

Positive mental health: is there a cross-cultural definition?

GEORGE E. VAILLANT

Department of Psychiatry, Harvard Medical School, Massachusetts General Hospital, 151 Merrimac Street, Boston, MA 02114, USA

Seven models for conceptualizing positive mental health are reviewed: mental health as above normal, epitomized by a DSM-IV's Global Assessment of Functioning (GAF) score of over 80; mental health as the presence of multiple human strengths rather than the absence of weaknesses; mental health conceptualized as maturity; mental health as the dominance of positive emotions; mental health as high socio-emotional intelligence; mental health as subjective well-being; mental health as resilience. Safeguards for the study of mental health are suggested, including the need to define mental health in terms that are culturally sensitive and inclusive, and the need to empirically and longitudinally validate criteria for mental health.

Key words: Positive mental health, maturity, resilience, coping mechanisms, subjective well-being, emotional intelligence, positive emotions

(World Psychiatry 2012;11:93-99)

The great epidemiological studies of the past half century have focused upon who was mentally ill and not who was well. Mental illness, after all, is a condition that can be defined reliably, and its limits are relatively clear. Until recently, only the Sterling County Studies by A. Leighton (1) came close to defining positive mental health operationally. In addition, it has been argued that achieving above average mental or physical health is not the province of medicine, but of education.

Early in the past century, internists began studying physiology at high altitude and devise measures of positive physical health for athletes, pilots, and finally astronauts. In 1929-30, at the University of California at Berkeley, the Institute of Human Development was founded by H. Jones, N. Bayley and J. McFarlane (2,3). Originally created to study healthy child development, the Institute was to provide a seminal influence on E. Erikson's model of healthy adult development. In the late 1930s, A. Bock, an internist trained in high altitude physiology and interested in positive physical health, began the Study of Adult Development at the Harvard University (4,5). This was designed as an interdisciplinary study of both mental and physical health.

Like physical fitness, positive mental health is too important to be ignored, but its definition is not easy. Several precautions are necessary. First, in defining mental health, cross-cultural differences must be kept in mind. My own efforts

to define mental health may appear parochial to those from other countries. Thus, the commentaries on this paper will be particularly important.

The second precaution is to keep in mind that "average" is not healthy. Community surveys always mix in the healthy with the prevalent amount of psychopathology. In the case of red blood count, or thyroid function, the middle of the bell curve is healthy. In the case of eyesight, only the upper end of the bell curve is healthy; and in the case of cholesterol and bilirubin only the low end of the curve is healthy.

A third precaution is to make clear whether one is discussing trait or state. Longitudinal study is particularly important. A world-class soccer player temporarily sidelined with a sprained ankle (state) is probably healthier than a type 1 diabetic (trait) with a temporarily normal blood sugar.

Finally, mental health needs to be seen in context. Sickle cell trait is unhealthy in Paris, but not in central Africa where malaria is endemic. In the 1940s, paranoid personalities made very poor submariners but excellent airplane spotters. Punctuality and competitiveness are seen as healthy in some communities, but not in others.

Moreover, if mental health is "good", what is it good for? The self or the society? For "fitting in" or for creativity? In defining mental health, biology usually trumps anthropology. Cultural anthropology teaches us that almost every form of behavior is considered

healthy in some cultures, but that does not mean that the tolerated behavior is mentally healthy. Until recently, Portugal did not recognize alcoholism as an illness, but that did not reduce the contribution of alcoholism to mortality in Lisbon. The best way to enrich our understanding of what constitutes mental health is to study a variety of healthy populations from different perspectives, in different cultures and for a long period of time.

This paper will contrast seven different empirical models of mental health. First, mental health can be conceptualized as above normal, as epitomized by a DSM-IV's Global Assessment of Functioning (GAF, 6) score of over 80. Second, it can be regarded as the presence of multiple human strengths rather than the absence of weaknesses. Third, it can be conceptualized as maturity. Fourth, it can be seen as the dominance of positive emotions. Fifth, it can be conceptualized as high socio-emotional intelligence. Sixth, it can be viewed as subjective well-being. Seventh, it can be conceptualized as resilience.

To avoid quibbling over which traits characterize mental health, it is helpful to adopt the analogy of a decathlon champion. What constitutes a "track star"? A decathlon star must possess muscle strength, speed, endurance, grace and competitive grit, although the combinations may vary. Amongst decathlon champions, the general definition will not differ from nation to nation, or century to century. The salience of a

given facet of a decathlon champion, or of mental health, may vary from culture to culture, but all facets are important.

