

# A Psychobiological Model of Temperament and Character

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**I**n this study, we describe a psychobiological model of the structure and development of personality that accounts for dimensions of both temperament and character. Previous research has confirmed four dimensions of temperament: novelty seeking, harm avoidance, reward dependence, and persistence, which are independently heritable, manifest early in life, and involve preconceptual biases in perceptual memory and habit formation. For the first time, we describe three dimensions of character that mature in adulthood and influence personal and social effectiveness by insight learning about self-concepts. Self-concepts vary according to the extent to which a person identifies the self as (1) an autonomous individual, (2) an integral part of humanity, and (3) an integral part of the universe as a whole. Each aspect of self-concept corresponds to one of three character dimensions called self-directedness, cooperativeness, and self-transcendence, respectively. We also describe the conceptual background and development of a self-report measure of these dimensions, the Temperament and Character Inventory. Data on 300 individuals from the general population support the reliability and structure of these seven personality dimensions. We discuss the implications for studies of information processing, inheritance, development, diagnosis, and treatment. (*Arch Gen Psychiatry*. 1993;50:975-990)

Several lines of research are converging to facilitate the integration of categorical and dimensional methods for diagnosing personality disorder. First, explicit diagnostic criteria were developed to define traditional categories of personality disorders,<sup>1</sup> and structured interviews were developed that make such diagnoses reliably.<sup>2,3</sup> Second, self-report scales for rating quantitative dimensions of personality were developed using factor analysis of traits observed in individuals with personality disorders<sup>4,6</sup> or in the general population<sup>7,9</sup>; these were shown to be reliable and to correlate highly with one another.<sup>5,10</sup> Third, self-reported dimensional measures were shown to explain much of the reliable variance in interview diagnoses of personality disorders<sup>11</sup> and to agree closely with indepen-

dent reports of spouses and other collateral informants.<sup>10</sup>

Despite this progress in assessment methods, no consensus has been reached on the number or content of the dimensions needed to describe personality disorder.<sup>5,12,13</sup> Five factors, plus or minus two, account for most variation in personality between individuals in the general population.<sup>12,13</sup> When observer-rated or self-reported behavior is factor analyzed, two factors like neuroticism (vs stability) and extraversion (vs introversion) are consistently described. There is less consistency in the content of the third factor; Eysenck and Eysenck<sup>7</sup> described tough-mindedness; Tellegen,<sup>9</sup> constraint; and Costa and McCrae,<sup>10</sup> openness to experience. In a popular five-factor model, two additional factors are conscientiousness and agreeableness, but the optimal rotation and content of alternative five-factor models remain subjects of active-

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debate.<sup>10,14</sup> Furthermore, the five-factor model does not capture some domains of personality relevant to personality disorders, such as individual autonomy, traditional moral values, and other aspects of maturity and self-actualization described in humanistic and transpersonal psychology.<sup>13</sup> Studies of natural language provide evidence of seven dimensions of personality, including two self-evaluative dimensions for good and bad self-concepts that are labeled positive and negative valence.<sup>12</sup>

Nevertheless, as the number of measured factors increases in available instruments, the cumulative proportion of shared variance is likely to increase between alternative models. In other words, what is left out of one model can be added until a comprehensive set is accumulated. However, factor analysis of individual case descriptions can only determine the minimum number of measured dimensions, and cannot decompose their underlying causal structure. Extrastatistical information is needed to specify the structure of the underlying biologic and social variability in personality traits. In other words, *descriptive data about individual behavior are not sufficient to permit any strong preference among alternative ways of summarizing personality traits.* Advocates of a particular model derived by factor analysis must ultimately base their preference on authority or tradition if they eschew external etiologic criteria.<sup>8</sup> An example of utmost importance in the assessment of personality disorder is the content of the factor called neuroticism. According to the authors of a popular five-factor inventory, neuroticism measures adjustment compared with emotional instability and identifies individuals who are prone to psychological distress, unrealistic ideas, excessive cravings or urges, and maladaptive coping responses.<sup>15</sup> It is a clinically heterogeneous composite of anxiety, hostility, depression, self-consciousness, impulsiveness, and general emotional vulnerability. High

neuroticism scores are frequent in individuals with personality disorder,<sup>11</sup> but are not diagnostically specific; many psychiatric patients without personality disorder also have high neuroticism scores and some individuals with high neuroticism scores have no psychiatric disorder.<sup>15</sup> Accordingly, the use of the five-factor model for clinical diagnosis has been criticized in part because the content of its individual factors is clinically heterogeneous.<sup>12</sup>

In addition, the content of factors defined by factor analysis of individual case descriptions is also etiologically heterogeneous. Gray<sup>16,17</sup> used observations about the effects of anti-anxiety drugs on personality to argue that the behavioral factors of neuroticism and extraversion-introversion do not correspond to their underlying biologic variation. He showed that drugs that reduce scores on measures of neuroticism, such as alcohol and benzodiazepines, also consistently reduce scores on measures of introversion, suggesting that these dimensions are not etiologically independent, but rather share biological determinants. Likewise, Cloninger<sup>18,19</sup> showed that the phenotypic structure of personality may differ from the underlying biogenetic structure because the observed behavioral variation is the result of the interaction of genetic and environmental influences. For example, extraversion and tough-mindedness are composed of elements that are genetically independent but share common environmental factors.<sup>20-22</sup> Such experimental information on etiologic factors helps to choose among an infinite set of alternative models of personality structure.

To test hypotheses about the causal structure of personality, a general psychobiological model of personality was developed and described by Cloninger<sup>18</sup> in two stages. The model was initially based on a synthesis of information from twin and family studies, studies of longitudinal development, neuropharmacologic and neurobehavioral studies

of learning in humans and other animals, as well as psychometric studies of personality in individuals and in twin pairs.<sup>18</sup> The original model described three dimensions of personality that were postulated to be genetically independent of one another. The dimensions were called novelty seeking, harm avoidance, and reward dependence, and were measured with a 100-item self-report inventory called the Tridimensional Personality Questionnaire (TPQ).<sup>23</sup> Recently the model was extended to measure seven dimensions of personality with the addition of measures of persistence, self-directedness, cooperativeness, and self-transcendence. This extension is based on a synthesis of information about social and cognitive development and descriptions of personality development in humanistic and transpersonal psychology. This seven-factor model supersedes models with fewer factors and is formulated to allow differential diagnosis of personality disorder subtypes from one another and from other psychiatric disorders.

The model was extended to be more comprehensive and to improve the diagnosis of personality disorder. We observed that the original three dimensions distinguished among subtypes of personality disorders, but did not consistently differentiate individuals with personality disorders or poor social adjustment from other well-adapted individuals with extreme personality profiles.<sup>24</sup> Furthermore, coverage of the personality domain was incomplete with a three-dimensional model: some *DSM-III-R* personality disorders such as paranoid and schizotypal personality had been neglected, and some personality factors measured in other dimensional models could not be explained by the TPQ. In a companion article<sup>25</sup> we show that the presence of an interview diagnosis of personality disorder by *DSM-III-R* criteria is consistently predicted by low scores on two personality dimensions: self-directedness and cooperativeness. Depending on these scores, the risk of

personality disorder in a clinical sample varied from 11% to 94%, so that the relationship to diagnosis is strong. In addition, the other five dimensions permit differential subtyping of all the individual *DSM-III-R* personality disorder categories.

Next, we briefly summarize the development of the model and then describe the structure and content of the factors to inform clinicians about their practical clinical use. Sample questions are provided.

## MATERIALS AND METHODS

### Development of the Psychobiological Model

Personality has been defined as "the dynamic organization within the individual of those psychophysical systems that determine his unique adjustments to his environment."<sup>26</sup> Learning has been likewise defined as "the organization of behavior as a result of individual experience."<sup>27</sup> Therefore, differences between individuals in the adaptive systems involved in the reception, processing, and storing of information about experience define personality in general. Two types of memory systems have been distinguished in primates.<sup>28-30</sup> Conscious experiences are represented as words, images, or symbols about facts and events that have explicit meanings and functional relations with one another that we can consciously retrieve, declare verbally, and act on intentionally. In contrast, unconscious, implicit, or procedural memories involve presemantic perceptual processing that encodes concrete visuospatial structural information and affective valence; such perceptual processing can operate independent of abstract conceptual, intentional, or declarative processes.<sup>31,32</sup> For example, individuals with amnesia who cannot recognize or recall prior exposure to particular pairs of words may have long-lasting affective responses and improvement of their ability to complete the word from partial letter

fragments.<sup>33-35</sup> In other words, conscious memories are concept-based whereas unconscious memories are percept-driven.

Hippocampal processing and long-term storage in association cortex appear to be essential for consolidation of explicit memories that can be intentionally retrieved; in contrast hippocampal processing is not required for retention of implicit memories that are unintentionally retrieved without any conscious recall of the original experiential events.<sup>31,32,36</sup> Lesion studies in humans and other primates show that conceptual information is processed and stored in a cortico-limbo-diencephalic system that includes the higher order sensory areas of the cortex, the entorhinal cortex, the amygdala, hippocampal formation, the medial thalamic nuclei, ventromedial prefrontal cortex, and the basal forebrain. In contrast, perceptual memories underlying unconscious habits are stored in a cortico-striatal system, which includes the sensory cortical areas, and the caudate and putamen.<sup>28,30</sup> An example of the anatomical separation of these two memory systems is that monkeys with combined amygdalo-hippocampal removal show severe impairments in conceptual memory tasks (such as visual recognition) after delays of only a minute, but they learn perceptual memory tasks (such as concurrent visual discrimination habits) as quickly as normal animals.<sup>28,37</sup>

Associative learning, such as operant conditioning of habits and affective responses, requires direct perceptual experience of the events but does not involve conscious recall or recognition of the contingencies that modify behavior.<sup>16</sup> In contrast, conceptual learning is conscious and abstractly symbolic, as is verbal learning in which symbolic communication can alter expectancies about the environment and behavior.<sup>38</sup>

Prior personality models failed to distinguish between distinct aspects of memory because they were derived by factor analysis of behavior,

not by consideration of its underlying biologic and social determinants. In this psychobiological model, four dimensions of personality involve automatic, preconceptual responses to perceptual stimuli, presumably reflecting heritable biases in information processing by the perceptual memory system. These four dimensions will be referred to as *temperament* factors, in contrast to the three factors that appear to be concept-based. The three personality factors based on differences in self-concepts will be denoted as *character* dimensions.

