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A Systematic Method for Clinical Description and Classification of Personality Variants

A Proposal

C. Robert Cloninger, MD

- A systematic method for clinical description and classification of both normal and abnormal personality variants is proposed based on a general biosocial theory of personality. Three dimensions of personality are defined in terms of the basic stimulus-response characteristics of novelty seeking, harm avoidance, and reward dependence. The possible underlying genetic and neuroanatomical bases of observed variation in these dimensions are reviewed and considered in relation to adaptive responses to environmental challenge. The functional interaction of these dimensions leads to integrated patterns of differential response to novelty, punishment, and reward. The possible tridimensional combinations of extreme (high or low) variants on these basic stimulus-response characteristics correspond closely to traditional descriptions of personality disorders. This reconciles dimensional and categorical approaches to personality description. It also implies that the underlying structure of normal adaptive traits is the same as that of maladaptive personality traits, except for schizotypal and paranoid disorders.

(Arch Gen Psychiatry 1987;44:573-588)

Current approaches to the description and diagnosis of personality disorders have serious practical and conceptual limitations. First, an individual often has features characteristic of more than one personality disorder when discrete categories are specified, as in current classifications of the American Psychiatric Association or the World Health Organization. Second, clinical distinctions between maladaptive personality traits and personality disorders are somewhat arbitrary because of the graded nature of variation in social and cognitive styles, as well as the graded nature of severity of adaptive impairment. Third, adaptive impairment depends on both situational and temperamental variables, so the same temperament may lead to successful achievement in one social or occupational setting and to disability and distress in another setting. Fourth, the behaviors that are typically chosen as criterion variables in a particular culture are obviously not socially desirable or admirable; consequently, direct questioning often leads to guarded and defensive responses, even when the individual is aware of others' perception of his behavior.

Partly as a result of such fundamental problems, the criteria and categories that are used to assess personality and its adaptive consequences have often fluctuated based on contemporary fashion rather than fact. Different categories for personality diagnosis are recommended in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III) and in the International Classification of Diseases (ICD). Such problems have been acknowledged in the development of systems such as DSM-III, but they have not been solved by such acknowledgment. For example, the different categories for personality disorder are meant to serve as "prototypes" or examples of clinical groups that have traditionally been distinguished rather than truly discrete pathophysiological entities with natural diagnostic boundaries. However, this begs the fundamental question of whether personality variation is categorical or dimensional, and ultimately fails in practice, as do all appeals to tradition or authority when there is no consensus about what the traditional categories are or should be. The inadequacy of reliance on traditional prototypes was recently vividly illustrated by the sociopolitical nature of the discussion about the addition of some new categories to DSM-III. Furthermore, the choice of categories and criterion variables in DSM-III appears culturebound or ethnocentric to clinicians in other countries (V. K. Varma, MD, personal communication, 1986).

In contrast, research on normal personality traits has usually measured variation along continuous dimensions.
that are based on either quantitative clinical ratings or scores on self-report inventories. The observed variation in "normal" or adaptive personality traits generally follows an approximately gaussian distribution in general population samples.

There has been little or no evidence of bimodality or multimodality, as would be expected if adaptive personality variation was influenced by discrete disease processes. A bewildering array of different scales have been described, but these are highly redundant with one another. Empirical factor analyses consistently indicate that there are three major dimensions of normal personality variation in the general population. The well-known scales of the Eysencks distinguish between the three dimensions of neuroticism, extraversion-introversion, and psychoticism, or tough-mindedness. Three dimensions, similar to those described by the Eysencks, consistently emerge when the many different inventories of normal personality variation are factor analyzed. In other words, normal personality traits can be well described by variation along three dimensions that are normally distributed and uncorrelated with one another.

Similarly, three independent dimensions arise when responses to questions measuring DSM-III personality disorder categories are factor analyzed. However, no systematic relationship has been described between the three major dimensions of normal (adaptive) personality traits and the three dimensions of abnormal (maladaptive) personality. For example, factor analyses of the Millon Clinical Multiaxial Inventory reveal factors for being "negativistic-avoidant," "paranoid," and "asocial-avoidant," which do not correspond well to adaptive traits. On the other hand, if the characteristics associated with the extremes of the Eysencks' three dimensions of adaptive personality traits ("neurotic" vs "stable," "extravert" vs "introvert," and "tough-minded" vs "tender-minded") are combined, the resulting combinations do not correspond closely with traditional descriptions of personality disorders.

One major difficulty in integrating work on adaptive and maladaptive traits is related to a fundamental limitation of factor analysis. The limitation is that extrastatistical information is needed to specify the structure of the underlying biologic and social variability in personality traits. Factor analysis can determine only the number of dimensions, not their underlying causal structure, location, or "rotation" in space. In other words, descriptive data about behavior are not sufficient to permit any strong preference among alternative ways of summarizing descriptive behavioral data. For example, Tellegen has suggested that variation in personality is better summarized by three behavioral dimensions he labeled as "positive emotionality," "negative emotionality," and "constraint." It is difficult to justify a preference between the factor structures of the Eysencks and Tellegen on descriptive grounds alone, and neither system seems to have a simple relationship to traditional categories of personality disorder. Gray has used observations about the effects of antianxiety drugs on personality to argue that the structure described by the Eysencks does not correspond well to underlying biologic variation. For example, drugs that reduce scores on measures of neuroticism, such as alcohol, barbiturates, and the benzodiazepines, also consistently reduce scores on measures of introversion, suggesting that these dimensions share biologic determinants even though the Eysencks' model assumes they are independent processes. Such experimental biologic information can help to choose among an infinite number of alternative sets of three dimensions.

However, another difficulty arises that complicates the use of biologic data to make choices about the structure of behavioral variation. This second difficulty is that the structure of the observed behavioral variation may not be the same as the structure of the underlying biologic variation because social learning and environmental factors also influence behavior. The phenotypic structure may differ from the underlying biogenetic structure because observed behavioral variation, ie, phenotypic variation, is the result of the interaction of genetic and environmental influences. The heritabilities of adaptive personality traits consistently have been estimated to be between 40% and 60%, so genetic and environmental factors have roughly equal importance in determining behavioral responses. In fact, the structure of the underlying biogenetic variation does not correspond closely with the phenotypic structure because the systems that are genetically independent have shared environmental determinants. Thus, additional information is needed to specify the structure of biogenetic and socioenvironmental factors for assessments of personality to have optimal utility for either biologic or social approaches to prevention and treatment.

