unhealthier psychosocial living patterns.

Historical Perspective

Psychosocial predictors of heart disease have been noted since ancient times. Biblical proverbs such as “gladness of the heart is the life of a man, and the joy of a man prolongs his days” (Apoc. 30:22) suggested a mind–health connection. The ancient

Greeks were especially keen observers of the relations between psychological factors and illness, and they proposed four bodily humors – black bile (or melancholy, depression); blood (a sanguine, ruddy disposition); yellow bile (choler, an angry bitterness), and phlegm (apathy, lack of feeling). Although their causal mechanisms were wrong, the ancient Greeks correctly observed key psychosocial correlates. Depression, optimism, hostility, and apathy are indeed useful patterns for the understanding of psychology and health.

In the first half of the twentieth century, interest in the psychological predictors of heart disease reemerged, with the influential medical educator Sir William Osler proposing a link between high-pressure activity and coronary heart disease (CHD). The well-known psychiatrists Karl and William Menninger asserted that heart disease is related to repressed aggression. Psychosomatic theorists developed and applied the psychoanalytic notions of Sigmund Freud to their patients, looking for repressed conflict as a cause of chest pain and heart disease, and psychological treatments often seemed helpful. These physicians were trying to account for the dramatic rise in CHD that was occurring in the twentieth century. As the twentieth century was also a time of rapid social and technological change, it made sense to look for explanations in the pressure and demands of modern-day life. However, most of this work was clinical and speculative. It was not until the 1950s that two cardiologists noticed that their patients possessed a distinctive constellation of psychological characteristics and proposed research on the Type A behavior pattern. The cardiologists and their associates began a systematic search for psychosocial predictors of heart disease, which eventually led to four decades of intensive and ever-broadening study, upon which our current understanding rests (even though the initial conceptions were eventually discarded).

Current research indicates that certain people are psychologically vulnerable or resilient because of a combination of temperament and early socialization. When vulnerable people encounter psychosocial environments that are a poor match for their needs, chronic negative emotional patterns often result. These reactions are accompanied by physiological disturbances – high levels of sympathetic activation and

stress-related hormones. Moreover, unhealthy behaviors such as substance abuse also often cooccur. These disturbances interact with disease proneness caused by heredity (e.g., proneness to the buildup of plaque in the coronary arteries) and environment (e.g., diets high in saturated fat), resulting in increased risk of illness that is comparable in size to that of many other commonly noted health risks.

Disease-Prone Personalities

There is strong reason to believe that stress, chronic negative emotions, and poor social relations, usually accompanied by sleep disturbances and unhealthy habits, play a role in the development or triggering of cardiovascular disease and heart attacks. Unfortunately, this psychosocial evidence often receives insufficient attention from a biomedically oriented health care system. For an individual who suffers a heart attack or is diagnosed with CHD, the disease usually has been developing slowly over years or decades. There is a hefty percentage of the population heading for expensive and dangerous coronary bypass operations or coronary angioplasty while psychosocial preventive measures are often given minimal resources.

Initial research (in the 1960s and 1970s) on the Type A behavior pattern focused on individuals who are aggressively involved in chronic struggle to quickly achieve more and more in less and less time (called *time urgency*). However, many active, expressive people often tend to work hard and hurry around like Type A people, but are not at all coronary-prone; on the contrary, they are especially healthy. Research now documents that hurrying around, being very involved with one's job, or working hard is not necessarily unhealthy. Rather, negative emotionality – characterized by chronic negative responses such as hostility, aggression, anger, cynicism, depression, and anxiety – is predictive of disease. Even here, however, the negative emotionality is often not necessarily the cause of the disease. Sometimes, earlier biological predispositions and unhealthy life pathways (involving social instability) are leading to poor coping, negative emotions, and disease.