The temperament dimensions were defined in terms of individual differences in associative learning in response to novelty, danger or punishment, and reward. They have been described previously in detail.<sup>18</sup> One temperament factor, *novelty seeking*, is viewed as a heritable bias in the activation or initiation of behaviors such as frequent exploratory activity in response to novelty, impulsive decision making, extravagance in approach to cues of reward, and quick loss of temper and active avoidance of frustration. A second temperament factor, *harm avoidance*, is viewed as a heritable bias in the inhibition or cessation of behaviors, such as pessimistic worry in anticipation of future problems, passive avoidant behaviors such as fear of uncertainty and shyness of strangers, and rapid fatigability. The third temperament factor, *reward dependence*, is viewed as a heritable bias in the maintenance or continuation of ongoing behaviors, and is manifest as sentimentality, social attachment, and dependence on approval of others.

Differences between individuals based on these dimensions are observable in early childhood and are moderately predictive of adolescent and adult behavior.<sup>39</sup> Accordingly, these aspects of personality denote traits that are usually considered temperament factors because they are heritable, manifest early in life, and apparently involve preconceptual or unconscious biases in learning.

The structure of temperament in this model was inferred largely from genetic studies of personality in humans and neurobiological studies of the functional organization of brain networks regulating classic and operant learning responses of rodents to simple appetitive or aversive stimuli.<sup>18,40,41</sup> As is typical of complex systems that are usually hierarchical and decomposable into stable subsystems that evolved sequentially,<sup>42</sup> ethologic studies also suggested that the phylogeny of temperament began with a behavioral inhibition (harm avoidance) system in all animals, next added an activation (novelty seeking) system in more advanced animals, and then added subsystems for behavioral maintenance (reward dependence) in reptiles and later phyla.<sup>43</sup>

Normative studies using the TPQ, a self-report inventory measuring the three dimensions of temperament described here, confirmed the proposed structure of temperament with the exception that *persistence* emerged as a distinct fourth dimension.<sup>22,23,44</sup> Persistence, originally thought to be a component of reward dependence, was measured in terms of perseverance despite frustration and fatigue; it was uncorrelated with other aspects of reward dependence (sentimentality, social attachment, and dependence on approval). A large-scale twin study confirmed that each of these four temperament factors had heritability between 50% and 65% and was genetically homogeneous and independent of the others.<sup>22</sup> In contrast, personality factors derived by factor analysis, such as neuroticism and extraversion, are composites of etiologically heterogeneous items, with heritable variation in at least two dimensions besides the four TPQ temperament dimensions. In other words, there are more than five heritable dimensions of personality.<sup>22</sup>

Ethological studies also suggested that conceptual or insight-based learning evolved after the pre-

conceptual learning biases involved in temperament.<sup>43</sup> Hence we extend our theory of personality to allow for the development of concept-based character traits. Character development is defined here in terms of insight learning or reorganization of self-concepts. Insight involves the conceptual organization of perception and is defined as the apprehension of relationships. Insight learning involves the development of a new adaptive response as a result of a sudden conceptual reorganization of experience.<sup>27,45</sup> In human beings, insight learning includes verbal learning, the acquisition of learning sets or how to learn, and abstract conceptualization that influences behavioral goals and expectancies.

Human beings process or convert some sensory inputs (ie, percepts) into abstract symbols (ie, concepts). Consequently in human beings, stimulus-response characteristics depend on the conceptual significance and salience of perceived stimuli.<sup>38</sup> Hence character may be described in terms of the response biases related to different concepts of the self, ie, who and what we are, and why we are here. Our unconscious automatic responses to initiate, maintain, or stop behavior are initially determined by temperament factors, but these can be modified and conditioned as a result of changes in the significance and salience of stimuli that are determined by our concept of our identity. From this perspective, personality development is seen as an iterative epigenetic process in which heritable temperament factors initially motivate insight learning of self-concepts, which in turn modify the significance and salience of perceived stimuli to which the person responds. In this way, both temperament and character development influence one another and motivate behavior.

Three aspects of the develop-

ment of self-concepts (ie, characterological response sets) are distinguished according to the extent to which a person identifies the self as (1) an autonomous individual, (2) an integral part of humanity or society, or (3) an integral part of the unity of all things (ie, the universe, which denotes everything turned into one interdependent whole). Each aspect of self-concept corresponds to one of three character dimensions that we call (1) self-directedness, (2) cooperativeness, and (3) self-transcendence, respectively.

### Empirical Dimensions of Character

After the genetic structure of the four temperament dimensions was confirmed, other studies were carried out to identify aspects of self-reported or observer-rated personality that are not correlated with temperament as measured by the TPQ. First, in factor-analytic research on personality in 11-year-old children, a factor defined by adjustment problems was found to be largely uncorrelated with novelty seeking, harm avoidance, and reward dependence.<sup>24,39</sup> Observations were based on behavioral adjustment ratings obtained in clinical interviews of the children's teachers. The adjustment problem factor was labeled "unpopularity" because it was highly correlated with frequent peer conflicts ( $r=.75$ ), being unpopular ( $r=.70$ ), and bullying or being bullied ( $r=.64$ ). The temperament and popularity factors were uncorrelated with intelligence and academic achievement.

In studies of self-reported personality by adults, we observed that various measures of social cooperation and compassion were not well explained by the TPQ. Specifically, the temperament factors of the TPQ were largely uncorrelated with some measures of social cooperation, such as the agreeability scale of the Neuroticism-Extraversion-Openness personality inventory,<sup>46</sup> the aggression scale of the Multidimensional Per-



sonality Questionnaire (MPQ),<sup>18,47</sup> and the hostility scale of the Profile of Mood States.<sup>48</sup>

Furthermore, measures of individual self-acceptance and esteem were not well explained by the TPQ. This included the alienation scale of the MPQ, in which individuals view themselves as victims of other people and circumstances.<sup>18,47</sup> It also includes the repression factor of the Minnesota Multiphasic Psychological Inventory, in which individuals have difficulty admitting to faults about themselves.<sup>49</sup> Acceptance of individual responsibility, positive self-regard, and leadership have been found to be correlated with the ability to endorse unflattering statements about self in other work.<sup>50</sup>

Finally, absorption in the MPQ is also not well correlated with any TPQ factors or with any of the three higher order dimensions of the MPQ.<sup>18,47</sup> The absorption scale has been associated with differential responsiveness to hypnosis, meditation, biofeedback, and with increased capacity for vivid imagery.<sup>51</sup> Absorption or self-forgetful concentration has been described as a stage in insight meditation that leads to self-transcendence.<sup>52</sup> It is also described as a correlate of self-actualization, self-transcendence, and loving fascination with nature.<sup>53,54</sup>

These observations suggested that aspects of personality unmeasured by the TPQ include dimensions of character related to acceptance of the individual self, acceptance of other people, and acceptance of nature in general. Individuals with mature personalities (ie, effective adaptation and self-satisfaction) are self-reliant, cooperative, and possibly self-transcendent. In contrast, those with personality disorders have difficulty with self-acceptance, are intolerant and revengeful toward others, and may feel self-conscious and unfulfilled. This suggested the hypothesis that subtypes of personality disorder can be defined in terms of temperament variables,<sup>18</sup> whereas the presence or absence of personality dis-

order may be defined in terms of the character dimensions of self-directedness, cooperativeness, and self-transcendence.

### Description of Character

To develop explicit self-report measures of self-directedness, cooperativeness, and self-transcendence, prior descriptions of related psychological concepts were reviewed. These provided descriptions of specific component factors for each of the three proposed dimensions of character.

### Self-Directedness

Our interview studies indicate that self-directedness is the major determinant of the presence or absence of personality disorder.<sup>25</sup> Accordingly, we will consider this dimension in the most detail because of its clinical importance.

The basic concept of self-directedness refers to self-determination and "willpower," or the ability of an individual to control, regulate, and adapt behavior to fit the situation in accord with individually chosen goals and values.<sup>55</sup> Popular concepts about "willpower" can be confusing, however, because willpower or the "will" is not an entity, but a metaphorical abstract concept to describe the extent to which a person identifies the imaginal self as an integrated, purposeful whole individual, rather than a disorganized set of reactive impulses. A more neutral and informative term than willpower may be to refer to the intentional force of individuals to affirm or commit to particular goals or purposes. According to humanists, human beings differ from other animals in terms of their ability to make choices among alternative responses, to "change their mind," and to tell lies; therefore, human beings can be considered to be responsible for what they do.<sup>56</sup>

On the positive side, individuals who are mature, effective, and well-organized leaders are described as hav-

ing good self-esteem, able to admit faults and accept themselves as they are, feel that their lives have meaning and purpose, delay gratification to achieve their goals, and show initiative in overcoming challenges. On the negative side, "borderline" individuals have low self-esteem, blame others for their problems, feel uncertain of their identity or purpose, and are often reactive, dependent, and resourceless. Such low self-esteem and feelings of inferiority have been suggested to be immature or "childish" characteristics.<sup>57</sup> However, many children show positive self-esteem at an early age, particularly when their parents show consistent affection and encourage autonomy.<sup>58,59</sup>

More specifically, Rotter<sup>60</sup> described the notion of locus of control, differentiating those with an internal locus of control (who believe their success is controlled by their own efforts) from those with an external locus of control (who believe their success is controlled by factors other than themselves). Studies of this measure showed that those with internal locus of control are more responsible and resourceful problem-solvers, whereas others are more alienated and apathetic, tending to blame other people and chance circumstances for problems.<sup>61</sup> Some measures of locus of control are confounded with other aspects of temperament and mood (eg, depression, high harm avoidance, and dependence on approval and persuasion), but a factor of responsibility vs blaming appears to be distinct from other aspects of temperament and related to the more general concept of self-directedness.