Allport defined personality as "the dynamic organization within the individual of those psychophysical systems that determine his unique adjustments to his environment." Likewise, Thorpe defined learning as "the organization of behavior as a result of individual experience." Individuals are said to learn when they perceive and change their behavior as a result of their perceptions. Therefore, individual differences in the adaptive systems involved in the reception, processing, and storing of information about the environment define "personality." Unfortunately, factor-analytic approaches to the characterization of personality have made little progress toward specifying the psychophysical systems involved in such learning, either in terms of the underlying neural systems or in terms of the relevant social and environmental stimuli involved in personality development and change. Studies of personality trait structure have not been well integrated with learning theory or with the remarkable recent advances in knowledge about the neurobiology of motivation and learning. At the same time, neurobiologic and learning studies are often difficult to interpret because they neglect robust findings about the multidimensional structure of personality.

To address these fundamental problems constructively, herein I describe a unified biosocial theory of personality that provides a systematic approach to the description and classification of personality variants. More specifically, I show that the overlap among the different traditional categories of personality disorder is orderly and systematically predictable from available knowledge of the biogenetic structure underlying basic patterns of adaptive response to danger, novelty, and reward.

A GENERAL THEORY OF PERSONALITY

Recently, I presented a unified biosocial theory of personality and its role in the development of anxiety states based on a synthesis of information from family studies, studies of longitudinal development, and psychometric studies of personality structure, as well as neuropharmacologic and neuroanatomical studies of behavioral conditioning and learning in man and other animals. Based on this synthesis, I hypothesized that there were three dimensions of personality that are genetically independent and that have predictable patterns of interaction in their adaptive responses to specific classes of environmental stimuli.

The three underlying genetic dimensions of personality are called novelty seeking, harm avoidance, and reward dependence. Novelty seeking is hypothesized to be a heritable tendency toward intense exhilaration or excitement in
response to novel stimuli or cues for potential rewards or potential relief of punishment, which leads to frequent exploratory activity in pursuit of potential rewards as well as active avoidance of monotony and potential punishment. Harm avoidance is a heritable tendency to respond intensely to signals of aversive stimuli, thereby learning to inhibit behavior to avoid punishment, novelty, and frustrative nonreward. Reward dependence is hypothesized to be a heritable tendency to respond to intense signals of reward (particularly verbal signals of social approval, sentiment, and succor), and to maintain or resist extinction of behavior that has previously been associated with rewards or relief from punishment. These three dimensions reflect variation in three brain systems described in Table 1. Further description and supporting data are presented below.

Genetic variation in each dimension follows a gaussian, or normal, distribution, with most people having intermediate values. Harm avoidance serves as a modulating influence on both novelty-seeking and reward-seeking behavior, leading to inhibition of exploration of unfamiliar or uncertain situations as well as passive avoidance of punishment and nonreward. As a result of this modulatory influence, environmental influences on harm-avoidant behavior are shared among the three dimensions. More specifically, in response to novel stimuli, the novelty-seeking dimension leads to active-approach behavior, whereas the harm-avoidance dimension leads to inhibited or passively avoidant behavior. The resulting behavior is the balance between these influences on active approach and passive avoidance. Likewise, in response to frustrative nonreward, reward dependence predisposes to continued reward-seeking behavior, whereas harm avoidance predisposes to extinction of behavior; again, the resulting behavior is the balance between these influences on maintenance and extinction. Furthermore, reward dependence predisposes to maintenance of familiar activities that have been rewarded previously, whereas novelty seeking leads to initiation of unfamiliar activities that are potentially rewarding. Thus, the genetic variation is independent, but correlated environmental variation leads to a different structure of the observed behavior.\textsuperscript{25}

Individuals who are higher than average in novelty seeking and average in the other two dimensions are characterized as impulsive, exploratory, fickle, excitable, quick-tempered, extravagant, and disorderly. They are readily engaged in new interests and activities, but they tend to neglect details and are quickly distracted or bored. Also they are easily provoked to prepare for flight or flight.

In contrast, individuals who are lower than average in novelty seeking and average on the other two dimensions are characterized as only slowly engaged in new interests, often become preoccupied with narrowly focused details, and require considerable thought before making decisions. They are typically described as reflective, rigid, loyal, stoic, slow-tempered, frugal, orderly, and persistent.

These novelty-seeking traits are thought to reflect variation in the brain's "incentive," or behavioral activation, system.\textsuperscript{26} Dopaminergic cell bodies in the midbrain receive inputs from several sources and then project impulses to the forebrain, thereby acting as the final common pathway for the behavioral activation system.\textsuperscript{27,28} This behavioral activation is associated with exploration of novel environmental stimuli, pursuit of and approach to potential rewards, active avoidance of monotony or potential punishment, and escape from punishment. Such behavioral activation is associated with a particular pattern of physiological arousal, particularly an increased heart rate and decreased sensation threshold.\textsuperscript{29,30}

This activation of purposeful behavior requires both sensorimotor integration and direction of behavior toward novel or pleasurable stimuli. In mammals, dopaminergic projections to the forebrain play a central role in all these functions via nigrostriatal projections, mesolimbic projections (from the ventral tegmentum to limbic structures, including the septum, nucleus accumbens, and amygdala), and mesofrontal projections (from the ventral tegmentum to the neocortex, including the mesial frontal, anterior cingulate, and entorhinal areas).\textsuperscript{31} The amygdala is involved in active avoidance responses and preparation for fight or flight in conjunction with the cortex and the hypothalamus. Inputs to the dopaminergic cell bodies include ascending paths in the reticular formation, descending paths from the hypothalamus, and feedback from the cerebral cortex via the amygdala and caudate.