Use of the statistical technique called meta-analysis (a quantitative method to combine the results of multiple studies) has allowed investigators to address the broad issue of psychological predictors of heart disease by looking at the size of effects, patterns of findings, and reasons for discrepancies in the scientific literature. Across both cross-sectional and longitudinal studies, hostility, anger, and depression are linked to CHD, often even after controlling for many other risk factors (age, sex, smoking, blood pressure, cholesterol, physical activity, diabetes and insulin resistance, social class, and heavy alcohol use).

Interestingly, the same patterns of psychosocial disruptions that predict heart disease also often predict incidence of other diseases and all-cause premature mortality. Therefore, Howard Friedman has developed the concepts of *disease-prone personalities* and *self-healing personalities*.

Social Integration

A variety of sociological and epidemiological investigations indicate that people who are well integrated into a stable community are less likely to develop heart disease or to die

prematurely. Friendly ties with family, friends, associates, and the community – often called *social support* – are beneficial in coping with stressful events and life changes, as well as in promoting healthier life patterns. Conversely, loneliness and the loss of social ties can have negative health effects. Lonely, anxious individuals experience more stress, both objectively and subjectively, and may experience higher levels of chronic physiological arousal. Bereaved individuals, especially men, have an increased risk of heart attack and sudden death – dying from a 'broken heart.'

How does social support work? Social support can influence how an individual views stressful events – the perceived severity of the situation and the need for an ensuing emotional response. Second, social support can help the stressed individual to develop coping strategies by providing practical information. Third, social support can provide tangible resources, such as healthy meals or rides to the doctor. Many times, an individual also benefits by assisting someone else who is facing similar challenges. Each of these types of support can be helpful, although it may be most beneficial when the type, amount, and provider of support match the needs of the recipient. Support might be harmful if it makes the individual feel inadequate, indebted, or unduly manipulated.

Social support is especially important when a person faces a severe challenge such as managing chronic cardiovascular illness. One of the biggest challenges is adhering to medical recommendations such as eating a heart-healthy diet, engaging in daily moderate exercise, and taking medication that will control symptoms, prolong life, and maintain quality of life. Family and friends can provide reminders, encouragement, and motivation to adhere to treatment regimens. However, individuals who need social support the most often receive the least support. Depressed individuals often become apathetic and withdraw from others, losing the chance for benefits that social integration provides. Hostile and cynical people are more likely to have interpersonal conflict, which can destroy social ties while simultaneously exacerbating tendencies toward physiological hyperreactivity (and stress on the cardiovascular system). There is good evidence that people who live in stable families and in stable communities are more protected from heart disease, especially if the quality of these relationships is good, and if there are associated patterns of healthy behaviors such as staying active and avoiding smoking and substance abuse.

Causal Mechanisms

There are two main pathways through which psychological factors can bring about increased likelihood of disease: psychophysiological mechanisms and behavioral mechanisms. Both of these also often involve biopsychosocial predispositions that develop earlier in life.

Psychophysiological Mechanisms (Nervous, Endocrine, and Immune Systems)

In response to danger – real or perceived threats – there is a physiological disturbance involving high sympathetic activation in the autonomic nervous system. Commonly termed

the 'fight-or-flight response,' this activation is an automatic and immediate internal response. Stress hormones such as epinephrine and norepinephrine affect all parts of the body, with both sudden and long-term effects.

An immediate effect may be sudden death via autonomic nervous system-induced arrhythmias of the heart. A severe psychological stress, such as witnessing a shocking scene of mutilation, can be as disruptive as a severe physical stress such as shoveling heavy snow. The heart may beat uncontrollably and irregularly, and then fail, causing sudden death. Such irregular, fatal heartbeats are much more probable when there is partial preexisting heart disease. However, such fatal events are relatively rare, especially as compared to slowly progressing chronic artery obstruction.

Links to chronic CHD are slower and more complex. CHD starts with an accumulation of lipid (fat) within the coronary arteries. To attempt a repair, the body deposits lipoproteins in the artery walls. Calcification (hardening) occurs, forming plaque, and over time the artery walls thicken, partially blocking the artery (called atherosclerosis). As blood flow is slowly impeded or a clot suddenly forms, oxygen needs may exceed supply (myocardial ischemia), and can lead to chest pain (angina pectoris) and unstable heart rhythms (arrhythmia). If enough of the blood flow to heart muscle is blocked, the heart will begin to die and stop beating – a myocardial infarction. Such clinical manifestations of the disease may occur decades after the damaging processes begin, affected in part by psychological and behavioral contributors.