Frankl<sup>62</sup> has emphasized the importance of purposefulness and meaningful goal-direction as a motivating force in mature people. He suggested that man's main concern is to fulfill meaning, rather than to gratify impulses and avoid conflicts. Such purposefulness varies widely among individuals.<sup>63</sup> Rogers<sup>64</sup> and Covey<sup>65</sup> have emphasized initiative and resourceful problem solving in effective

schoolchildren and business leaders, respectively, as an important aspect of mature character. Bandura<sup>66</sup> and Bandura and Cervone<sup>67</sup> described self-efficacy, which is related to resourcefulness and initiative in goal-directed behavior. According to some Yoga practitioners, after someone has cultivated clear goals and values for a long time, what was initially an effort becomes "second nature."<sup>68</sup> In other words, such integrated individuals expect their automatic responses to be congruent with their goals and values, and they trust themselves to act spontaneously without any feeling of suppressed conflict.

Self-esteem and the ability to accept one's limitations unapologetically without fantasies of unlimited ability and ageless youth are crucial aspects of the development of mature self-directed behavior.<sup>53,57,58,64</sup> Individuals with poor adjustment and feelings of inferiority or inadequacy are often reactive and deny, repress, or ignore their faults, wishing to be best at everything always, whereas well-adjusted children are able to recognize and admit unflattering truths about themselves.<sup>50</sup> Such positive self-esteem and ability to accept individual limitations has been found to be strongly correlated with responsibility and resourcefulness.<sup>50</sup>

In summary, self-directedness can be formulated as a developmental process with several stages or aspects. These include (1) acceptance of responsibility for one's own choices instead of blaming other people and circumstances, (2) identification of individually valued goals and purposes vs lack of goal direction, (3) development of skills and confidence in solving problems (resourcefulness vs apathy), (4) self-acceptance vs self-striving, and finally (5) congruent second nature vs personal distrust. Sample questions from the Temperament and Character Inventory (TCI) are listed in **Table 1** along with their endorsement frequency in a community sample described later. The assessment of self-directedness is crucial for diagnosis because *low self-directedness is the common characteristic of all categories of personality disorders*, as shown in our companion article.<sup>25</sup> Regardless of other personality traits or circumstances, personality disorder is likely to be present if self-directedness is low, and vice versa.

### Cooperativeness

The second higher order character factor of cooperativeness was formulated to account for individual differences in identification with and acceptance of other people. This factor

was designed to measure different aspects of character related to agreeability vs self-centered aggression and hostility. In our companion article, we found that low cooperativeness scores contribute substantially to the likelihood of concomitant personality disorder.<sup>25</sup> Particularly in individuals who are high or only moderately low in self-directedness, the probability of a diagnosis of personality disorder was increased by low cooperativeness. *All categories of personality disorder are associated with low cooperativeness.*

Cooperative individuals are described as socially tolerant, empathic, helpful, and compassionate, whereas uncooperative individuals are described as socially intolerant, disinterested in other people, unhelpful, and revengeful. Rogers<sup>64</sup> has described facilitative people who show unconditional acceptance of others, empathy with others' feelings, and willingness to help others achieve their goals without selfish domination. Such social acceptance, helpfulness, and concern for the rights of others are often correlated with one another and with positive self-esteem.<sup>69</sup> Empathy, defined as a feeling of unity or identification with other people, is said to allow improved communication and compassion for others.<sup>70</sup>

**Table 1. Sample Questions From the Temperament and Character Inventory About Aspects of Self-Directedness, With Keyed Endorsement Frequencies in the Community**

Subscale	Characteristic	Response/%
S1	Responsibility vs blaming	
	I often feel that I am the victim of circumstances.	No/63
S2	Purposefulness vs lack of goal direction	
	My attitudes are determined largely by influences outside my control.	No/68
S3	Resourcefulness vs inertia	
	My behavior is strongly guided by certain goals that I have set for my life.	Yes/68
S4	Self-acceptance vs self-striving	
	Often I feel that my life has little purpose or meaning.	No/76
S5	Congruent second nature vs incongruent habits	
	I usually look at a difficult situation as a challenge or opportunity.	Yes/72
S6	Self-acceptance vs self-striving	
	Most people seem more resourceful than I am.	No/35
S7	Congruent second nature vs incongruent habits	
	I wish I were better looking than everyone else.	No/68
S8	Congruent second nature vs incongruent habits	
	I often wish I were more powerful than everyone else.	No/67
S9	Congruent second nature vs incongruent habits	
	I think my natural responses now are usually consistent with my principles and long-term goals.	Yes/87
S10	Congruent second nature vs incongruent habits	
	Many of my habits make it hard for me to accomplish worthwhile goals.	No/66

Helpful generativity and compassion are frequently noted as signs of maturity in developmental psychology.<sup>71</sup> Such compassion involves the willingness to forgive and be kind to others regardless of their behavior, rather than to seek revenge or to enjoy their embarrassment or suffering; it involves feelings of brotherly love and the absence of hostility.<sup>53,72</sup>

Effective business leadership often involves helpfulness, ie, skill in finding mutually satisfying (“win-win”) solutions to problems, rather than looking out only for personal gain.<sup>69</sup> Religious traditions from Buddhism to Judeo-Christianity also emphasize the concept of “pure-hearted” acceptance of principles or natural laws that cannot be broken without inevitable bad consequences for the individual, society, and nature.<sup>65,73</sup> Belief in such natural principles, as opposed to immediate self-advantage or social conventions, represents an advanced level of moral or character development, as described by Kohlberg<sup>74,75</sup> and Baruk.<sup>76</sup>

In summary, cooperativeness can be formulated as a developmental process with several aspects or stages. These include (1) social acceptance vs intolerance, (2) empathy vs social disinterest, (3) helpfulness vs un-

helpfulness, (4) compassion vs revengefulness, and (5) pure-hearted principles vs self-advantage. Sample questions about cooperativeness are listed in **Table 2**. Uncooperative individuals tend to see the world and others as hostile and alien to them. In contrast, cooperative individuals feel they are synergistic components of a mutually supportive and helpful community that is motivated by compassion and reciprocal respect.

### Self-Transcendence

Most people meditate or pray daily, which is more frequent than sexual intercourse according to population surveys.<sup>77</sup> Frequent meditation or prayer is often associated with enhanced life satisfaction and personal effectiveness, particularly in older adults.<sup>78</sup> Nevertheless, self-transcendence and character traits associated with spirituality have usually been neglected in systematic research and omitted from personality inventories that purport to be comprehensive, including the five-factor model. However, much information about the observable behavior of self-transcendent individuals has been written based on the lives of mystics and saints<sup>79,80</sup> and self-actualizing individuals.<sup>53,54</sup> Also

transpersonal psychology has recently provided descriptions of the subjective experiences and changes in behavior of people who attain the state of “nirvana” or self-transcendence as a result of insight meditation techniques.<sup>81,82</sup> Self-transcendence refers generally to identification with everything conceived as essential and consequential parts of a unified whole. This involves a state of “unitive consciousness” in which everything is part of one totality. In unitive consciousness, there is no individual self because there is no meaningful distinction between self and other—the person is simply aware of being an integral part of the evolution of the cosmos. This unitive perspective may be described as acceptance, identification, or spiritual union with nature and its source.<sup>79</sup>

We found that self-transcendence was lower in psychiatric inpatients than adults in the general community, but did not differentiate most patients with personality disorders from those without such disorders.<sup>25</sup> In the clinical setting of our interview studies with psychiatric patients, self-transcendence was significantly low only in patients with many symptoms of schizoid personality disorder.<sup>25</sup> In contrast, self-directedness and cooperative-

**Table 2. Sample Questions From the Temperament and Character Inventory About Aspects of Cooperativeness With Keyed Endorsement Frequency in the Community**

Subscale	Characteristic	Response/%
C1	Social acceptance vs intolerance	
	I can usually accept other people as they are, even when they are very different from me.	Yes/89
	People involved with me have to learn how to do things my way.	No/77
C2	Empathy vs social disinterest	
	I usually try to imagine myself “in other people’s shoes,” so I can really understand them.	Yes/78
	I wish other people didn’t talk as much as they do.	No/54
C3	Helpfulness vs unhelpfulness	
	I like to help find a solution to problems so that everyone comes out ahead.	Yes/90
	It is usually foolish to promote the success of other people.	No/79
C4	Compassion vs revengefulness	
	I would rather be kind than to get revenge when someone hurts me.	Yes/71
	I enjoy getting revenge on people who hurt me.	No/71
C5	Principles vs self-advantage	
	Everyone should be treated with dignity and respect, even if they seem to be unimportant or bad.	Yes/83
	Dishonesty only causes problems if you get caught.	No/55



ness were low in all personality disorders. Self-transcendence can be particularly useful in differentiating schizoid from schizotypal patients because the latter tend to endorse questions about extrasensory perception and other aspects of self-transcendence.