Self-stimulation with electrodes at sites of dopaminergic neurons is rapid and accompanied by marked locomotor activation and positive reinforcement of eliciting behavior in animals and reports of the subjective experience of pleasure and satisfaction in humans.\textsuperscript{32,33,34} Lesions of noradrenergic neurons in the locus ceruleus do not affect self-stimulatory behavior, at least not with continuous reinforcement schedules.\textsuperscript{35,36,37} Spontaneous exploratory motor behavior by mammals in a novel environment is dependent on the integrity of mesolimbic dopaminergic projections.\textsuperscript{38} Dopamine-depleting lesions in the nucleus accumbens or the ventral tegmentum lead to neglect of novel environmental stimuli and reduce both spontaneous
activity and investigative behavior, but partial lesions may lead to hyperactivity.29 Dopamine agonists, such as amphetamines and cocaine as well as alcohol, opiates, and opioid neuropeptides, lead to facilitation of dopaminergic transmission and behavioral activation, whereas dopamine blockers, such as haloperidol, lead to reduced exploratory behavior and anhedonia or reduced responsiveness to positive reinforcement.30 Such behavioral activation by dopamine and its agonists depends on the integrity of the nucleus accumbens, but not the caudate nucleus.31 Other supporting neurophysiological, neuroanatomical, and biochemical data are reviewed elsewhere.24,25,30

A seven-point scale for clinical rating of novelty seeking is summarized in Table 2. An interview and a self-report questionnaire for obtaining ratings are described later. Average is rated as 0 with mild (1), moderate (2), and extreme (3) deviations from the mean specified in both directions. These values are meant to approximate standard scores rounded to the nearest integer between +3 and −3. In other words, in a general population the highest 1% are expected to have scores of +3, the next highest 6% have moderate ratings of +2, another 24% have mildly elevated ratings of +1, and the middle 38% have average ratings of 0.

Individuals who are higher than average in harm avoidance and average on the other two dimensions are characterized as cautious, tense, apprehensive, fearful, inhibited, shy, easily fatiguable, and apprehensive worriers. Those who are lower than average in harm avoidance and average on the other two dimensions are confident, relaxed, optimistic, carefree, uninhibited, outgoing, and energetic. A seven-point scale for clinical ratings of harm avoidance is summarized in Table 3.

These harm-avoidant traits are thought to reflect variation in the brain’s “punishment,” or behavioral inhibition system, which includes the septohippocampal system, serotonergic projections from the raphe nuclei in the brain stem, and cholinergic projections to the frontal neocortex from the ventral tegmental area and the basal nucleus of Meynert.32 Ascending serotonergic neurons from the raphe nuclei project to the limbic system, including the septum and hippocampus, as well as to the prefrontal cortex. Gray33,34 and Warburton35 have suggested that the septohippocampal system functions as a comparator, checking predictions against actual events, and then interrupting behavior when the unexpected is encountered. Ascending serotonergic projections from the dorsal raphe nuclei to the substantia nigra inhibit nigrostriatal dopaminergic neurons and are essential for conditioned inhibition of activity by signals of punishment and frustrative nonreward.36 In response to novel stimuli that are not paired with rewards or relief of punishment, cholinergic projections from the ventral tegmental area and the basal nucleus of the amygdala excite the frontal cortex and stimulate release of stress hormones such as corticotropin and cortisol.37 In turn, frontostriatal projections reduce exploratory activity by inhibiting dopaminergic neurons in the caudate nucleus.38

Benzodiazepines and other anxiolytic drugs do not block the acquisition of aversive responses by “classic” conditioning, in which a neutral stimulus is learned to predict an aversive stimulus.39,40 However, anxiolytic drugs block the expression of behavioral inhibition acquired by “operant” or “instrumental” conditioning, in which a particular behavioral response is learned to predict punishment or omission of rewards.41,42 Furthermore, anxiolytic drugs block the increase in electrodermal activity that occurs in anticipation of both classically and operantly conditioned aversive stimuli.43 Benzodiazepines disinherit avoidance conditioning by γ-aminobutyric acid–ergic inhibition of serotonergic neurons originating in the dorsal raphe nuclei.44,45 Other neuropharmacologic, neuroanatomical, and biochemical data are reviewed elsewhere.24,30

Individuals who are higher than average in reward dependence and average on the other two dimensions are clinically characterized as eager to help and please others, persistent, industrious, warmly sympathetic, sentimental, and sensitive to social cues and personal sucor but able to
Table 3.—Summary of Harm-Avoidance Scale

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
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<tbody>
<tr>
<td>+3</td>
<td>Severely High: Nearly always fearful and anticipating harm even with reassurance and supportive circumstances; extremely pessimistic and inhibited by unfamiliar situations, strangers, and minor risks; highly fatigable so that activities must be limited to minimize effort required</td>
</tr>
<tr>
<td>+2</td>
<td>Moderately High: Noticeably inhibited and tense even under ordinary circumstances; frequent worrying far in advance about minor difficulties; moderately pessimistic and negative; easily tired so that extra rest and relaxation is needed on most days; slow to recover from physical exertion, emotional stress, or minor illness</td>
</tr>
<tr>
<td>+1</td>
<td>Mildly High: Usually worried that things will not go well even under ordinary circumstances; inhibited and tense unless there is high probability of friendly support; mildly fatigable with need for occasional extra periods of rest and relaxation</td>
</tr>
<tr>
<td>0</td>
<td>Average: Transient worries and tension in proportion to objective risks; no prolonged rumination; avoids risk of serious personal injury nearly always but willing to take calculated moderate risks occasionally; average energy level and recuperative/adaptive ability</td>
</tr>
<tr>
<td>-1</td>
<td>Mildly Low: Uninhibited and calm under ordinary circumstances with some inhibition and/or tension in face of serious harm or personal injury that is highly probable; occasional worry in advance about minor problems; somewhat more energetic and rapidly recuperative/adaptive than average</td>
</tr>
<tr>
<td>-2</td>
<td>Moderately Low: Uninhibited and carefree unless others call attention to dangers that are severe and nearly certain; confident and optimistic with rare anticipatory worries about severe risks but not minor problems; moderately high energy level and rapid recuperative/adaptive ability</td>
</tr>
<tr>
<td>-3</td>
<td>Severely Low: Highly uninhibited, calm, and carefree even when confronted with unfamiliar situations, strangers, or imminent risk of personal injury; confident and optimistic with no worry in advance of difficulties; minimal reluctance to risk personal injury; highly energetic with rapid recuperative ability following exertion and rapid adaptation to changes in routine</td>
</tr>
</tbody>
</table>

...delay gratification with the expectation of eventually being rewarded. In contrast, those who are lower than average in reward dependence are socially detached, emotionally cool, practical, tough-minded, and emotionally independent in what they choose to do. Individuals who are low in reward dependence do respond to practical rewards such as money, but are insensitive to verbal signals of social reinforcement and quickly become indifferent and terminate activities or relations that are no longer gratifying. In contrast, highly reward-dependent individuals are highly sensitive to praise and social cues and also persist in their craving for gratification in the same or similar ways long after reinforcement by actual rewards is withdrawn because of reinforcement by secondary signals of approval. A seven-point scale for clinical ratings of reward dependence is summarized in Table 4.