MENTAL HEALTH AS ABOVE NORMAL, EPITOMIZED BY A GAF SCORE OF OVER 80

After World War II, influential works on mental health began to be published (7-9). Although all studies concentrated on normal populations, they still put their emphasis on *not pathological* rather than on *above average* mental health. Besides, many post-war psychiatrists continued to agree with S. Freud who had dismissed mental health as “an ideal fiction”.

Then, in 1958, M. Jahoda’s report to the American Joint Commission on Mental Illness and Health (10) led to a psychiatric sea change regarding the existence of mental health. She suggested that mental health includes autonomy (being in touch with one’s own identity and feelings); investment in life (self-actualization and orientation toward the future); efficient problem solving (accurate perception of reality, resistance to stress, environmental mastery); and ability to love, work and play. However, at the time she published her criteria, there was still no evidence to prove that her plausible definitions were more than mere platitudes.

Next, came R. Grinker’s 1962 studies of “homoclitcs”, the first empirical study of positive mental health (11). Grinker’s homoclitcs were physical education majors selected for normality but studied only briefly. A second more longitudinal study was the elimination process, by which out of 130 healthy jet pilots, already selected for mental health, the seven original American astronauts were selected (12). These astronauts not only enjoyed exemplary work records, but also were competent at loving. Although venturesome test pilots, they all had had very few accidents during their years of flying. They could tolerate both close interdependent association and extreme isolation. Although each of the astronauts was very different, they all would have starred in a mental health “decathlon”.

An even more influential study of mental health was the Menninger Psychotherapy Project led by the psychologist L. Luborsky. He devised the Health-Sickness Rating Scale, with a scale from 0 to 100 (13), based on behavior rather than pencil and paper tests. A score of 80 or above reflected positive mental health; a score of 95-100 reflected “an ideal state of complete integration, of resiliency in the face of stress, of happiness and social effectiveness”.

Luborsky’s scale was modified by two of the architects of DSM-III into what is now Axis V (14). In cross-cultural comparisons, investigators have confirmed the usefulness of Luborsky’s measure as an international thermometer of mental health (15).

MENTAL HEALTH AS THE PRESENCE OF MULTIPLE HUMAN STRENGTHS

The fact that psychologists have approached mental health somewhat differently from psychiatry has led to this second model, which has provided the basis for the positive psychology movement (16). Psychologists, like physiologists, look at continua (traits) rather than categories, while in medicine you either have an illness or you do not. In psychology, interventions to improve adequate intelligence or social skills are common, while in medicine to meddle with adequate thyroid function, or a healthy hematocrit or a normal mood, is only to cause trouble. In the healthy rested individual, virtually all psychopharmacological interventions will, over time, make the brain function worse. Thus, the medical goal of using medication to remove pathology is different from the psychologists’ goal of fostering positive mental health in an educative model.

As early as in 1925, the psychiatrist A. Meyer was already warning of the need to stop “moralizing” about utopian mental health. Mental health, he suggested, should be studied through “conscientious and impartial study” and “constructive experimentation” (17). Subsequently, the psychologist M. Seligman stated that positive psychology will

use evidence-based experimentation to study positive mental health and incorporate recent empirical advances in cognitive psychology (18).

Since the late 19th century, many social scientists had mistrusted optimistic cognition, especially religious optimism, as a maladaptive “American” illusion interfering with accurate perception of reality. Nietzsche, Freud, Marx and Darwin all perceived optimism as evidence of an ingenuous cultural adolescence, not of mature mental health. However, cognitive therapists have then demonstrated that optimistic cognition can not only change behavior, but even alter brain function (19). If pessimism is the dominant cognition of the depressed, optimism appears the dominant cognition of the mentally healthy. In part, the importance of optimism to positive mental health depends upon an attributional cognitive style which asserts that the good things happening to me are my “fault”, will last forever and are pervasive, while the bad things are limited, not my fault, and unlikely to happen again (20).

The psychologists C. Peterson and M. Seligman identified four components in positive mental health: talents, enablers, strengths, and outcomes. Talents are in-born, genetic and are not much affected by intervention (e.g., high IQ) (21). Enablers reflect benign social conditions, interventions, and environmental good luck (e.g., a strong family, a good school system, living in a democratic meritocracy). Strengths are character traits (such as kindness, forgiveness, curiosity, honesty) which reflect facets of mental health that are amenable to change. Outcomes reflect dependent variables (e.g., improved social relationships and subjective well-being) which can be used to provide evidence that efforts by clinicians to enhance strengths are effective.