The stable self-forgetfulness of self-transcendent people has been described as the same as experienced transiently by people when they are totally absorbed, intensely concentrated, and fascinated by one thing.<sup>54</sup> In such one-pointed concentration people may forget where they are and lose all sense of the passage of time.

Such absorption often leads to "transpersonal" identification with things outside the individual self. The person may identify (or feel a sense of spiritual union) with anything or everything. They may experience the feeling that they are part of or being guided by a wonderful intelligence, which is possibly the divine source of all phenomena. Ultimately, there may be loss of all distinctions between self and other by identifying with the concept of an immanent God as one-in-all.

Such transpersonal identification leads to spiritual acceptance, or the apprehension of relationships that cannot be explained by analytical reasoning or demonstrated by objective observation to others. Spirituality has been defined as our inner craving to be im-

mortal,<sup>83</sup> which leads us to identify with nature as a whole or with its source. Such arguably metaphorical concepts as extrasensory perception or reincarnation of souls can be understood as attempts to describe the experience of transpersonal identification using words, which unavoidably denote things and events. Use of language to describe self-transcendent experience is difficult at best because self-transcendent cognition is intuitive rather than analytical and deductive.<sup>83</sup>

Considered as a developmental process, self-transcendence has multiple aspects or stages. These stages can be simplified into some basic experiences and behaviors that have been described in a broad spectrum of people and cultures, not just rare mystics: (1) self-forgetful vs self-conscious experience, (2) transpersonal identification (ie, identification with nature) vs self-differentiation, and (3) spiritual acceptance vs rational materialism. Some examples of questions about these factors are listed in **Table 3**. In our clinical studies only the symptoms of schizoid personality disorder were significantly correlated with low self-transcendence, so it is *not* a common characteristic of traditional concepts of personality disorder.<sup>25</sup> Nevertheless, current *DSM-III-R* definitions of personality disorder may be too narrow because spirituality and other phenomena measured by this dimension are

important for the adjustment and personal satisfaction of many people, particularly those over 35 years of age.<sup>84</sup> Self-transcendence merits further systematic study in samples from both clinical and general populations to clarify its clinical significance.

### Empirical Testing of the Personality Model

A sample of 300 adults, 150 women and 150 men, completed the TCI, which is a 226-item, true-false questionnaire measuring seven dimensions of personality. These include a 107-item version of the TPQ, measuring the temperament dimensions of novelty seeking, harm avoidance, and reward dependence and persistence. It also includes a 119-item character inventory measuring self-directedness, cooperativeness, and self-transcendence. These 119 items were selected from 195 items obtained by generating 15 questions for each of the 13 rationally defined character factors. This included measures of the five aspects of self-directedness, five aspects of cooperativeness, and five aspects of self-transcendence described in the prior section. These measures were pretested in a sample of 212 college students, discarding questions that had extreme response frequencies (generally outside 20% to 80% endorsement) or

**Table 3. Sample Questions From the Temperament and Character Inventory About Aspects of Self-Transcendence, With Keyed Endorsement Frequency in the Community**

Subscale	Characteristic	Response/%
ST1	Self-forgetful vs self-conscious experience	
	I often become so fascinated with what I'm doing that I get lost in the moment, like I'm detached from time and place.	Yes/47
	Often when I look at an ordinary thing, something wonderful happens; I get the feeling that I am seeing it fresh for the first time.	Yes/57
ST2	Transpersonal identification vs self-isolation	
	I have had moments of great joy in which I suddenly had a clear, deep feeling of oneness with all that exists.	Yes/61
	I sometimes feel so connected to nature that everything seems to be part of one living organism.	Yes/40
ST3	Spiritual acceptance vs rational materialism	
	I love the blooming of flowers in the spring as much as seeing an old friend again.	Yes/74
	I have made real personal sacrifices to make the world a better place, like trying to prevent war, poverty, and injustice.	Yes/38
ST3	Spiritual acceptance vs rational materialism	
	I seem to have a "sixth sense" that sometimes allows me to know what is going to happen.	Yes/54
	I sometimes feel a spiritual connection to other people that I cannot explain in words.	Yes/62
	Sometimes I have felt my life being guided by a spiritual force greater than any human being.	Yes/58



were weakly correlated with the other retained items on each factor. No selection was made based on intercorrelations between factors. This yielded 13 scales that are internally consistent and face-valid measures of the constructs to be tested here.

Subjects were solicited for participation in the study as they entered a shopping mall whose customers were thought to be fairly representative of the general population of St Louis, Mo. Subjects aged

18 years or older were recruited sequentially, and were excluded only if they were in an oversampled gender-age group. The recruiters and administrators of the test were blind to the personality model measured by the TCI. The mean ( $\pm$ SD) age of the sample was  $34.1 \pm 12.9$  years (range, 18 to 91 years). The women (mean [ $\pm$ SD],  $35.5 \pm 13.7$  years; range, 18 to 91 years) were slightly older than the men (mean [ $\pm$ SD],  $32.7 \pm 11.9$  years; range, 18 to 84 years). The

sample consisted of 114 white (62 men and 52 women) and 186 non-white (88 men and 98 women) subjects.

To test for representativeness of the sample, the results of the TPQ were compared with those obtained in a national area probability sample of 1019 noninstitutionalized adults.<sup>23</sup>

Statistical analyses were carried out using version 6.03 of the SAS statistical software (SAS Institute, Cary, NC).<sup>85</sup>

**Table 4. Temperament Scales Based on the Temperament and Character Inventory**

Subscales	Temperament Scales	No. of Items	Mean $\pm$ SD	Cronbach $\alpha$
	<b>Novelty Seeking</b>	<b>40</b>	<b>19.2 <math>\pm</math> 6.0</b>	<b>.78</b>
NS1	Exploratory excitability vs rigidity	11	6.3 $\pm$ 2.3	.60
NS2	Impulsiveness vs reflection	10	3.7 $\pm$ 2.2	.62
NS3	Extravagance vs reserve	9	5.0 $\pm$ 2.3	.71
NS4	Disorderliness vs regimentation	10	4.3 $\pm$ 2.1	.54
	<b>Harm Avoidance</b>	<b>35</b>	<b>12.6 <math>\pm</math> 6.8</b>	<b>.87</b>
HA1	Anticipatory worry vs optimism	11	3.2 $\pm$ 2.4	.71
HA2	Fear of uncertainty vs confidence	7	3.6 $\pm$ 2.0	.69
HA3	Shyness vs gregariousness	8	3.3 $\pm$ 2.3	.76
HA4	Fatigability and asthenia vs vigor	9	2.5 $\pm$ 2.2	.72
	<b>Reward Dependence</b>	<b>24</b>	<b>15.5 <math>\pm</math> 4.4</b>	<b>.76</b>
RD1	Sentimentality vs insensitivity	10	7.3 $\pm$ 2.1	.62
RD3	Attachment vs detachment	8	4.7 $\pm$ 2.3	.72
RD4	Dependence vs independence	6	3.5 $\pm$ 1.6	.57
	<b>Persistence</b>			
RD2	Persistence vs irresoluteness	8	5.6 $\pm$ 1.9	.65

**Table 5. Character Scales Based on the Temperament and Character Inventory**

Subscales	Character Scales	No. of Items	Mean $\pm$ SD	Cronbach $\alpha$
	<b>Self-Directedness</b>	<b>44</b>	<b>30.7 <math>\pm</math> 7.5</b>	<b>.86</b>
SD1	Responsibility vs blaming	8	5.8 $\pm$ 2.0	.70
SD2	Purposeful vs goal-undirected	8	5.5 $\pm$ 1.8	.58
SD3	Resourcefulness vs apathy	5	4.0 $\pm$ 1.2	.57
SD4	Self-acceptance vs self-striving	11	6.4 $\pm$ 2.8	.75
SD5	Congruent second nature	12	9.0 $\pm$ 2.5	.75
	<b>Cooperativeness</b>	<b>42</b>	<b>32.3 <math>\pm</math> 7.2</b>	<b>.89</b>
C1	Social acceptance vs intolerance	8	6.7 $\pm$ 1.5	.64
C2	Empathy vs social disinterest	7	5.3 $\pm$ 1.4	.47
C3	Helpfulness vs unhelpfulness	8	6.3 $\pm$ 1.6	.63
C4	Compassion vs revengefulness	10	7.6 $\pm$ 2.8	.86
C5	Pure-hearted vs self-serving	9	6.5 $\pm$ 2.0	.65
	<b>Self-Transcendence</b>	<b>33</b>	<b>19.2 <math>\pm</math> 6.3</b>	<b>.84</b>
ST1	Self-forgetful vs self-conscious	11	5.9 $\pm$ 2.7	.73
ST2	Transpersonal identification	9	4.6 $\pm$ 2.4	.72
ST3	Spiritual acceptance vs materialism	13	8.7 $\pm$ 2.9	.74