These reward-dependent traits are thought to reflect variation in a third major brain system that is postulated to facilitate acquisition of conditioned signals of reward or relief from punishment, and thereby also to increase resistance to extinction of previously rewarded behavior. Noradrenaline appears to be the major neuromodulator for this system, and may play a critical role in the learning and memory of new paired associations. The major ascending noradrenergic pathways arise from the locus ceruleus in the pons and project to the hypothalamus and limbic structures, including the amygdala, septum, and hippocampal formation, and then branch throughout the entire neocortex. The number of noradrenergic neurons is small, but they project to nearly every brain region with elaborately branched axons that have highly collaterized networks of fine preterminal fibers with many varicosities. These varicosities are loaded with synaptic vesicles that store norepinephrine, but only about 5% form actual synapses in the cerebral cortex. The remainder secretes norepinephrine into the surrounding neuropil to modulate the general level or “tone” of neuronal activity or response to other inputs.

More specifically, stimulation of the locus or its dorsal bundle, or direct application of norepinephrine, has two effects on a target area: the spontaneous firing rate of affected neurons is inhibited, but their response to other afferents is increased. Thus, the “signal to noise ratio” is increased, allowing relevant or important stimuli to stand out from irrelevant stimuli.

Extensive studies of a variety of conditioning and learning paradigms in human and other mammals suggest that the effects of noradrenergic deficits are rather specific. In rodents, long-term partial reduction of norepinephrine release in the forebrain by lesions of the locus ceruleus or its dorsal bundle leads to increased resistance to extinction of previously rewarded behavior and to improved responses to conditioned signals of relief of punishment in two-way active avoidance tasks. Mason and Iversen have reported that in rodents, resistance to extinction is increased if the lesion is made before acquisition of the rewarded response but not if it is made after the response is acquired. Reduced noradrenergic activity in the dorsal bundle or lesions of the locus ceruleus do not consistently impair the initial acquisition of behavioral responses to unconditioned rewards or relief from punishment in animals. In humans, short-term reduction of norepinephrine release by acute infusion of the a2-prefusynaptic agonist clonidine selectively impairs paired-associate learning, particularly the acquisition of novel associations. This deficit in learning new associations is similar to the circumscribed learning deficit characteristic of patients with destructive lesions of the locus ceruleus, as occurs in many subjects with Korsakoff’s amnestic syndrome. Arginine vasoressin and norepinephrine metabolite levels are reduced in the cerebrospinal fluid of patients with such lesions. Vasopressin enhances memory when injected immediately after learning trials, but this enhancement is dependent on an intact dorsal noradrenergic bundle.

These findings in humans indicate that norepinephrine release leads to enhancement of the formation of conditioned associations in general. However, studies of rodents indicate a greater or more consistent effect of the noradrenergic system on the formation of conditioned signals of reward or relief of punishment, rather than conditioned signals of punishment or frustrating nonreward. This difference may be attributable to the inhibition of the locus ceruleus by serotonergic activity at the onset of punishment or omission of expected rewards. Consequently, under natural conditions the enhancement of paired-associate learning by norepinephrine release will occur mainly at the onset of rewards or the offset of punishment.

Verbal indications of approval (eg, “That’s good”) may be regarded as conditioned signals of reward. There are individual differences in responsiveness to such signals, and verbal conditioning of social reinforcement is impaired in humans who are low in reward dependence, including both primary psychopaths and obstinate obsessionals. Individuals with reduced basal activity in the dorsal noradrenergic bundle (and, hence, greater sensitivity to norepinephrine) are expected to respond to signals of social sentiment and to persist in reward-seeking behavior even...
when frustrated, whereas those with higher basal noradrenergic activity (and, hence, lower sensitivity to norepinephrine) are more practical and quickly stop activity that is no longer gratifying. In this way, the resistance to extinction of intermittently rewarded behavior may determine individual differences in perseverance and responsiveness to verbal conditioning.

The behavioral maintenance and activation systems act in concert so that the dopaminergic activation system influences approach and initial acquisition of rewarded behavior and the noradrenergic maintenance system influences the rate of extinction of previously rewarded behavior. In contrast, the behavioral maintenance system functions in counterbalance with the behavioral inhibition system, since

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**Table 4.—Summary of Reward Dependence Scale**

<table>
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<th>Score</th>
<th>Description</th>
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<tbody>
<tr>
<td>+3</td>
<td>Severely High: Highly dependent on emotional supports and intimacy with others; highly sensitive to social cues and responsive to social pressure; highly sentimental, crying very easily; industrious, ambitious overachiever who pushes self to exhaustion; extremely sensitive to rejection from even minor slights, leading to reward-seeking behaviors such as overeating; highly persistent in craving for gratification even when frustrated in attempts to obtain expected recognition or benefits</td>
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<tr>
<td>+2</td>
<td>Moderately High: Close intimate relations are desired nearly always; cries easily in sentimental situations; pushes self to maximal efforts but not exhaustion; sensitive to major rejection always and minor slights usually; but perseveres in activities long after they are no longer gratifying or rewarded</td>
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<tr>
<td>+1</td>
<td>Mildly High: More warm and emotionally open than average, preferring intimacy over privacy; usually conforms to social pressure because of a desire to be liked and to please; usually sympathetic and helpful; usually industrious and mildly ambitious; sensitive to major rejections but not minor slights</td>
</tr>
<tr>
<td>0</td>
<td>Average: Average emotional warmth and social attachment; average ambition, industriousness, and sensitivity to rejection or frustrating nonreward</td>
</tr>
<tr>
<td>−1</td>
<td>Mildly Low: Maintains regular social contacts but with minimal intimacy; usually resists social pressures but occasionally acts based on sympathetic sentiment; occasionally responds to encouragement to work hard to please others and to attain rewards; only occasional and transient upset in response to rejection or frustration</td>
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<tr>
<td>−2</td>
<td>Moderately Low: Seldom confides personal feelings in others, occasionally wants social support and acts based on sympathetic sentiment; works to please others seldom and then only due to practical benefits; quickly stops activities and relations that are no longer gratifying</td>
</tr>
<tr>
<td>−3</td>
<td>Severely Low: Socially detached, never sharing intimate feelings with others, content to be alone; independent nonconformist, practical and self-determined; minimal ambition and motivation to please others; cynical, alienated, and insensitive to social cues and pressures; does only what is immediately gratifying, stopping other activities as soon as they cease to be rewarding</td>
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**Fig 1.—Interaction of two personality dimensions, novelty seeking and harm avoidance.**