Individuals who show an exaggerated psychophysiological response to stress or face excessive stressful challenges show high levels of what is termed *cardiovascular reactivity* (CVR), evidenced by high blood pressure and heart rate, increased sympathetic activation, reduced parasympathetic deactivation, and increased cardiac output and resistance. Both animal and human studies suggest that CVR contributes to or hastens the development of CHD. For example, in a series of experimental studies with monkeys, social stress (and competition) promoted atherosclerosis among monkeys straining to maintain a position of social dominance. When the composition of monkey groups was changed by the experimenter, the monkeys struggling for dominance faced ill health. Monkeys with the greatest heart-rate reactivity showed the most coronary artery damage and acted more aggressively, again suggesting the relevance of the 'fight-or-flight' physiological response. These experiments confirm clinical studies of humans regarding excessive aggressiveness, hostility, and struggle. All else being equal, the regulation and modulation of sympathetic arousal is likely to promote physical health, in both monkeys and people.

A second but related pathway linking psychosocial factors and CHD is through the endocrine system. In the fight-or-flight response, the endocrine system is also activated, as cortisol and related stress hormones are released. Both nervous system arousal and other forms of psychophysiological imbalance such as depression alter the usual complement of bodily hormones. Stress, helplessness, and depression are linked to high cortisol levels, and stress, anger, and frustration are linked to high levels of catecholamines (such as of norepinephrine). Other stress-related or stress-influenced hormones such as thyroxine and testosterone have also been shown to play a

significant role in stress-related homeostasis and physical health. Depression and the related hormonal irregularities are thus a common correlate but not simply a cause of heart disease. Treating depression may have no effect on the likelihood of recurrent heart disease unless other processes related to the atherosclerotic processes are also affected.

A third pathway linking psychosocial factors and CHD is through the immune system. There is increasing evidence that immune dysfunction is linked to CHD. For example, leukocytes play an important role in tissue repair; when overactive, these can adversely affect the cardiovascular function. After a cardiac event, the immune system helps repair damage; when it is malfunctioning under stress, this repair goes awry. Inflammation – the organism's reaction to infection or injury – involves the immune system and the vascular system attempting to heal the body, and such inflammatory processes are thought to play a role in many disease processes including heart disease. Inflammation can be exacerbated by stress and is known to be associated with chronic depression, and so it is increasingly a focus as a mediating link to disease. However, the links are undoubtedly complex, as inflammation, immune response, stress, depression, and behavior are all known to affect one another.

For each of these psychophysiological mechanisms, research studies have uncovered psychosocial factors that predict reactivity, hormonal imbalance, and disrupted immune function. However, no study has yet followed the whole process in humans, showing for example that hostile people develop certain psychophysiological disturbances that impair metabolism and thereby bring on heart disease, but there is increasing support for the different pieces of the model.

Behavioral Mechanisms

Personality-based behavioral patterns directly influence cardiac health and interact with psychophysiological mechanisms to indirectly influence health outcomes. There is strong evidence that smoking, substance abuse, physical inactivity, poor diet (high in saturated fats and low in vegetables), and obesity increase risk of heart disease. Many of these behaviors are affected by individual differences. For example, hostile, impulsive, and neurotic people are more likely to smoke, drink to excess, overeat, and/or use drugs, thereby increasing their risk of heart disease.