**Table 6. Correlations Among Character Subscales\***

Subscale	Self-Directedness					Cooperativeness					Self-Transcendence	
	SD1	SD2	SD3	SD4	SD5	C1	C2	C3	C4	C5	ST1	ST2
SD1	...	...	...	...	...	...	...	...	...	...	...	...
SD2	<b>.51</b>	...	...	...	...	...	...	...	...	...	...	...
SD3	<b>.57</b>	<b>.46</b>	...	...	...	...	...	...	...	...	...	...
SD4	.33	.30	.30	...	...	...	...	...	...	...	...	...
SD5	.38	<b>.43</b>	<b>.44</b>	.33	...	...	...	...	...	...	...	...
C1	.32	.35	.34	.20	.32	...	...	...	...	...	...	...
C2	.35	.38	.27	.28	.26	<b>.53</b>	...	...	...	...	...	...
C3	<b>.43</b>	<b>.46</b>	<b>.41</b>	.29	.34	<b>.48</b>	<b>.50</b>	...	...	...	...	...
C4	.26	.26	.29	.33	.24	<b>.50</b>	<b>.48</b>	<b>.48</b>	...	...	...	...
C5	.32	.34	.34	.38	.37	.37	.39	<b>.54</b>	<b>.50</b>	...	...	...
ST1	-.23	-.11	-.17	-.20	-.15	-.04	-.02	-.18	.05	-.16	...	...
ST2	-.16	-.02	-.07	-.10	-.10	.03	.14	-.11	.22	-.08	<b>.52</b>	...
ST3	.05	.10	.08	.03	.15	.20	.27	.15	.33	.26	<b>.45</b>	.31

\*Correlations above .40 are indicated in bold. S1 indicates responsibility vs blaming; S2, purposefulness vs lack of goal direction; S3, resourcefulness; S4, self-acceptance vs self-striving; S5, congruent second nature; C1, social acceptance vs social intolerance; C2, empathy vs social disinterest; C3, helpfulness vs unhelpfulness; C4, compassion vs revengefulness; C5, pure-hearted principles vs self advantage; ST1, self-forgetful vs self-conscious experience; ST2, transpersonal identification vs self-differentiation; and ST3, spiritual acceptance vs rational materialism.

**RESULTS**

**Variability of Personality Traits**

The means, SDs, and internal consistency (Cronbach  $\alpha$ ) for each scale and subscale are shown in **Tables 4** and **5** for the temperament and character scales, respectively. The results for the temperament scales were similar to those obtained in a national area probability sample,<sup>23</sup> suggesting that the sample was representative of the general adult population. All the scales showed substantial variability among individuals. The internal consistency of the composite scales was high, ranging from .76 to .87 for the temperament scales and .84 to .89 for the character scales.

**Structure of Character Scales**

The correlations among the 13 character subscales are summarized in **Table 6**. Principal component analysis identified three factors with eigenvalues greater than 1.0. These accounted for 35%, 16%, and 8% of the variance (59% cumulatively). The standardized factor loadings following Pro-

max rotation (that is, allowing for nonindependence of factors) are shown in **Table 7**. The highest loadings of all the cooperativeness scales and self-acceptance are on factor 1. In other words, the ability to accept limitations about oneself is associated with the ability to tolerate and accept limitations in other people as well. The highest loadings of all the self-directedness subscales except self-acceptance are on factor 2. The highest loadings of all the self-transcendence scales are on factor 3. The variances explained by each factor after rotation were 30%, 27%, and 15%, respectively. Interfactor correlations were .52 for factors 1 and 2, -.16 for factors 2 and 3, and .06 for factors 1 and 3. The derived three-factor solution for the 13 character scales corresponds closely with the rationally defined dimensions of self-directedness, cooperativeness, and self-transcendence.

**Structure of Temperament and Character**

The correlations among the four dimensions of temperament and

three dimensions of character are summarized in **Table 8**. The only correlations above .40 relate harm avoidance with self-directedness (-.47) and cooperativeness with reward dependence (.54) and self-directedness (.57).

Principal component analysis identified seven factors with eigenvalues greater than 1. In the varimax solution the variances explained by each factor were 14.2%, 12.0%, 10.1%, 9.0%, 7.6%, 6.0%, and 5.7%, accounting for 65.0% of the total variance. The standardized factor loadings following Promax rotation are shown in **Table 9**. Ignoring correlations with other factors, the variances explained by each rotated factor ranged from 4.4% to 2.0%, which is 17.7% to 8.0% of the total variance in the 25 factors. The correlations among the seven empirically derived factors corresponded closely to those summarized in Table 8 for the rationally defined factors.

The persistence factor appears to be a fairly distinct seventh dimension of personality, but it has significant relations to other aspects of both temperament and character. It

**Table 7. Factor Structure of Three Higher Order Character Dimensions (Promax Rotation)\***

Character Subscale	Factor 1	Factor 2	Factor 3
C1	<b>.69</b>	.06	.05
C2	<b>.72</b>	.04	.13
C3	<b>.70</b>	.14	-.15
C4	<b>.84</b>	-.12	.18
C5	<b>.75</b>	.02	-.13
S1	.02	<b>.77</b>	-.07
S2	.04	<b>.77</b>	.10
S3	-.03	<b>.83</b>	.03
S4	<b>.37</b>	.23	-.20
S5	.04	<b>.69</b>	.03
ST1	-.17	-.03	<b>.79</b>
ST2	-.01	-.01	<b>.86</b>
ST3	.29	.07	<b>.67</b>

\*The highest loadings are indicated in bold. S1 indicates responsibility vs blaming; S2, purposefulness vs lack of goal direction; S3, resourcefulness; S4, self-acceptance vs self-striving; S5, congruent second nature; C1, social acceptance vs social intolerance; C2, empathy vs social disinterest; C3, helpfulness vs unhelpfulness; C4, compassion vs revengefulness; C5, pure-hearted principles vs self advantage; ST1, self-forgetful vs self-conscious experience; ST2, transpersonal identification vs self-differentiation; and ST3, spiritual acceptance vs rational materialism.

**Table 8. Correlations Among Temperament and Character Scales Based on the Temperament and Character Inventory\***

	NS	HA	P	RD	SD	C
NS	...	...	...	...	...	...
HA	-.08	...	...	...	...	...
P	-.14	-.27	...	...	...	...
RD	.08	-.16	.03	...	...	...
SD	-.26	<b>-.47</b>	.28	.21	...	...
C	-.10	-.28	.18	<b>.54</b>	<b>.57</b>	...
ST	.20	-.08	.11	.28	-.10	.15

\*Correlations above .40 are indicated in bold. NS indicates novelty seeking; HA, harm avoidance; P, persistence; RD, reward dependence; SD, self-directedness; C, cooperativeness; and ST, self-transcendence.

has positive correlations greater than .20 with three self-directedness components: resourcefulness (.36), congruent second nature (.28), and purposefulness (.24). However, it is not strongly correlated with other aspects of self-directedness such as responsibility (.14) and self-acceptance (.08). Persistence has negative correlations less than -.20 with three temperament factors: fatigability (-.29), impulsiveness (-.21), and disorderliness (-.21). In this sample, it was not significantly correlated with reward-dependence measures such as sentimentality (.09), attachment (.03), or dependence (-.07). We tenta-

tively consider persistence to be a temperament factor because of its prominent development in early childhood.

#### Effects of Demographic Variables on Character

The effects of gender, ethnicity, and age were examined on the character scales. Women had higher scores on total cooperativeness (81% vs 72% as proportion of total items;  $P < .01$ ) and each of its components. Women also had higher scores in spiritual acceptance than men (71% vs 64%;  $P < .01$ ).

There were no gender differences in self-directedness or other as-

pects of self-transcendence. The effects of ethnicity on character were small, accounting for less than 3% of variance in any scale.

Age was strongly correlated with self-directedness ( $r = .30$ ;  $P < .0001$ ) and cooperativeness ( $r = .35$ ;  $P < .0001$ ), but not self-transcendence ( $r = .01$ ; differences were not significant). The effect of age on each character scale is depicted in **Figures 1** through **3**. The sample was divided into quintiles according to age. This yielded groups with ages between 18 and 21 years ( $n = 58$ ; mean age, 19 years), 22 and 29 years ( $n = 64$ ; mean age, 26 years), 30 and 35 years ( $n = 62$ ; mean age, 33 years), 36 and 43 years ( $n = 61$ ; mean age, 40 years), and 44 and 91 years ( $n = 55$ ; mean age, 55 years). For self-directedness (Figure 1), each component increased for birth cohorts from age 18 to 43 years. Self-congruence was still higher in the oldest cohort, whereas the other components remained at about the same level in cohorts aged 40 years and older.

For cooperativeness (Figure 2), each component increased for the birth cohorts from ages 18 to 43 years, much like self-directedness except that the greatest increase was between the cohorts from 18 to 29 years. Compassion and principles showed some further increase in the oldest cohorts.

For self-transcendence (Figure 3), self-forgetfulness and transpersonal identification were lowest in the cohort between ages 30 and 35 years. Spiritual acceptance increased most sharply in the cohort aged about 40 years compared with the next younger cohort.