Which strengths are most associated with mental health is open to debate. Wisdom, kindness and the capacity to love and be loved are strengths upon which few would argue. But should courage be included as a strength? And why were intelligence, perfect musical pitch and punctuality excluded? In addition, there is considerable debate within the mental health professions

about whether positive mental health is a process that any insurance program should be expected to cover. Over time society will have to decide who should pay for positive mental health: the individual, the educational system, third party payers, religious organizations, or a combination of all four?

MENTAL HEALTH AS MATURITY

Unlike other organs of the body that have evolved to stay the same or deteriorate after puberty, the human brain continues to evolve in adulthood. A ten-year-old's lungs and kidneys are more likely to reflect optimal function than are those of a sixty-year-old, but that is not true of their central nervous systems. To some extent, then, adult mental health reflects a continuing process of maturational unfolding and progressive brain myelinization into the sixth decade (22,23). Prospective studies reveal that individuals are less depressed and show greater emotional modulation at age 70 than they did at age 30 (5,24).

In some respects E. Erikson in 1950 anticipated Jahoda and Grinker when he provided the first model of adult lifespan development (25). All previous models had depicted deterioration after 45-50. In contrast, Erikson viewed each of his eight stages of human development as a fresh "criterion of mental health". Subsequently, J. Loevinger provided a model of adult ego development (26) and L. Kohlberg built up a model of adult moral development (27). Implicit in all these models is the assumption that greater maturity reflects greater mental health. Arguably, the best definition of mental health that we have is W. Menninger's definition of maturity (28) as capacity for love, absence of stereotyped patterns of problem solving, realistic acceptance of the destiny imposed by one's time and place in the world, appropriate expectations and goals for oneself, and capacity for hope. In this model, maturity is not only the opposite of narcissism, but it is quite congruent with other models of mental health.

To support the maturational model of mental health, the assessment of the

behavior and feeling states of persons studied over a lifetime becomes necessary. Although such longitudinal studies have come to fruition only recently, all illustrate the positive association of maturity with increasing mental health (5,24,29,30,31). In order to illustrate the association between mental health and brain maturity, individuals with brain trauma, major depression, arteriosclerosis, Alzheimer's disease, alcoholism, and schizophrenia must all be excluded.

Erikson conceptualized that maturity, through the evolution of adult development via life experience, produces a "widening social radius". In Erikson's model, adult maturity is achieved over time through the mastery of the four sequential tasks of "identity", "intimacy", "generativity", and "integrity". On the basis of empirical data from Harvard's Study of Adult Development, Vaillant has added two more tasks: "career consolidation" prior to generativity and "keeper of the meaning" prior to integrity (32). Surprisingly, the mastery of such tasks appears relatively independent of education, gender, social class and probably culture. The age at which any task is mastered differs enormously, but the maturity of life stage is highly correlated with mental health.

Identity is not just a product of egocentricity, of running away from home, or of marrying to get out of a dysfunctional family. There is a world of difference between the instrumental act of running away from home and the developmental task of knowing where one's family values end and one's own values begin. Such separation derives as much from the identification and internalization of important adolescent friends and non-family mentors as it does from simple biologic maturation. For example, our accents become relatively fixed by age 16 and reflect those of our adolescent peer group rather than the accents of our parents.

Next, young adults should develop intimacy, which permits them to become reciprocally, and not selfishly, involved with a partner. Living with just one other person in an interdependent, reciprocal, and committed fashion may seem neither desirable nor possible to a

young adult. Once achieved, however, the capacity for intimacy may seem as effortless and desirable as riding a bicycle. Sometimes the relationship is with a person of the same gender; sometimes it is completely asexual; and sometimes, as in religious orders, the interdependence is with a community.

Career consolidation is a task that is usually mastered together with or that follows the mastery of intimacy. Mastery of this task permits adults to find a career as valuable as they once found play. There are four crucial developmental criteria that transform a "job" into a "career": contentment, compensation (i.e., useful to others, not just a hobby), competence and commitment. Failure to achieve career consolidation is almost pathognomonic of severe personality disorder.