<table>
<thead>
<tr>
<th>High Novelty Seeking</th>
<th>Excitable</th>
<th>Impulsive</th>
<th>Exploratory</th>
<th>Fickle</th>
<th>Extravagant</th>
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<tr>
<td>Danger Seeking</td>
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<td>Aggressive</td>
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<td>Competitive</td>
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<td>Overactive</td>
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<tr>
<td>Impatient</td>
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<td>Talkative</td>
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<tr>
<td>Extraverted</td>
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<tr>
<td>Confident, Carefree</td>
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<td>Uninhibited, Energetic</td>
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<td>Hyperthymic</td>
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<td>Cheerful</td>
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<td>Unwavering Stubborn</td>
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<td>Boastful Overconfident</td>
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<td>Reflective</td>
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<td>Rigid</td>
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<td>Loyal</td>
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<td>Fatigable, Inhibited</td>
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<td>Serenity Seeking</td>
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<td>Passive</td>
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<td>Unassertive</td>
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<td>Inactive</td>
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<td>Patient</td>
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<td>Quiet</td>
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<td>Introverted</td>
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<tr>
<td>Stoic</td>
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<td>Slow Temperated</td>
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<td>Frugal</td>
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<td>Low Novelty Seeking</td>
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<tr>
<td>Low Harm Avoidance</td>
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</tr>
<tr>
<td>High Harm Avoidance</td>
<td></td>
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</tbody>
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Personality Variants—Cloninger
Fig 2.—Interaction of two personality dimensions, reward dependence and harm avoidance.

Fig 3.—Interaction of two personality dimensions, novelty seeking and reward dependence.
each has opposite effects on the rate of extinction in response to punishment or frustrative nonreward. For example, increased serotonergic activity at the onset of punishment leads to inhibition of noradrenergic neurons in the locus ceruleus. Likewise, the behavioral activation system functions in counterbalance with the behavioral inhibition system, since each has opposite effects on approach to unfamiliar or uncertain situations and other novel stimuli, and serotonergic neurons inhibit nigrostriatal dopaminergic neurons.

The biogenetic predisposition to the stimulus-response characteristics of each of these three systems appears to be independently set in each individual, but the systems are functionally interconnected. As a result of these interconnections, the systems interact to give rise to integrated patterns of differential responses to punishment, reward, and novelty. These functional interactions give rise to the wide variation in personal response characteristics that are observed in social behavior in different situations. In other words, the same response level on one dimension is expressed in different ways depending on the response level on the other dimensions.

The interactions of the three personality dimensions are summarized in Figs. 1 through 3. For example, in Fig. 1 an individual who is high in novelty seeking will usually show behavior that is impulsive, danger seeking, and aggressive if he is also low in harm avoidance, whereas he will usually show conflicted or neurotic behavior, with inhibition or worrisome "second thoughts" checking his initial impulses, if he is also high in harm avoidance. On the other hand, an individual who is low in harm avoidance will usually be cheerful, boastful, and overconfident if he is also low in novelty seeking. Since average values are most frequent, the description of behavior associated with each dimension will be dominated by the characteristics mentioned earlier, but at least one of these combinations of extreme values are expected to occur about as often as deviations on only one dimension.

While the same response level may be expressed in different ways depending on other traits, the same adjective may be used to describe different combinations of personality traits. For example, the word "sociable" may be used to describe different response patterns. An individual may be described as sociable if he is readily engaged when meeting new people (as someone who is high in novelty seeking and average on other dimensions), if he is confident and uninhibited with strangers (as someone who is low in harm avoidance and average on other dimensions), or if he is warm and socially sympathetic (as someone who is high in reward dependence and average on the other dimensions). As a result, the rating of each underlying dimension from observed or self-reported behavior requires attention to the interaction of the dimensions with one another. Description and rating is a problem of pattern recognition that must take into account a wide range of responses in a variety of situations.

**EMPIRICAL TESTS OF THE PROPOSED STRUCTURAL MODEL**

Given my concern about the ambiguity of descriptive terms, I developed a set of specific self-report questions based on the theoretical model. To quantify behavioral variation on each dimension separately, questions were specified that were theoretically expected to involve minimal interaction among the dimensions. In practice, this meant that questions were chosen to evaluate the behaviors that were thought to be characteristic of individuals deviant on one dimension and average on the others. Questions that could be answered "true" or "false" were written to distinguish different degrees of deviation from the mean, as summarized in Tables 2 through 4. For example, two questions assessing the rapid, intuitive decision-making characteristic of novelty seekers are "I prefer to make decisions only after careful thought" (true in individuals who are below the mean on novelty seeking, so false indicates novelty seeking), and "I often act on hunches, momentary whims, or my intuition without making a detailed analysis of facts" (true in individuals who are above the mean on novelty seeking, so true indicates novelty seeking). An 80-item inventory, called the *Tridimensional Personality Questionnaire* (TPQ), was developed and administered to a group of 101 sophomore medical students along with several other tests over a month period. The results of these tests will be described in detail elsewhere. Briefly, the students had average means and variances on the Eysenck extraversion and neuroticism scales, but had low means and restricted variances in psychoticism or tough mindedness. On Tellegen's *Multidimensional Personality Questionnaire* (MPQ), they had high mean and restricted variance on achievement, and they had a low mean and restricted variance on alienation.

The distribution of scores was approximately trivariate normal and had reliabilities comparable with those of commonly used tests (Table 5). The intercorrelations among scales were negligible or weak (Table 6). The weak correlations observed were consistent with those expected theoretically: novelty seeking is inhibited by harm avoidance, so these behavioral scales have a weak negative correlation, whereas high reward dependence leads to repeated exposure to frustrative nonreward, thus predisposing weakly to sensitization, so there is a weak positive correlation between reward-dependent and harm-avoidant behavior.