#### COMMENT

Our empirical results and review of prior literature support a tridimensional model of character structure. These three factors of self-directedness, cooperativeness, and self-transcendence can be understood in terms of the epigenetic



**Table 9. Factor Structure of the Subscales of the Temperament and Character Inventory (Rotation by Promax)\***

Subscale	F1	F2	F3	F4	F5	F6	F7
NS1	.23	-.19	-.18	.13	<b>.37</b>	.33	.27
NS2	.15	-.32	-.32	-.01	<b>.56</b>	-.26	-.21
NS3	.04	.26	.25	.09	<b>.83</b>	.15	-.18
NS4	-.19	-.16	-.09	-.05	<b>.66</b>	-.05	.05
HA1	-.05	-.23	<b>.75</b>	-.01	.07	-.02	.07
HA2	.09	.00	<b>.81</b>	.02	-.16	.02	.04
HA3	.19	-.17	<b>.64</b>	-.26	.07	-.39	.08
HA4	-.24	-.05	<b>.48</b>	.15	.18	.06	-.37
RD1	<b>.63</b>	-.23	.15	.34	-.05	<b>.11</b>	.10
RD2	-.00	.16	.08	.09	-.13	-.10	<b>.85</b>
RD3	.07	-.00	-.07	.09	.02	<b>.82</b>	-.11
RD4	<b>.62</b>	-.16	.07	-.26	-.15	<b>.40</b>	-.24
C1	<b>.70</b>	.07	-.05	-.04	.07	-.06	.24
C2	<b>.60</b>	.15	-.14	.10	.07	.10	.00
C3	<b>.60</b>	.33	.04	-.18	.13	.11	-.01
C4	<b>.73</b>	.12	-.06	.27	-.12	-.18	-.04
C5	<b>.51</b>	.45	.19	.04	-.01	-.05	-.03
S1	.07	<b>.64</b>	.21	-.18	.14	.07	.02
S2	.00	.53	-.11	-.04	-.09	.37	.10
S3	.07	<b>.56</b>	.21	-.08	-.05	-.00	.34
S4	.13	<b>.64</b>	-.12	.10	-.08	-.22	-.27
S5	-.01	<b>.68</b>	-.01	.04	-.06	-.05	.27
ST1	-.10	-.05	.13	<b>.73</b>	.24	-.02	.14
ST2	.01	-.18	-.18	<b>.79</b>	-.14	.09	.00
ST3	.22	.17	.00	<b>.70</b>	.02	.03	-.07

\*Highest loadings are given in bold; postulated factors, in italics. NS1 indicates exploratory excitability; NS2, impulsiveness; NS3, extravagance; NS4, disorderliness; HA1, worry/pessimism; HA2, fear of uncertainty; HA3, shyness with strangers; HA4, fatigability and asthenia; RD1, sentimentality vs insensitivity; RD2, persistence; RD3, attachment vs detachment; RD4, dependence vs independence; S1, responsibility vs blaming; S2, purposefulness; S3, resourcefulness; S4, self-acceptance vs self-striving; S5, congruent second nature; C1, social acceptance vs social intolerance; C2, empathy; C3, helpfulness; C4, compassion vs revengefulness; C5, pure-hearted principles; ST1, self-forgetful vs self-conscious experience; ST2, transpersonal identification vs self-differentiation; and ST3, spiritual acceptance vs rational materialism.

development of increasingly inclusive concepts of the self: identification as an autonomous individual (self-directedness), as an integral part of human society (cooperativeness), and as an integral part of the universe (self-transcendence). This supports the hypothesis that *personality is a complex hierarchic system that can be naturally decomposed into distinct psychobiological dimensions of temperament and character.*

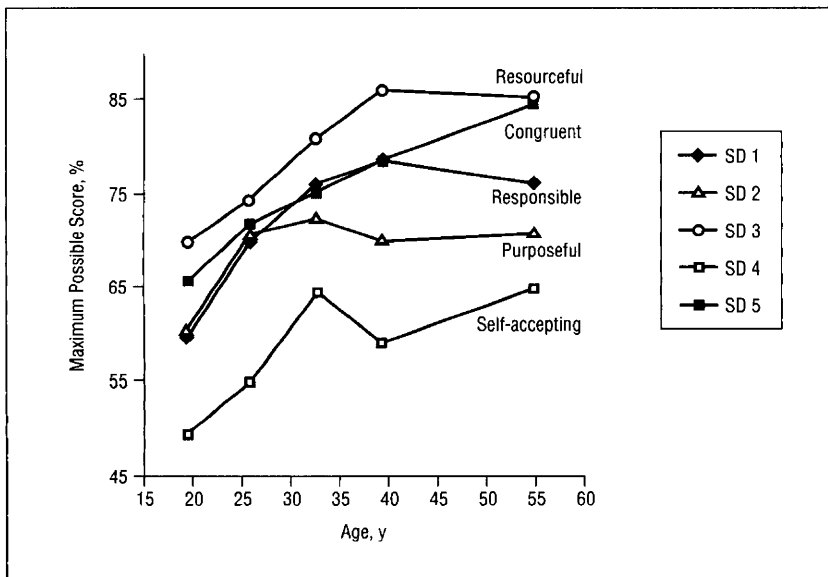
### Alternative Models

We do not assume that the psychobiological model presented herein provides the only way to derive a description and understanding of character traits. In fact, psychodynamic theories suggest that

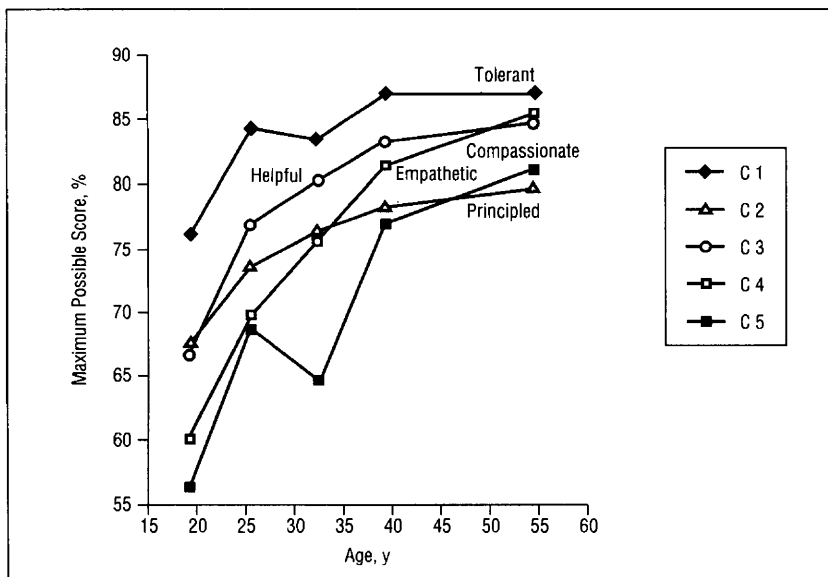
character traits arise as stable residues of normal defense mechanisms, such as anticipation, altruism, and sublimation. Anticipation, which enables people to work for long-term goals, can lead to some self-directed behaviors like purposefulness. Likewise altruism can lead to cooperative traits, such as helpfulness and compassion. Despite such parallels in content, psychodynamic concepts of character are categorical constructs that emphasize the uniqueness of each individual. In contrast, we emphasize the consistent quantitative structure of the differences among individuals. This dimensional structure facilitates the testing of quantitative, falsifiable hypotheses relating psychological variation to its biological and social causes.

### Development

The finding of three distinct character dimensions has strong implications for models of longitudinal development. The findings of Erikson<sup>71,86</sup> and others are often interpreted to mean that there is a fixed stepwise sequence in which development of one factor necessarily precedes the development of the next. Bowlby<sup>87</sup> has suggested an alternative epigenetic model in which personality development of each individual can proceed along any one of a set of potential paths, depending on initial temperament and initial experience. According to this multiple-path epigenetic model, each subsequent step in development is a motivated effort to adapt to current circumstances, given



**Figure 1.** Relationship of age to self-directedness (SD) subscale scores in quintiles of 300 individuals from the general community.



**Figure 2.** Relationship of age to cooperativeness (C) subscale scores in quintiles of 300 individuals from the general community.

current personality. However, if there really were a fixed developmental sequence for character traits, then maturity could be adequately described on a single scale. The observation of three character dimensions suggests that there are multiple aspects of character development, each having unique antecedents. Nevertheless, the joint staging and interaction of these multiple dimensions has received little study because of the absence of comprehensive quan-

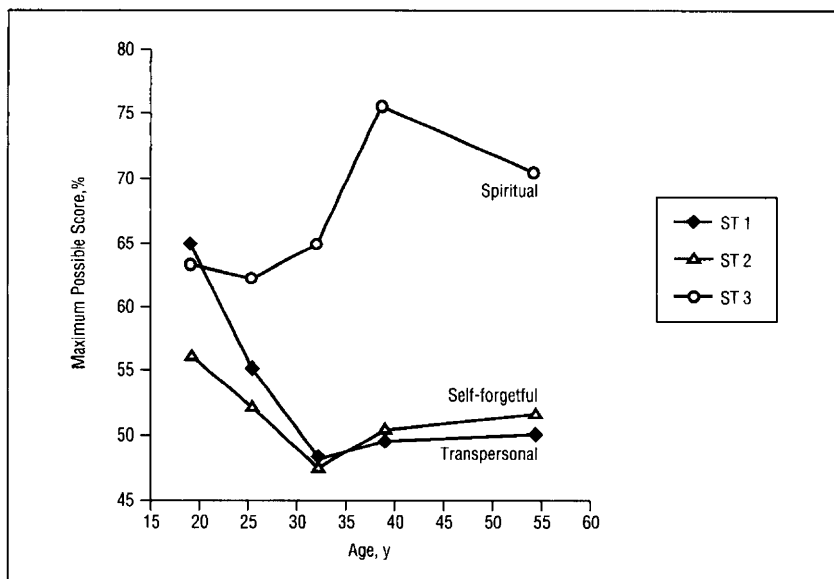
titative measures of the multiple factors of temperament and character. Some sequences in character development may be more frequent or optimal than others, and the correlations among the character and temperament dimensions suggest some reciprocal interaction. Our findings about longitudinal development should be considered illustrative and tentative because this is a cross-sectional study of people of varying age. In this study we cannot dis-

tinguish developmental effects from cohort effects. Nevertheless, our findings suggest the importance of age and/or cohort effects in the unfolding of character and encourage future longitudinal research.

## DIAGNOSIS

These character scales may help to clarify current concepts of what a personality disorder is in contrast to more optimal adaptation. That is, individuals with extreme variants of temperament may be well-adapted, depending on their character and circumstances. However, anyone who is low in self-directedness and cooperativeness is likely to have a personality disorder, and vice versa. The importance of self-transcendence in character development is arguable in early life, but it becomes a major concern as we face death and misfortune. The availability of this set of personality measures should facilitate evaluation and classification of personality and its disorders, as well as studies of inheritance, information processing, and development (cognitive, personal, social, moral, and spiritual).