Mastery of the fourth task, generativity, involves the demonstration of a clear capacity to care for and guide the next generation. Existing research reveals that sometime between age 35 and 55 our need for achievement declines and our need for community and affiliation increases. Depending on the opportunities that the society makes available, generativity can mean serving as a consultant, guide, mentor or coach to young adults in the larger society. Generativity is achieved by a little more than half the population and is a powerful indicator of positive mental health measured in other ways (31,32).

The penultimate life task is to become a "keeper of the meaning". This task, often part of grandparenthood, involves passing on the traditions of the past to the future. The focus of a keeper of the meaning is on conservation and preservation of the collective products of mankind. Generativity and its virtue, care, requires taking care of one person rather than another. In contrast, keeper of the meaning and its virtues of wisdom and justice are less selective; for justice, unlike care, means not taking sides.

The last life task is integrity, the task of achieving some sense of peace and unity with respect to both one's own life and the whole world, and the acceptance of one's life cycle as something that had to be and that, by necessity, permitted

of no substitutions. In our prospective study, healthy adult development followed the same pattern for inner-city men and gifted women as for university graduates (5,32). However, cross-cultural validation is badly needed.

MENTAL HEALTH AS POSITIVE EMOTIONS

In the 19th century, psychiatrists wrote of concepts like “moral insanity” and “good character” and mental health was deemed related to morality and religious observance. During the 20th century, the rise of cultural anthropology, psychoanalysis, behaviorism, molecular biology, and secularism in general led psychiatrists to doubt there was any relationship between morality (especially as exemplified by religion) and health. However, recent advances in the biological understanding of positive emotions have necessitated psychiatry taking them seriously (33,34). In the last ten years, positive emotions – previously relegated to popular songs, pastoral counseling, and religion – have been rendered scientifically plausible.

Fifty years ago, medical students were taught mainly about hypothalamic emotions like lust, hunger, fear and rage. Such emotions are also common in alligators and decorticate cats. Prosocial emotions like empathy, compassion and parental love were thought to be learned behaviors and, therefore, placed in the neocortex, and in the curricula of schools of education – not of medicine. Then, in the 1960s, P. MacLean (35), H. Harlow (36), and J. Bowlby (37) shifted attention to love as attachment rather than love as sexuality, thereby creating the basis for neuroscience to provide substance to the platitudes of Jahoda, Maslow, and even of St. Paul with his “theological virtues” of faith, compassion, hope and love.

The neurobiologist P. MacLean pointed out that the limbic structures govern our mammalian capacity, not only to remember (cognition) but also to play (joy), to cry out at separation (faith/trust) and to take care of our own (love). Except for rudimentary memory, reptiles

express none of these qualities. Remove a mother hamster’s cortex and she cannot do mazes but remains a competent mother. Damage her limbic system, however, and she can still do mazes but not parent her pups. The Darwinian advantages of positive emotions seem clear.

Not until the last twenty years, however, have functional magnetic resonance imaging (fMRI) studies explored the neurobiology of positive emotions. Various studies have located human pleasurable experiences (tasting chocolate, winning money, admiring pretty faces, enjoying music and orgasmic ecstasy) in limbic areas, especially in the orbitofrontal region, anterior cingulate and insula. These diverse structures are closely integrated and organized to help us to seek and to recognize all that falls under the rubric of mammalian love and human spirituality. In the last twenty years neuroscientists, like J. Allman (38) and G. Rizzolatti (39), have identified the limbic spindle cells and mirror cells that undergird prosocial human mentation.

Mirror neurons reside in the insula and anterior cingulate and appear to mediate empathy, the experience of “feeling” the emotions of another. The fMRI of prosocial mirror cells in the anterior cingulate cortex and insula is most active in individuals with the highest levels of social awareness and empathy, confirmed by pencil and paper tests (40).

Eight positive emotions (love, hope, joy, forgiveness, compassion, faith, awe and gratitude) comprise the important positive and “moral” emotions included in this model. Of great importance, the eight selected positive emotions all involve human connection, none is all about “me”; they are all future oriented; and they all appear to be a common denominator of the world’s major faiths (41). Omitted from the list are five other present oriented positive emotions (excitement, interest, contentment, humor, and a sense of mastery), for we can feel these latter five emotions while alone on a desert island.