One of the most important health behaviors affecting the course of heart disease is adherence to treatment. Although logically a person with CHD should follow the doctor's recommendations, a host of individual psychosocial characteristics affect whether a patient will take medication, follow a proper diet, return for follow-up, and so on. The patient's sense of self-efficacy, confidence that success is achievable, perceived behavioral control, internal motivation, support by others, and personality traits relate both to healthy behavior and success in changing unhealthy behaviors. In particular, conscientious individuals are likely to adhere to treatment and to engage in more healthy behaviors and fewer risky behaviors. Conscientiousness is a solid predictor of both CVD and risk of all-cause mortality. Hostility and anger can also endanger the doctor-patient relationship, making adherence more challenging. Further, tendencies toward denial, isolation, or excessive optimism may result in a deadly delay in seeking treatment.

Depression is not only associated with a range of hormonal disruptions but is also correlated with a host of behavioral risk factors for disease, including disturbances in eating and sleeping, impaired social relations, and substance abuse. Here again, multiple causal pathways are implicated, but the full causal model has not been tested. Prospective clinical studies of depression and disease in humans, combined with experiments using animal models, could prove especially informative if they also included genetic predispositions, psychophysiological measurement, assessment of health behaviors, and heart disease and other disease outcomes over long periods of time.

Noncausal Effects

A part of the association between psychological variables and heart disease is due to noncausal pathways, or to effects that are only partially causal. This is important because if the psychological predictor is a correlate but not a causal element of disease, then changing the psychology will not prevent or treat the disease.

The development of heart disease can produce dramatic psychosocial changes in the patient's life. Heart attack victims (who survive) may become angry at the world for their plight, or they may become depressed over the new limitations on their activities. They may lose their job or be treated differently by their employers or colleagues. Sexual relations with one's partner may change, as fear, fatigue, or resentment enters the relationship. Immune system alterations may further induce depression and isolation. In all of these cases, psychological and behavioral patterns are a result rather than a cause of heart disease. Nevertheless, these factors or patterns sometimes may then predict or contribute to further deterioration, through the causal mechanisms described above.

Some disease predictors may act differently following a heart attack. For example, anxiety sometimes contributes to the development of heart disease, but not its progression. In fact, anxiety after angina or an attack may prove helpful if it leads the patient to cooperate more fully with medical treatment. We should not expect the same factors always to predict disease and recovery from disease, although this error of inference is often made.

Spurious relations (falsely seen as causal) between psychological variables and heart disease may result from underlying third variables that produce both the psychological characteristics and the disease. A more complicated case involves various genetic patterns that affect both personality and health. For example, aspects of the same genetic predisposition may make one more susceptible to both anxiety or depression and heart disease. In such cases, interventions to change these aspects of personality would not necessarily lead to improvements in health, unless other mediating mechanisms are also affected.

A final type of noncausal association between psychological variables and heart disease results from methodological artifacts – errors in the design of the study. A common artifact in this field is a selection artifact or bias. For example, neurotic individuals are more likely to report symptoms and seek out medical care than nonneurotics, even when there is little or no discernable organic disease. In a study of personality and heart

disease, a large percentage of the patients may be neurotic, because those worriers are the individuals who are especially likely to visit the doctor and be included in the studies. Similarly, an interesting relation can emerge in which neuroticism appears to be inversely related to arterial blockage, as only the neurotics with clean or with damaged arteries, and the nonneurotics with true blockage-caused pain, are in the sample. The nonneurotics with clean arteries do not worry, and do not wind up in the doctor's office, so they are inadvertently omitted from the study. This artifact might obscure a true causal relation between neuroticism and the development of disease, and so such artifact-biased studies should never be undertaken.

Self-Healing Personalities

In the field of medicine, it is too often assumed that health is simply the absence of disease. A negative test result is good news – it means the disease is not there. Studies and theories tie stress and negative emotionality to illness, disease, and mortality. However, until relatively recently, little attention has been paid to the positive, proactive elements of good health.

What is a healthy psychological pattern? A self-healing personality can be characterized by enthusiasm for life and emotional balance, with good social relationships. Such people are curious, secure, constructive, responsive, and conscientious. They may be alert and energetic, or calm and self-assured. They are people one likes to be around, infecting others with their natural *joie de vie*. Self-healing individuals are hardy, feeling a sense of personal control in their lives, being committed to a higher ideal or cause, and interpreting stressful events in terms of meaningful challenge. They are inspired toward continual growth and resilience. These characteristics of the self-healing personality are not merely the opposite of disease-prone characteristics such as suspiciousness, bitter cynicism, despair and depression, loneliness, or repressed conflicts, but are positive, meaningful motives in their own right.