The three dimensions of character are distinct from previously described measures of temperament. Overall, our results support a seven-dimensional model of personality; four temperament factors and three character factors. The temperament factors appear to be more directly tied to neurobiological and genetic determinants of behavior, in contrast to the epigenetic development of self-concepts in character. Furthermore, the temperament dimensions appear to be more closely related to susceptibility to different neurotic syndromes, such as anxiety and somatoform disorders, rather than to the presence or absence of personality disorders or psychoses.<sup>40</sup> Eating disorders and substance abuse disorders appear to involve differences in both temperament and character development, but this requires further systematic study.<sup>19</sup>



**Figure 3.** Relationship of age to self-transcendence (ST) subscale scores in quintiles of 300 individuals from the general community.

### INHERITANCE

It is likely that genetic factors are as important in character development as they are for temperament. In fact, the heritability of character may explain why some individuals maintain inflexible maladaptive behavior patterns whereas others with similar temperaments do not. Conceptual learning, such as self-aware imitation, is an evolutionary development of mammals.<sup>43</sup> Individual differences in human twins for the MPQ primary factors of alienation, aggression, and absorption are influenced by genetic factors as much as other aspects of personality.<sup>88</sup> However, if cultural perspectives<sup>89,90</sup> and social learning<sup>59,64,66,91</sup> are as important in the epigenesis of self-concepts as has been suggested, then environmental effects associated with particular families and cultures should be more important in character development than has been observed for temperament. Comparisons of the inheritance of temperament and character should be useful for testing sociocultural learning hypotheses. Likewise, the effect of different forms of psychotherapy on character development should be a controlled way of assessing

the influence of environmental change on personality.

### MEMORY SYSTEMS

The most fundamental distinction between character and temperament here appears to be that character development is a concept-based process whereas temperament involves differences between individuals in perceptual processes and habit formation. This corresponds to the distinction of conceptual memory (regulated by the cortico-limbodiencephalic memory system) and perceptual memory (regulated by the cortico-striatal memory system).

### TREATMENT

Different pharmacological interventions have been proposed in the modification of temperament.<sup>40,92</sup> For example, lithium therapy reduces frequency of temper outbursts and increases reflectiveness.<sup>93</sup> However, lithium therapy does not change self-concepts or increase self-directedness, and compliance outside of authoritarian controlled settings is poor.<sup>93</sup> In contrast, different psychological treatments may be relevant for the development of different aspects of character. For example, particular cognitive-behavioral

techniques may facilitate learning self-directed behavior.<sup>55</sup> Some other methods of psychological treatment, such as psychoanalysis, transactional analysis, and reality therapy, are also directed primarily at development of self-directed behavior.<sup>81</sup> In contrast, other experiential techniques are designed to facilitate acceptance of others or development of cooperative behavior; these include Rogerian counseling,<sup>64</sup> logotherapy,<sup>62</sup> and interpersonal psychosynthesis.<sup>94</sup> Finally, attainment of self-transcendence is a goal of Jungian analysis<sup>84</sup> and insight meditation as practiced in Mahayana Buddhism, Vedanta Hinduism, Taoism, and mystical forms of other religions.<sup>52</sup> Much research is needed to explore the interactions of specific drugs and psychosocial interventions in treatment of personality and its disorders.

Finally, assuming that character and temperament involve concept-based and percept-driven memory, stable personality change probably requires that conceptual insights modify habits by disciplined practice, perhaps facilitated by combined pharmacotherapy. In other words, personality change has both rational and emotional components.<sup>95</sup> Conscious intention is transient, effortful, and inefficient, whereas perceptual conditioning is more long-lasting, automatic, and efficient.<sup>34,96,97</sup> A combination of cognitive-behavioral treatments and, perhaps only initially, medications to alter individual differences in temperament should be most effective.

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## REFERENCES

- American Psychiatric Association, Committee on Nomenclature and Statistics. *Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition*. Washington, DC: American Psychiatric Association; 1987.
- Pfohl B, Blum N, Zimmerman M, Stangl D. *Structured Interview for DSM-III-R Personality Disorders*. Iowa City, Iowa: University of Iowa; 1989.
- Loranger AW, Lenzenweger MF, Gartner AF, Susman VL, Herzeg J, Zammit GK, Gartner JD, Abrams RC, Young RC. Trait-state artifacts and the diagnosis of personality disorders. *Arch Gen Psychiatry*. 1991;48:720-728.
- Livesley WJ. A systematic approach to the delineation of personality disorders. *Am J Psychiatry*. 1987;144:772-777.
- Schroeder ML, Wormworth JA, Livesley WJ. Dimensions of personality disorder and their relationships to the big five dimensions of personality. *Psychol Assess*. 1992;4:47-53.
- Clark LA. Toward a consensual set of symptom clusters for assessment of personality disorder. *Adv Pers Assess*. 1990;9:243-266.
- Eysenck HJ, Eysenck SB. *Manual of the EPQ (Eysenck Personality Questionnaire)*. San Diego, Calif: Educational and Industrial Testing Service; 1976.
- Costa PT Jr, McCrae RR. Four ways five factors are basic. *Pers Individual Diff*. 1992;13:653-665.
- Tellegen A. Structures of mood and personality and their relevance to assessing anxiety, with an emphasis on self-report. In: Tuma AH, Maser J, eds. *Anxiety and the Anxiety Disorders*. Hillsdale, NJ: Lawrence Erlbaum Assoc; 1985:681-706.
- Costa PT Jr, McCrae RR. Normal personality assessment in clinical practice: the NEO personality inventory. *Psychol Assess*. 1992;4:5-13.
- Trull T. DSM-III-R personality disorders and the five factor model of personality. *J Abnorm Psychol*. 1992;101:553-560.
- Ben-Porath YS, Waller NG. Normal personality inventories in clinical assessment: general requirements and the potential for using the NEO personality inventory. *Psychol Assess*. 1992;4:14-19.
- John OP. The search for basic dimensions of personality: review and critique. *Adv Psychol Assess*. 1990;7:1-37.
- Zuckerman M, Kuhlman DM, Thornquist M, Kiers H. Five (or three) robust questionnaire scale factors of personality without culture. *Pers Individual Diff*. 1991;12:929-941.
- Costa PT Jr, McCrae RR. *The NEO Personality Inventory Manual*. Odessa, Fla: Psychological Assessment Resources; 1985.
- Gray JA. *The Neuropsychology of Anxiety*. New York, NY: Oxford University Press; 1982.
- Gray JA. Anxiety, personality and the brain. In: Gale A, Edwards JA, eds. *Physiological Correlates of Human Behavior, III: Individual Differences and Psychopathology*. Orlando, Fla: Academic Press Inc; 1983:31-43.
- Cloninger CR. A systematic method for clinical description and classification of personality variants. *Arch Gen Psychiatry*. 1987;44:573-588.
- Cloninger CR. Neurogenetic adaptive mechanisms in alcoholism. *Science*. 1987;236:410-416.
- Eaves L, Eysenck HJ. The nature of extraversion: a genetical analysis. *J Pers Soc Psychol*. 1975;32:102-112.
- Heath AC, Eaves LJ, Martin NG. The genetic structure of personality, III: multivariate genetic item analysis of the EPQ scales. *Pers Individual Diff*. 1989;10:877-888.
- Heath AC, Cloninger CR, Martin NG. Testing a model for the genetic structure of personality. *J Pers Soc Psychol*. In press.
- Cloninger CR, Svrakic DM, Przybeck TR. The Tridimensional Personality Questionnaire: US normative data. *Psychol Rep*. 1991;69:1047-1057.
- Cloninger CR, Sigvardsson S, Bohman M. Childhood personality predicts alcohol abuse in young adults. *Alcoholism*. 1988;12:494-505.
- Svrakic DM, Whitehead C, Przybeck TR, Cloninger CR. Differential diagnosis of personality disorders by the seven-factor model of temperament and character. *Arch Gen Psychiatry*. 1993;50:991-999.
- Allport GW. *Personality: A Psychological Interpretation*. New York, NY: Holt Rinehart & Winston; 1937.
- Thorpe WH. *Learning and Instinct in Animals*. Cambridge, Mass: Harvard University Press; 1956.
- Bachevalier J. Ontogenetic development of habit and memory formation in primates. *Ann N Y Acad Sci*. 1990;608:457-477.
- Bachevalier J, Brickson M, Hagger C, Mishkin M. Age and sex differences in the effects of selective temporal lobe lesion on the formation of visual discrimination habits in rhesus monkeys. *Behav Neurosci*. 1990;104:885-899.
- Phillips RR, Malamut BL, Bachevalier J, Mishkin M. Dissociation of the effects of inferior temporal and limbic lesions on object discrimination learning with 24 hour intertrial intervals. *Behav Brain Res*. 1988;27:99-107.
- Squire LR, Zola-Morgan S. The medial temporal lobe memory system. *Science*. 1991;253:1380-1386.
- Graf P, Schacter DL. Implicit and explicit memory for new association in normal and amnesic subjects. *J Exp Psychol Learn Mem Cogn*. 1985;11:501-518.
- Parkin AJ, Reid TK, Russo R. On the differential nature of implicit and explicit memory. *Mem Cogn*. 1990;18:507-514.
- Hashtroudi S, Ferguson SA, Rappold VA, Chrosniak LD. Data-driven and conceptually driven processes in partial word identification and recognition. *J Exp Psychol*. 1988;14:749-757.
- Schacter DL, Rapsack SZ, Rubens AB, Tharan M, Laguna J. Priming effects in a letter by letter reader depend upon access to the word form system. *Neuropsychologia*. 1990;28:1079-1094.
- Zola-Morgan S, Squire LR, Amaral DG. Human amnesia and the medial temporal region: enduring memory impairment following a bilateral lesion limited to field CA1 of the hippocampus. *J Neurosci*. 1986;6:2950-2960.
- Malamut BL, Saunders RC, Mishkin M. Monkeys with combined amygdalo-hippocampal lesions succeed in object discrimination learning despite 24-hour intertrial intervals. *Behav Neurosci*. 1984;98:759-769.
- Martin I. Human classical conditioning. In: Gale A, Edwards JA, eds. *Physiological Correlates of Human Behavior, II: Attention and Performance*. Orlando, Fla: Academic Press Inc; 1983:129-148.
- Sigvardsson S, Bohman M, Cloninger CR. Structure and stability of childhood personality: prediction of later social adjustment. *J Child Psychol Psychiatry*. 1987;28:929-946.
- Cloninger CR. A unified biosocial theory of personality and its role in the development of anxiety states. *Psychiatr Dev*. 1986;3:167-226.
- Cloninger CR. Brain networks underlying personality development. In: Carroll BJ, Barrett JE, eds. *Psychopathology and the Brain*. New York, NY: Raven Press; 1991:183-208.
- Simon HA. The architecture of complexity. *Proc Am Philos Soc*. 1962;106:467-482.
- Cloninger CR, Gilligan SB. Neurogenetic mechanisms of learning: a phylogenetic perspective. *J Psychiatr Res*. 1987;21:457-472.
- Nixon SJ, Parsons OA. Cloninger's tridimensional theory of personality: construct validity in a sample of college students. *Pers Individual Diff*. 1989;10:1261-1267.
- Koehler W, Winter E, trans. *The Mentality of Apes*. London, England: Routledge & Kegan Paul; 1927.
- Costa PT Jr, McCrae RR. The NEO personality inventory. In: Briggs SR, Cheek J, eds. *Personality Measures*. Greenwich, Conn: JAI Press. In press.
- Waller NG, Lilienfeld SO, Tellegen A, Lykken DT. The Tridimensional Personality Questionnaire: structural validity and comparison with the Multidimensional Personality Questionnaire. *Multivariate Behav Res*. 1991;26:1-23.
- Svrakic DM, Przybeck TR, Cloninger CR. Mood states and personality traits. *J Affect Dis*. 1992;24:217-220.
- Wetzel RD, Knesevich MA, Brown SL, Wolff HA, Horn CJ, Cloninger CR. Correlates of Tridimensional Personality Questionnaire Scales with selected Minnesota Multiphasic Personality Inventory Scales. *Psychol Rep*. In press.