Of tremendous importance to individual survival, negative emotions are

all about “me”. We feel both the emotions of vengeance and forgiveness deeply, but the long-term mental health results of these two emotions are very different. Negative emotions are crucial for survival in time present. Experiments by neuroscientists like J. Panskepp (42) and psychologists like B. Fredrickson (33) and S. Lyubormirsky (43) document that, while negative emotions narrow attention and miss the forest for the trees, positive emotions, especially joy, make thought patterns more flexible, creative, integrative and efficient. Focused on time future, positive emotions increase our tolerance for strangers, expand our moral compass, and enhance our creativity (34).

The effect of positive emotions on the autonomic nervous system has much in common with the relaxation response and meditation. Negative emotions, via our sympathetic nervous system, induce metabolic and cardiac arousal. Positive emotions, via our parasympathetic nervous system, reduce basal metabolism, blood pressure, heart rate, respiratory rate and muscle tension. fMRI studies of Kundalini yoga demonstrate that meditation increases activity of the hippocampus and the right lateral amygdala, which in turn leads to parasympathetic stimulation, and the sensation of deep peacefulness (44).

MENTAL HEALTH AS SOCIO-EMOTIONAL INTELLIGENCE

High socio-emotional intelligence reflects above average mental health in the same way that a high IQ reflects above average intellectual aptitude. Such emotional intelligence lies at the heart of positive mental health. In the *Nicomachean Ethics*, Aristotle defined socio-emotional intelligence as follows: “Anyone can become angry – that is easy. But to be angry with the right person, to the right degree, at the right time, for the right purpose, and in the right way – that is not easy”. Nevertheless, as recently as 50 years ago, a textbook on intelligence dismissed the concept of such Aristotelian social intelligence as “useless”. Indeed, only in the 1970s

did the modulation of “object relations” become more important to psychiatry than the modulation of “instinct”.

Social and emotional intelligence can be defined by the following criteria (45): accurate conscious perception and monitoring of one’s own emotions; modification of our emotions so that their expression is appropriate; accurate recognition of and response to emotions in others; skill in negotiating close relationships with others; capacity for focusing emotions (motivation) toward a desired goal.

Over the last 25 years, steps have been taken to apply our understanding of the relationship of socio-emotional intelligence to positive mental health. The first step is that both fMRI and neurophysiological experimentation have led to advances in our understanding of the integration of prefrontal cortex with the limbic system (46,47).

The second step forward has been our slow but steady progress in the conceptualizing and even the measuring of “emotional intelligence”. Over the last decade, measures of emotional intelligence have been evolving rapidly (48).

There are now many exercises in handling relationships that help couples, business executives and diplomats become more skilled at conflict resolution and negotiation. In the past decades, there has also been an increasing effort to teach schoolchildren core emotional and social competencies, sometimes called “emotional literacy” (45).

MENTAL HEALTH AS SUBJECTIVE WELL-BEING

Long before philosophers pondered criteria for mental health, they considered criteria for happiness and the “good life”. However, if through the centuries philosophers have sometimes regarded happiness as the highest good, psychologists and psychiatrists have tended to suspect it.

Happiness that comes from joy or unselfish love (agape), or from self-control and self-efficacy, or from play and “flow” (deep but effortless involvement), reflects health. Happiness that comes from spiritual discipline and con-

centration, or from mature humor, or from being relieved of narcissistic focus on shame, resentments, and the “poor-me’s” is a blessing. Authentic happiness, according to Seligman, depends upon achieving engagement, meaning, positive emotions and positive relationships (18).

On the other hand, subjective happiness can have maladaptive as well as adaptive facets. The search for happiness can appear selfish, narcissistic, superficial and banal. Hedonic pleasure can come easily and be soon gone. Illusory happiness is seen in the character structure associated with bipolar and dissociative disorders and with exaltation of “me” advocated by much popular American psychology. Examples of maladaptive “happiness” can refer to any unmodulated but gratifying primitive need like binge eating, drug abuse, tantrums, promiscuity and revenge. It is because of such ambiguity of meaning that, in this paper, the term “subjective well-being” will be substituted for happiness.

The rest of the world has always been skeptical of American concern with happiness. Only in the last decades have investigators like M. Seligman and E. Diener (49,50) pointed out that a primary function of subjective well-being is that it facilitates self-care, thus becoming an antidote to learned helplessness. Again, controlling for income, education, weight, smoking, drinking and disease, people high in subjective well-being live significantly longer (51).