Tellegen's MPQ measures 11 primary phenotypic factors, many of which were expected to involve substantial interactions among the underlying dimensions proposed herein. The observed pattern of relations (Table 7) agreed remarkably well with the expected patterns depicted in Figs 1 through 3. Feelings of well-being (happy, optimistic) were associated with low harm avoidance, particularly when novelty seeking was not high, as shown in Fig. 1. In contrast, the combination of low harm avoidance and high novelty seeking was associated with social potency (assertiveness) and impulsiveness (lack of control), as predicted in Fig. 1. On the MPQ, danger seeking was also associated largely with low harm-avoidance alone. High resistance to extinction of rewarded behavior, indicated by the combination of high reward dependence and low harm avoidance, was associated with achievement (perseverance, hard work) and social closeness (warm sociability), as predicted in Fig. 2. Traditionalism (authoritarian, conventional) is
Table 7.—Partial Regressions of MPQ Primary Scales on TPQ Scales (Decimals Omitted)∗

<table>
<thead>
<tr>
<th>MPQ Scales</th>
<th>Partial Regression Weights on TPQ</th>
<th>Multiple R²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Harm Avoidance Novelty Seeking</td>
<td>Reward Dependence</td>
</tr>
<tr>
<td>Well-being</td>
<td>−66†</td>
<td>−08</td>
</tr>
<tr>
<td>Social potency</td>
<td>−50†</td>
<td>29†</td>
</tr>
<tr>
<td>Achievement</td>
<td>−25†</td>
<td>−14</td>
</tr>
<tr>
<td>Social closeness</td>
<td>−28†</td>
<td>−03</td>
</tr>
<tr>
<td>Stress reaction</td>
<td>79†</td>
<td>57†</td>
</tr>
<tr>
<td>Alienation</td>
<td>04</td>
<td>02</td>
</tr>
<tr>
<td>Aggression</td>
<td>04</td>
<td>18†</td>
</tr>
<tr>
<td>Impulsiveness</td>
<td>−25†</td>
<td>70†</td>
</tr>
<tr>
<td>Danger seeking</td>
<td>−30†</td>
<td>08</td>
</tr>
<tr>
<td>Traditionalism</td>
<td>00</td>
<td>−29†</td>
</tr>
<tr>
<td>Absorption</td>
<td>−12</td>
<td>49†</td>
</tr>
</tbody>
</table>

∗MPQ indicates Multidimensional Personality Questionnaire; TPQ, Tri-dimensional Personality Questionnaire; and EPQ, Eysenck Personality Questionnaire.
†P<.01
‡P<.05

associated with low novelty seeking, particularly when combined with high reward dependence, as predicted in Fig 3. Absorbeny was developed to understand hypnotic susceptibility and is associated with high novelty seeking, especially in combination with high reward dependence, as predicted in Fig 3. The tendency to be nervous and easily distressed (stress reaction) was associated with high scores on all three dimensions of the TPQ, as predicted.24 Alienation was expected to be low in individuals who are high in reward dependence and low in harm avoidance (Fig 2); this is consistent with the low mean and restricted variance in this medical student sample, but the restricted variance makes detailed interpretation impossible here.

The amount of variability in these behaviors that is explained by the TPQ is similar to that explained by the Eysenck Personality Questionnaire overall (Table 7). However, the proportion of variability explained (multiple R²) by the TPQ or the Eysenck questionnaire differs from scale to scale, much as they do when the three higher order factor scales of the MPQ are used to predict the values of their individual components (Table 7).

These initial empirical results support the basic structural model of personality proposed herein, and indicate that reliable and clinically relevant assessments can be made with brief self-report instruments.

**DIAGNOSIS OF PERSONALITY VARIANTS**

To describe and diagnose personality variants systematically, a clinical interview schedule was also developed. This schedule, called the Tri-dimensional Interview of Personality Style (TIPS), includes seven questions about the response patterns or traits that are characteristic of each of the three basic dimensions and four questions for each of the six pairwise combinations shown in Figs 1 through 3. Each question has a hierarchy of six additional probes specified to allow rating on a seven-point scale. These probes are an expanded set of those used in the self-report TPQ. Each trait is rated for two periods (the past year and the midteens) to assess age at onset and developmental change. In addition, advantages and/or problems associated with each trait are evaluated separately so that response style is not confounded with adaptive success or impairment.

Altogether, the TIPS yields ratings of impairment, inflexibility, or distress in nine clusters of traits that, in varying combinations, make up the criteria for personality disorders. The personality disorders defined in this way include extreme variants on each of the three dimensions, extreme variants on two dimensions, and extreme variants on only one dimension. I will first describe the items used to assess the three basic dimensions of response to novel, aversive, and rewarding stimuli. Next I will describe the six second-order clusters of traits arising from the combination of deviations on two dimensions. Finally, I will describe the eight third-order clusters of traits arising from the combination of deviations on all three dimensions.

**ASSESSMENT OF BASIC STIMULUS-RESPONSE CHARACTERISTICS**

The basic patterns of response to novelty, punishment, and reward are assessed by variation in the three dimensions of novelty seeking, harm avoidance, and reward dependence briefly described above. The eight possible combinations of deviations on these three dimensions correspond closely to traditional descriptions of personality disorders that have been most consistently presented. This correspondence is summarized in Table 8 to help guide the reader to what follows, but the description of the interrelationship between basic response characteristics and traditional personality categories will be developed in stages in the following sections.

The first stage of this description is a summary of traits characterizing each of the three basic response dimensions. In the TIPS, each dimension is assessed by seven bipolar traits. In other words, each trait varies from high to low. In the following summaries, the two poles of each trait are separately described.

**High vs Low Novelty Seeking**

High novelty seeking is part of the characteristics of the antisocial, histrionic, passive-aggressive, and explosive personality disorders. Low novelty seeking is part of the characteristics of the obsessional, passive-dependent, cyclothymic, and schizoid personality. Either extreme variant can also occur alone.

1. Frequent exploratory thrill-seeking and intolerance of familiar routine vs resistance to changes in familiar routine.
2. Disorderly or unconventional rule breaking vs highly regimented discipline and order.
3. Excitable and quick tempered vs stoical and slow tempered.
4. Fickle (attachments quickly formed and dissolved) vs loyal (attachments slowly formed and dissolved regardless of advantages or disadvantages).
5. Often acts immediately on momentary whims or quickly formed intuitive impressions or is distractive and impulsive vs often acts too slowly and only after considerable thought, methodical reflection, and planning with a preoccupation with organizational details.
6. Frequent dramatization and preference for talking over listening vs preference for listening over talking and restricted ability at role playing or dramatization.
7. Extravagant spending so as to have difficulty saving or delaying gratification vs frugal saving and budgeting so as to have difficulty enjoying buying things for oneself.