50. Taylor C, Combs AW. Self-acceptance and adjustment. *J Consult Psychol.* 1953;16:89-91.
51. Pekala RJ, Wenger CF, Levine RL. Individual differences in phenomenological experience: states of consciousness as a function of absorption. *J Pers Soc Psychol.* 1985;48:125-132.
52. Goleman D. *The Meditative Mind: The Varieties of Meditative Experience.* Los Angeles, Calif: JP Tarcher Inc; 1988.
53. Maslow AH. *Motivation and Personality.* 2nd ed. New York, NY: Harper & Row Publishers Inc; 1970.
54. Maslow AH. *The Farther Reaches of Human Nature.* New York, NY: The Viking Press; 1971.
55. Watson DL, Tharp RG. *Self-Directed Behavior: Self-Modification for Personal Adjustment.* 5th ed. Pacific Grove, Calif: Brooks/Cole Publishing; 1989.
56. Leach ER. Humanism. In: Gregory RL, ed. *Oxford Companion to the Mind.* Oxford, England: Oxford University Press; 1987:317-319.
57. Adler A. Individual psychology. In: Murchison C, ed. *Psychologies of 1930.* Worcester, Mass: Clark University Press; 1930.
58. Coopersmith S. *The Antecedents of Self-Esteem.* San Francisco, Calif: WH Freeman; 1967.
59. Parker G. The parental bonding instrument: psychometric properties reviewed. *Psychiatr Dev.* 1989;7:317-335.
60. Rotter JB. Generalized expectancies for internal versus external locus of control of reinforcement. *Psychol Monogr Gen Appl.* 1966; 80(Whole No. 609).
61. Lefcourt HM. Recent developments in the study of locus of control. *Prog Exp Pers Res.* 1972; 6:1-39.
62. Frankl VE. *Man's Search for Meaning: An Introduction to Logotherapy.* 3rd ed. New York, NY: Simon & Schuster Inc; 1984.
63. Crumbaugh JC. Cross-validation of purpose-in-life test based on Frankl's concepts. *J Individual Psychol.* 1968;24:74-81.
64. Rogers CR; Kirschenbaum H, Henderson VL, eds. *The Carl Rogers Reader.* Boston, Mass: Houghton Mifflin Co; 1989.
65. Covey SR. *The Seven Habits of Highly Effective People: Restoring the Character Ethic.* New York, NY: Simon & Schuster Inc; 1989.
66. Bandura A. Self-efficacy mechanisms in human agency. *Am Psychol.* 1982;37:122-147.
67. Bandura A, Cervone D. Self-evaluative and self-efficacy mechanisms governing the motivational effects of goal systems. *J Pers Social Psychol.* 1983;45:1017-1028.
68. Yuasa Y; Nagatomo S, Kasulis TP, trans. Editor's introduction. In: Kasulis TP, ed. *The Body: Toward an Eastern Mind-Body Theory.* Albany, NY: SUNY Press; 1987:1-15.
69. Berger EM. The relation between expressed acceptance of self and expressed acceptance of others. *J Abnorm Social Psychol.* 1952;47:778-782.
70. Combs AW, Snygg D. *Individual Behavior: A Perceptual Approach to Behavior.* New York, NY: Harper & Row Publishers Inc; 1959.
71. Erikson E. *Childhood and Society.* 2nd ed. New York, NY: Norton Publishing; 1963.
72. Adler A. *Social Interest.* New York, NY: GP Putnam's Sons; 1939.
73. Huxley A. *The Perennial Philosophy.* London, England: Chatto & Windus; 1946.
74. Kohlberg L. The development of children's orientations toward a moral order, I: sequence in the development of moral thought. *Vita Humana.* 1963;6:11-33.
75. Kohlberg L. The cognitive-developmental approach to socialization. In: Goslin DA, ed. *Handbook of Socialization Theory and Research.* Chicago, Ill: Rand McNally; 1969.
76. Baruk H. *Patients Are People Like Us: The Experiences of Half a Century in Neuropsychiatry.* New York, NY: William Morrow & Co; 1978.
77. Princeton Religion Research Center. *Religion in America.* Princeton, NJ: The Gallup Poll; 1982.
78. Koenig HG, Kvale JN, Ferrel C. Religion and well-being in later life. *Gerontologist.* 1988;28:18-28.
79. Underhill E. *Mysticism: A Study in the Nature and Development of Man's Spiritual Consciousness.* London, England: Methuen & Co Ltd; 1911.
80. White J. *What Is Enlightenment? Exploring the Goal of the Spiritual Path.* Los Angeles, Calif: JP Tarcher; 1985.
81. Wilber K. *No Boundary: Eastern and Western Approaches to Personal Growth.* Boston, Mass: Shambhala Publishing Inc; 1985.
82. Watts A. *Psychotherapy East and West.* New York, NY: Vintage Books; 1961.
83. Shaku S; Suzuki DT, trans. *Zen for Americans.* LaSalle, Ill: Open Court; 1906.
84. Jung CG. *Modern Man in Search of a Soul.* London, England: Routledge & Kegan Paul; 1933.
85. SAS Institute. *SAS/STAT User's Guide, Release 6.03.* Cary, NC: SAS Institute; 1989.
86. Erikson E. *Identity: Youth and Crisis.* New York, NY: Norton Publishing; 1968.
87. Bowlby J. *Attachment and Loss, II: Separation, Anger, and Loss.* New York, NY: Basic Books Inc Publishers; 1973.
88. Tellegen A, Lykken DT, Bouchard TJ, Wilcox KJ, Segal N, Rich S. Personality similarity in twins reared apart and together. *J Pers Social Psychol.* 1988;54:1031-1039.
89. Benedict R. *Patterns of Culture.* Boston, NY: Houghton Mifflin Co; 1961.
90. Lee D. *Freedom and Culture.* New York, NY: Spectrum Books, Prentice-Hall International Inc; 1959.
91. Rutter M. Family and school influences on cognitive development. *J Child Psychol Psychiatry.* 1985;26:683-704.
92. Liebowitz MR. In discussion: Cloninger CR. A unified biosocial theory of personality and its role in the development of anxiety states. *Psychiatr Dev.* 1988;4:377-394.
93. Sheard MH, Marini SL, Bridges CI, Wagner E. The effect of lithium on impulsive aggressive behavior in man. *Am J Psychiatry.* 1976;133: 1409-1413.
94. Assagioli R. *Psychosynthesis: A Manual of Principles and Techniques.* New York, NY: Viking Press; 1965.
95. Ellis A. *Reason and Emotion in Psychotherapy.* New York, NY: Lyle Stuart; 1962.
96. Musen G. Effects of verbal labeling and exposure duration on implicit memory for visual patterns. *J Exp Psychol.* 1991;17:954-962.
97. Grafton ST, Woods RP, Mazziotta JC, Phelps ME. Somatotopic mapping of the primary motor cortex in humans: activation studies with cerebral blood flow and positron emission tomography. *J Neurophysiol.* 1991;66:735-743.