Nevertheless, efforts to measure subjective well-being have been quite varied and lack a gold standard. Some investigators measure subjective well-being as simply global life satisfaction; other investigators assess more specific domains like work or marital satisfaction. However, the question “How do you feel about your life as a whole?”, answered on a simple 7 point scale ranging from “delighted” to “terrible”, works surprisingly well.

Because short-lived environmental variables can have a confounding effect, consensus is emerging that naturalistic experience-sampling methods are the most valid way to assess subjective well-

being. With such sampling methods, research subjects are contacted by beeper at random times during the day for days or weeks and at each interval are asked to assess their subjective well-being (52). Better yet, in order to tease verbal self-report from actual subjective experience, physiological measures of stress (for example, measures of galvanic skin response, salivary cortisol, and filming facial expression by concealed cameras) have also proven useful.

MENTAL HEALTH AS RESILIENCE

There are three broad classes of coping mechanisms that humans use to overcome stressful situations. The first two are conscious: seeking social support and cognitive strategies that we intentionally employ to master stress. The third mode of coping is by involuntary mechanisms which distort our perception of internal and external reality in order to reduce subjective distress, anxiety and depression.

These involuntary mental mechanisms are labeled by the Defensive Function Scale of DSM-IV as defenses. They can abolish impulse (e.g., by reaction formation), or conscience (e.g., by acting out), or the need for other people (e.g., by schizoid fantasy) or reality (e.g., by psychotic denial). They can abolish our conscious recognition of the subject (e.g., by projection) or the awareness of a transgressor (e.g., by turning against the self) or abolish the idea (e.g., by repression), or the affect associated with an idea (e.g., isolation of affect/intellectualization).

The most pathological category of coping mechanisms includes denial and distortion of external reality. More common to everyday life are the immature and maladaptive defenses found in adolescents and in adults with personality disorders: projection, passive aggression, acting out and schizoid fantasy. The third class of defenses, often associated with anxiety disorders and with the psychopathology of everyday life, include repression, intellectualization, reaction formation, and displacement (i.e., directing affect at a more neutral object).

The fourth class of involuntary coping mechanisms characterize mental health (53). "Mature defenses" still distort and alter feelings, conscience, relationships and reality, but they achieve these alterations gracefully and flexibly. Doing as one would be done by (altruism), keeping a stiff upper lip (suppression), keeping future pain in awareness (anticipation), the ability not to take one's self too seriously (humor), and turning lemons into lemonade (sublimation) are the very stuff from which positive mental health is made. But alas, these behaviors cannot be achieved by a simple act of conscious will. Thus, the beholder regards such adaptive defenses as virtues, just as the beholder may regard the prejudice of projection and the tantrums of acting out as sins. Ultimately, like other facets of mental health, the reliable identification of healthy but involuntary coping mechanisms requires longitudinal study. Studies from both Berkeley's Institute of Human Development (54) and Harvard's Study of Adult Development (55) have illustrated the importance of the mature defenses to mental health.

Just as psychiatry needs to understand how, on Axis V, a score of 75 might become 90, just so psychiatry needs to understand how best to facilitate the transmutation of less mature into more mature coping styles. Progress is underway in using fMRI studies to demonstrate how these mechanisms are initiated by the brain (46,47) and how to use empiri-

cal methods to demonstrate change in the maturation of defenses during psychotherapy (56).

CONCLUSIONS

This paper has suggested seven conceptually distinct models of positive mental health. As outlined in Table 1, the Study of Adult Development at Harvard provides an empirical illustration of the interrelationship of five of these different models in a prospective study of non-delinquent inner-city men (55). Not only was each of five models (measured by independent raters) significantly correlated with the other four, but each model predicted objective global mental health assessed 15 years later. Significantly, none of the five models was well predicted by parental social class, or even by a warm childhood environment.

The concept of mental health raises the issue of therapeutic interventions to achieve it. What facets of mental health are fixed and which are susceptible to change? As noted above, chemicals can alleviate mental illness, but do not improve healthy brain function. We can enhance mental health only through cognitive, behavioral and psychodynamic education.

Finally, the study of positive mental health requires safeguards. First, mental health must be broadly defined in terms that are culturally sensitive and

inclusive. Second, the criteria for mental health must be empirically and longitudinally validated. Finally, although mental health is one of humanity's important values, it should not be regarded as an ultimate good in itself. We must proceed in our efforts towards trying to achieve positive mental health while maintaining due respect for individual autonomy.