**High vs Low Harm Avoidance**

High harm avoidance is part of the characteristics of obsessional, passive-dependent, passive-aggressive, and explosive personality...
Table 9.—Clusters of Personality Traits Associated With Various Combinations of Basic Stimulus-Response Characteristics

<table>
<thead>
<tr>
<th>Personality Cluster</th>
<th>Basic Stimulus-Response Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Novelty Seeking</td>
</tr>
<tr>
<td>Impulsive vs Rigid</td>
<td>High</td>
</tr>
<tr>
<td>Hyperthymic vs Hypothymic</td>
<td>Low</td>
</tr>
<tr>
<td>Scrupulous vs Opportunistic</td>
<td>Low</td>
</tr>
<tr>
<td>Narcissistic vs Self-efficacious</td>
<td>High</td>
</tr>
<tr>
<td>Passive-avoidant vs Oppositional</td>
<td>...</td>
</tr>
<tr>
<td>Gullible vs Alienated</td>
<td>...</td>
</tr>
</tbody>
</table>

disorders. Low harm avoidance is part of the characteristics of antisocial, histrionic, schizoid, and cyclothymic personalities. Either variant can also occur alone.

1. Frequent anticipatory worrying and inhibitory apprehension requiring reassurance even under ordinary circumstances vs carefree lack of inhibition even when the situation calls for caution.

2. Tension and worry when dealing with unfamiliar tasks or situations vs overconfident and lacking in appropriate caution when dealing with unfamiliar tasks.

3. Shyness (inhibited withdrawal from strangers that limits social activity or enjoyment) vs carefree lack of inhibition around strangers.

4. Preference for quiet inactivity because of overstimulation by excitement or activities involving risk of physical injury vs preference for stimulation by activities with risk of physical injury rather than quiet inactivity.

5. Pessimistic, with frequent negative expectations vs optimistic, with frequent positive expectations.

6. Easy fatigability that limits physical exertion vs high energy level with quick recovery from exertion.

7. Slow adaptation to change and slow recovery from minor illness, stress, or changes in familiar routines vs rapid adaptation and recovery from minor illness, stress, or changes in familiar routines.

High vs Low Reward Dependence

High reward dependence is part of the characteristics of passive-dependent, cyclothymic, histrionic, and passive-aggressive personalities. Low reward dependence is part of the characteristics of antisocial, explosive, obsessional, and schizoid personalities. Either variant can occur alone.

1. Social vulnerability associated with ready tendency to openly reveal personal intimacies vs social detachment with tendency to remain aloof and distant without revealing personal intimacies.

2. Need for praise and approval of others with excessive tendency to conform to peer pressures vs independent nonconformist with resistance to peer pressures.

3. Highly sympathetic and easily exploited by sentimental appeals vs practical tough-minded detachment from social sentiment.

4. Intensely driven, frequently pushing self to point of exhaustion vs lack of industry and initiative, frequently quitting before maximal effort has been expended.

5. Marked persistence in previously rewarded behavior despite frustration of efforts vs rapid termination of activities that are not immediately gratifying with feelings of indifference or lack of persistent ambition for delayed rewards.

6. Marked sensitivity to social cues of approval or rejection, loss, and frustrative nonreward with persistent craving for gratification in similar ways vs insensitivity to social cues of approval or rejection, loss, and frustrative nonreward with rapid development of indifference to relationships that become ungratifying.

7. Excessive reward-seeking behavior in response to rejection or frustration (such as overeating, overworking, increased sexual activity, or unnecessary buying) vs cynical social alienation and preference to be alone.

Six Second-Order Clusters of Personality Traits

Deviations on two basic dimensions in the same individual give rise to integrated patterns of basic responses that are associated with distinctive behavioral clusters. The possible combinations of deviations on pairs of dimensions are summarized in Table 9. Descriptions of the associated clusters of personality traits are summarized in the following sections, which are summaries of items specified in the TIPS. As before, each trait is bipolar, and each pole is separately described.

Impulsive-Aggressive vs Rigid-Patient

The impulsive-aggressive pole results from high novelty seeking and low harm avoidance, as in histrionic and antisocial personalities. The rigid-patient pole results from low novelty seeking and high harm avoidance, as in passive-dependent and obsessional personalities. The impulsive-aggressive pole corresponds to broad concepts of antisociality, whereas the rigid-patient pole corresponds to broad concepts of obsessionality. Each variant can also occur alone.

1. Danger-seeking behavior or impulsive acts involving high risk of personal injury vs safety- and serenity-seeking behavior or preoccupation with maintaining order and safety by means of attention to rules and organizational details.

2. Highly aggressive and competitive behavior, including offensive initiation of violence, bullying, or forceful domination of others vs highly passive and unassertive behavior and inability to tolerate conflict or violence.

3. Highly impatient and easily annoyed by short delays or need for even brief periods of quiet inactivity either at work or at leisure vs highly patient and able to wait in contented silence and inactivity for prolonged periods.

4. Reckless and quick decisions are often made without regard to later consequences vs decision making is avoided, postponed, or deferred to others as a result of concern about making mistakes and/or rigid preoccupation with trivial details.

Hyperthymic vs Hypothymic

The hyperthymic pole results from low novelty seeking and harm avoidance, as in cyclothymic and schizoid disorders. The hypothymic pole results from high novelty seeking and harm avoidance, as in passive-aggressive and explosive disorders. Each variant can also occur alone.

1. Hyperthymia or cheerful overoptimism with a tendency to underestimate the need for caution and alarm vs hypothymia or easily distressed and pessimistic with a tendency to overestimate the need for alarm and caution.

2. Unwavering and stubbornly methodical regardless of danger vs frequent conflicted wavering or indecision due to worrisome "second thoughts."

3. Boastful or bragging overconfidence even in unfamiliar situations for which the individual is unprepared or untrained vs low self-confidence and pessimistic self-doubt even in situations for which the individual is well prepared.

4. Expresses disagreement openly and assertively but slow to become angry vs quickly becomes angry but often keeps anger partially bottled up because of fear to express anger fully and openly.