Positive emotionality and psychological maturity may protect one from illness and promote health through multiple pathways. Physiologically, positive emotions may buffer autonomic and hormonal responses to stress and restore parasympathetic processes sooner, essentially undoing the effect of CVR and physiological arousal. If there is less need to constantly reestablish homeostasis, there is less accumulated strain on the cardiovascular system over time. Socially, positive and mature individuals tend to have better relationships with others, and so will tend to have better individual and social coping resources. Behaviorally, positive and psychologically mature individuals tend to have healthier behavior patterns – more physical activity, better diet, and less smoking and substance abuse.

Dr. Walter Cannon, who developed the ideas of homeostasis upon which modern notions of self-healing are built, emphasized that the body has developed a margin of safety. By this, Cannon meant that the body has allowance for contingencies that we may count on in times of stress. The lungs, the blood, and the muscles have much greater capacity than is ordinarily needed. In other words, the body naturally prepares itself for the rare 'extra' challenge, and self-healing people do what they can to increase these margins of safety.

William James, who anticipated much of our modern scientific understanding of emotional responses, summed up this idea succinctly as he advised:

Keep the faculty of effort alive in you by a little gratuitous exercise every day. That is, be systematically ascetic or heroic in little unnecessary points, do every day or two something for no other reason that you would rather not do it, so that when the hour of dire need draws nigh, it may find you not unnerved and untrained to stand the test (*Principles of Psychology*, 1890, Chap. 4).

Like much of social and behavioral science, psychosocial prescriptions for good cardiovascular health often sound like 'common sense,' until the matter is examined more closely. In actual fact, it is very difficult to walk the fine line between narrow-minded biomedical views of the nature of health that exclude psychosocial factors, and the unscientific touchy-feely health gurus who proclaim oversimplified and overgeneralized prescriptions for good health.

Interventions

What psychosocial interventions can be made to prevent, reverse, or halt the progression of heart disease? Given that cardiovascular disease is by far the greatest cause of premature mortality in economically developed countries, and given that social and economic costs of heart disease are overwhelming for both families and society, what can be done? Because the various elements of a self-healing personality are usually inter-correlated, teasing out the causal pathways and the best interventions remains a major challenge.

There is good evidence that lifestyle changes affect the incidence of heart disease. Most of this evidence is epidemiological and anthropological, showing that when people move from one country or one cultural group to another, their heart disease rate can change dramatically. There is also some experimental evidence indicating that dramatic lifestyle changes can improve aspects or correlates of cardiovascular health. A serious problem with this work is that little is known about which components of the healthy, self-healing lifestyle are the necessary causal elements.

For example, consider Japanese immigrants entering America. They leave a close-knit, well-ordered society with an Asian diet and Asian recreation patterns, and they (or their children) enter an individualistic, heterogeneous American society with very different social and recreational patterns and a hamburger stand on every corner. If heart disease rates rise, what is to blame? Nutritionists might point to fish oils or fat intake; religionists may point to meditation patterns; sociologists may point to family structure; psychologists may point to stress reactions. We simply do not know for sure. There is evidence that some or all of these points may be valid.

What about specific recommendations that are often heard regarding individuals at risk for an initial or recurrent heart attack? For example, is it unhealthy to work long hours? There is no evidence at all that it is unhealthy to be a 'workaholic' if all the other elements of self-healing are in place. That is, hard work and long hours themselves have not been shown to be a risk factor. On the contrary, for example, many powerful or influential executives, leaders, artists, and scientists work

exceedingly long hours and live long and healthy lives. Instead, the individual's response to and success in the work environment are more important.