Acknowledgement

This work was supported by research grant MH42248 from the National Institute of Mental Health.

References

1. Leighton AH. My name is Legion: the Stirling County Study, Vol. 1. New York: Basic Books, 1959.
2. Clausen J. American lives. New York: Free Press, 1993.
3. Jones CJ, Meredith W. Developmental paths of psychological health from early adolescence to later adulthood. *Psychol Aging* 2000;15:351-60.
4. Vaillant GE. *Adaptation to life*. Boston: Little Brown, 1977.
5. Vaillant GE. *Aging well*. New York: Little Brown, 2002.
6. American Psychiatric Association. *Diagnostic and statistical manual of mental Disorders*, 4th ed. Washington: American Psychiatric Association, 1994.
7. Srole L, Langer TS, Michael ST et al. *Mental health in the metropolis*. New York: McGraw Hill, 1962.
8. Leighton DC, Harding JS, Macklin D et al. *The character of danger*, vol. 3. The Stirling County Study. New York: Basic Books, 1963.
9. Offer D, Sabshin M. *Normality: theoretical and clinical concepts of mental health*. New York: Basic Books, 1966.
10. Jahoda M. *Current concepts of positive mental health*. New York: Basic Books, 1958.
11. Grinker RR Sr., Grinker RR Jr., Timberlake J. A study of mentally healthy young males (homoclitics). *Arch Gen Psychiatry* 1962;6:405-53.
12. Korchin SJ, Ruff GE. Personality characteristics of the Mercury astronauts. In: Grosser GH, Wechsler H, Greenblatt M (eds). *The threat of impending disaster*. Cambridge: MIT Press, 1964.
13. Luborsky L. Clinicians' judgment of mental health: a proposed scale. *Arch Gen Psychiatry* 1962;7:407-17.
14. Endicott J, Spitzer RL, Fleiss JL et al. The

Table 1 Cross-correlation between different models of mental health at midlife and their predictive value and independence from parental social class and childhood environment: data from the Study of Adult Development at Harvard (55)

	A	B	C	D	E
Model A: GAF at age 50	-				
Model B: Maturity	.59	-			
Model C: Social intelligence	.38	.44	-		
Model D: Subjective well-being	.40	.30	.40	-	
Model E: Resilience	.76	.52	.39	.31	-
Objective global mental health at 65	.45	.33	.30	.56	.45
Parental social class	.06	.40	.18	.13	.07
Warm childhood environment	.05	.04	.07	.07	.03

GAF – Global Assessment of Functioning
All correlations > .25 are significant at $p < 0.001$