Is it healthy to retire and get away from the stresses of the workplace? In fact, retiring may be helpful or it may be very stressful and unhealthy, depending upon the particular individual and the particular situation. Retirement may be healthy if it reduces the psychosocial stress of the workplace and increases opportunities for healthy habits. Retiring has been shown to be unhealthy if it results in a diminution of social ties, inadequate financial resources, and psychological states of uselessness or boredom. In addition, changing societal reactions to retirement can be extremely important – in terms of social security programs, health insurance, laws that prohibit age discrimination, opportunities for educational and social activities, and so on.

Can heart disease be prevented or reversed by relaxation techniques? With the attention to the negative role of stress, some studies consider stress-reduction techniques, such as yoga and meditation. However, the general efficacy of these programs is still unknown. Is chronic stress a risk factor for heart disease? Yes. Has it been shown through controlled study that meditation is key to reducing the incidence of heart disease? No. Meditation is wonderful for some people, but others may find it stressful or impractical. It may be more important to match stress-amelioration techniques to individual preferences and situations.

Is it healthy to be optimistic and look on the bright side? Although it seems to be the case that a sense of willpower and positive hopes for the future can help us through difficulty, it is also true that optimism can lead us to be shocked by reality or to avoid taking necessary prophylactic measures. It makes sense, as has been found, that for a heart disease surgical patient, optimism is helpful. It does not, however, make sense to assume that optimism will prove helpful to a chain smoker or an ice cream addict. The emphasis on optimism without sufficient regard to context is an example of the futile search for the psychosocial equivalent of a 'miracle drug' that can cure all diseases.

Are societal pressures that encourage jogging the key to protecting one's heart? It is very clear that a cigarette-smoking obese person who cannot walk up a flight of stairs is at markedly increased risk of heart disease; and this often has led to the incorrect belief that being in shape means the ability to run 5 miles every morning. Moderate exercise, such as a brisk walk each day, may be sufficient to provide cardiovascular benefits. It is probably even better if the individual develops a more active daily lifestyle, even if it does not include any formal 'exercise.' Such lifestyle changes are more likely to be maintained. People who constantly struggle to 'get in shape' may be harming their health.

Few specific recommendations to make psychological changes to prevent heart disease are supported by strong, systematic, long-term human research. Further, most studies have focused on male participants or ignored possible gender differences, even though there is some indication that women experience different stressors and have different psychophysiological responses. Psychosocial factors do increase risk of the development and progression of heart disease. However, it remains unclear what interventions work, who should receive them,

and when we should intervene, beyond the encouragement of psychologically mature individuals who are well integrated in their communities.

Conclusion

Contrary to some common conceptions, most of the increase in life expectancy in the developed countries has come not from high-technology medicine but rather from improved sanitation, infection control techniques, low-cost inoculations, better nutrition, and other public health improvements. Antibiotics have also made a significant difference, but visits to super-specialized cardiac surgeons at university hospitals produce limited impact overall when the big picture is considered. This is not to say that a heart disease patient would not be wise to seek out a cardiac specialist, but only that the overall public health benefit of such high-cost cardiac surgery is relatively small. However, there is reason to suspect that dramatic (and lower-cost) improvements can be realized if we put our knowledge of self-healing to good use. Societal and lifestyle changes may be the psychosocial equivalents of improved sanitation, nutrition, and infection control.

Major reports are regularly published breaking the 'news' that some medical researchers are now urging that psychological and emotional reactions of patients be taken into account. Such considerations generally still lie outside the traditional medical model of disease that focuses primarily on pharmaceuticals and surgery. Individuals who learn their own psychosocial needs, expand their social ties, and develop appropriate techniques of self-regulation and better habits can maximize their potential for good health. Moreover, these psychological styles can be significantly complemented by societal structures that promote such healthy reaction patterns and behaviors.

See also: Anger; Behavioral Medicine; Behavioral Pharmacology; Depression; Homeostasis; Hormones and Behavior; Personality

Development and Aging; Self-Efficacy; Social Support; Stress and Blood Pressure Dysregulation; Stress and Illness.

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