- Global Assessment Scale: a procedure for measuring overall severity of psychiatric disturbance. *Arch Gen Psychiatry* 1976;33:766-71.
15. Armelius BA, Gerin P, Luborsky L et al. Clinician's judgment of mental health: an international validation of HSRS. *Psychother Res* 1991;1:31-8.
 16. Seligman MEP, Csikszentmihalyi M. Positive psychology. *Am Psychol* 2000;55:5-14.
 17. Lief A (ed). *The commonsense psychiatry of Dr. Adolf Meyer*. New York: McGraw-Hill, 1948.
 18. Seligman MEP. *Flourish*. New York: Free Press, 2011.
 19. Baxter LR, Schwartz JM, Bergman KS et al. Caudate glucose metabolic rate changes with both drug and behavior therapy for obsessive-compulsive disorder. *Arch Gen Psychiatry* 1992;49:681-9.
 20. Peterson C, Seligman MEP. Causal explanations as a risk factor for depression: theory and evidence. *Psychol Rev* 1984;91:347-74.
 21. Peterson C, Seligman MEP. *Character strengths and virtues*. New York: Oxford University Press, 2004.
 22. Yakovlev PI, Lecours AR. The myelogenetic cycles of regional maturation of the brain. In: Minkowski A (ed). *Regional development of the brain in early life*. Oxford: Blackwell, 1967.
 23. Benes FM, Turtle M, Khan Y et al. Myelination of a key relay in the hippocampal formation occurs in the human brain during childhood, adolescence and adulthood. *Arch Gen Psychiatry* 1994;51:477-84.
 24. Carstensen LL. Evidence for life-span theory of socio-emotional selectivity. *Current Directions in Psychological Science* 1995;4:151-6.
 25. Erikson E. *Childhood and society*. New York: Norton, 1950.
 26. Loevinger J. *Ego development*. San Francisco: Jossey-Bass, 1976.
 27. Kohlberg L. *Essays on moral development, Vol. 2: The nature and validity of moral stages*. San Francisco: Harper Row, 1984.
 28. Menninger WC. *A psychiatrist for a troubled world: selected papers of William C. Menninger, M.D.* New York: Viking Press, 1967.
 29. White RW. *Lives in progress*, 3rd ed. New York: Holt Rinehart & Winston, 1975.
 30. Friedman HS, Martin LR. *The Longevity Project*. New York: Hudson Street Press, 2011.
 31. Vaillant GE, Milofsky ES. Natural history of male psychological health: IX. Empirical evidence for Erikson's model of the life cycle. *Am J Psychiatry* 1980;137:1348-59.
 32. Vaillant GE. *The wisdom of the Ego*. Cambridge: Harvard University Press, 1995.
 33. Fredrickson BL. The role of positive emotions in positive psychology: the broaden-and-build theory of positive emotions. *Am Psychol* 2001;56:218-26.
 34. Vaillant GE. *Spiritual evolution: a scientific defense of faith*. New York: Doubleday Broadway, 2008.
 35. MacLean PP. *The triune brain in evolution*. New York: Plenum, 1990.
 36. Harlow H. The nature of love. *Am Psychol* 1958;13:673-85.
 37. Bowlby J. *The making and breaking of affectional bonds*. London: Tavistock, 1979.
 38. Allman JM, Watson KK, Tetreault NA et al. Intuition and autism: a possible role for Von Economo neurons. *Trends in Cognitive Science* 2005;9:367-73.
 39. Rizzolatti G. The mirror neuron system and its function in humans. *Anat Embryol* 2005;210:419-21.
 40. Kaplan JT, Iacoboni M. Getting a grip on the other's mind: mirror neurons, intention, understanding and cognitive empathy. *Social Neuroscience* 2006;1:175-83.
 41. Armstrong K. *The great transformation*. New York: Knopf, 2006.
 42. Panksepp J. *Affective neuroscience. The foundations of human and animal emotion*. New York: Oxford University Press, 1998.
 43. Lyubomirsky S, King L, Diener E. The benefits of frequent positive affect: does happiness lead to success? *Psychol Bull* 2005;131:803-55.
 44. Thayer JF, Sternberg EM. Neural aspects of immunomodulation: focus on the vagus nerve. *Brain, Behavior, and Immunity* 2010;24:1223-8.
 45. Goleman D. *Emotional intelligence*. New York: Bantam Books, 1995.
 46. Etkin A, Egner T, Peraza DM et al. Resolving emotional conflict: a role for the rostral anterior cingulate cortex in modulating activity in the amygdala. *Neuron* 2006;51:871-82.
 47. Westen D, Blagou PS, Harenski K et al. Neural bases of motivated reasoning: an fMRI study of emotional constraints on partisan political judgments in the 2004 U.S. Presidential Election. *J Cogn Neurosci* 2006;18:1947-58.
 48. Mayer JD, Salovey P, Caruso D. *Emotional Intelligence Test (MSCEIT)*. Toronto: Multi-Health Systems, 2002.
 49. Diener E, Suh EM, Lucas RE et al. Subjective well-being: three decades of progress. *Psychol Bull* 1999;125:276-302.
 50. Diener E. Subjective well-being. *Am Psychol* 2000;55:34-43.
 51. Diener E, Chan MY. Happy people live longer: subjective well-being contributes to health and longevity. *Applied Psychology: Health and Well-Being* 2011;3:1-43.
 52. Csikszentmihalyi M. *Flow: the psychology of optimal experience*. New York: Harper Row, 1990.
 53. Vaillant GE. Adaptive mental mechanisms: their role in a positive psychology. *Am Psychol* 2000;55:89-98.
 54. Haan N. *Coping and defending*. San Diego: Academic Press, 1977.
 55. Vaillant GE, Schnurr P. What is a case? A 45-year study of psychiatric impairment within a college sample selected for mental health. *Arch Gen Psychiatry* 1988;45:313-27.
 56. Perry JA, Beck SM, Constantinides P et al. Studying change in defensive functioning in psychotherapy, using defense mechanism rating scales: four hypotheses, four cases. In: Levy RA, Ablon JS (eds). *Handbook of evidence-based psychodynamic psychotherapy*. Totowa: Humana Press, 2008:121-53.