Scrupulous-Authoritarian vs Opportunistic-Libertarian

The scrupulous-authoritarian pole results from the combination of low novelty seeking and high reward dependence, and is part of the characteristics of cyclothymic and passive-dependent personalities. The opportunistic-libertarian pole results from the combi-
Table 10.—Personality Clusters Associated With Traditional Categories

<table>
<thead>
<tr>
<th>Personality Disorder</th>
<th>Second-Order Personality Clusters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impulsive vs Rigid</td>
<td>Hyperthymic vs Hypothymic</td>
</tr>
<tr>
<td>Antisocial</td>
<td>Scrupulous vs Opportunistic</td>
</tr>
<tr>
<td>Histrionic</td>
<td>Narcissistic vs Self-Effacing</td>
</tr>
<tr>
<td>Passive-aggressive</td>
<td>Passive-Avoidant vs Oppositional</td>
</tr>
<tr>
<td>Explosive</td>
<td>Alienated</td>
</tr>
<tr>
<td>Obsessional</td>
<td>Alienated</td>
</tr>
<tr>
<td>Schizoid</td>
<td>Self-effacing</td>
</tr>
<tr>
<td>Cyclothymic</td>
<td>Scrupulous</td>
</tr>
<tr>
<td>Passive-dependent</td>
<td>Passive-avoidant</td>
</tr>
</tbody>
</table>

**Narcissistic vs Self-effacing**

The narcissistic pole results from high novelty seeking and high reward dependence; it is one of the characteristics of histrionic and passive-aggressive personalities. The self-effacing pole results from low novelty seeking and low reward dependence; it is one of the characteristics of obsessional and schizoid disorders. Each variant can also occur alone, as in narcissistic personality disorder.

1. Excessive attention seeking vs excessive privacy seeking.
2. Prodigal (reckless, wasteful, extravagant) self-indulgence vs excessive self-effacement or rigid insistence on sacrifice and sharing with others without regard to sentiment or self-interest.
3. Excessively demonstrative and affectionate vs restricted ability to express warm feelings.
4. Preoccupation and frequent deep absorbency in fantasy and imagined experiences, possibly including trancelike states, mystical or paranormal experiences, other dissociative states or identity disturbances vs restricted ability to be deeply involved in fantasy, imagined experiences, art, or music, or to appreciate nature.

**Passive-Avoidant vs Oppositional**

The passive-avoidant pole results from high reward dependence and harm avoidance, as in passive-aggressive and passive-dependent personalities. The oppositional pole results from low reward dependence and harm avoidance, as in antisocial and schizoid disorders. Either variant can also occur alone.

1. Highly submissive, deferential, and ingratiating vs highly oppositional, defiant, and argumentative.
2. Indirectly manipulative using indirect methods of resistance such as pouting, postponing or delaying effective action, intentional forgetting, or inefficiency vs direct argument and confrontation in an offensive argumentative way.
3. Lonely and socially avoidant out of fear of rejection vs content and socially indifferent when isolated or alone.
4. Frequent fear of failure with ambivalence or conflicting feelings about the uncertain benefit of hard work vs the social shame and disapproval of giving up vs confident indifference to issues about long-term success, doing whatever is independently considered desirable and practical and no more or less.

**Gullible-Heroic vs Alienated-Cowardly**

The gullible-heroic pole results from high reward dependence and low harm avoidance, as in histrionic and cyclothymic personalities. The alienated-cowardly pole results from low reward dependence and high harm avoidance, as in obsessional and explosive personalities. Individuals who are alienated view the world warily as an unfriendly place, but they are not suspicious in the sense of actively seeking confirmation of preconceived ideas that they are special targets for harm or abuse. Either variant can occur alone.

1. Excessive heroic risk-taking, such as risking own life to save total strangers, vs cowardly or self-protective behavior in which devious methods are used to avoid jeopardy to self, even to help family or friends.
2. Excessively gullible, trusting, and easily exploited by others, even after being cheated or rejected vs alienated and cynically dispassionate with the feeling that others cannot be trusted not to harm or take advantage.
3. Markedly pushy, domineering, or persuasive vs socially ineffective, reserved, and unable to influence others.
4. Perseverance and fortitude or the ability to persist calmly and firmly in the face of difficulty, misfortune, danger, or opposition vs excessive tendency to give up quickly in response to difficulty, misfortune, danger, or opposition.

**EIGHT THIRD-ORDER CLUSTERS OF PERSONALITY TRAITS**

The clusters of traits described in the preceding section can be combined to define personality disorders that correspond closely to descriptions of traditional clinical categories (summarized in Table 10). This provides a simple and systematic way to decompose the overlap among various traditional categories. It provides a more accurate account of the pattern of overlap among categories than does separation into three nonoverlapping groups of categories, such as the “anxious,” “erratic,” and “odd” clusters suggested in DSM-III. It also provides a systematic method for defining diagnostic criteria for personality disorder. The suggested systematic method is to use ratings of both the basic response characteristics and the second-order characteristics described above. The second-order characteristics are not adequate when used alone because similar patterns can result when an individual is moderately high on two dimensions or when an individual is extremely high on one dimension and not too low on the other dimension. Accordingly, use of both the basic and the second-order characteristics minimizes overlap between categories and thereby increases the descriptive value and discriminative power of the diagnostic criteria. Criteria for antisocial personality disorder are presented here in detail as an example of this approach, and others are easily elaborated from Tables 8 through 10 based on this example.

**Antisocial Personality Disorder**

The individual’s current and long-term functioning is characterized by the combination of features described in A and B below.
This characteristic behavior is not limited to episodes of illness and causes significant impairment in social or occupational functioning, or prominent inflexibility in behavior and attitudes that restricts life-style, or subjective distress in particular situations leading to changes in life-style.

A. Impairment, restriction, or distress in each of the following three adaptive patterns.

1. Difficulty from at least two of the seven traits characteristic of high novelty seeking.
2. Difficulty from at least two of the seven traits characteristic of low reward dependence.
3. Difficulty from at least two of the seven traits characteristic of low harm avoidance.

B. Impairment, restriction, or distress in each of the following three groups of adaptive patterns.

1. The combination of high novelty seeking and low reward dependence, as evidenced by difficulty from at least one of the four traits in the opportunistic cluster.
2. The combination of high novelty seeking and low harm avoidance, as evidenced by difficulty with at least one of the four traits in the impulsive aggressive cluster.
3. The combination of low reward dependence and low harm avoidance, as evidenced by difficulty in at least one of the four traits in the oppositional cluster.

**COMPARISON WITH TRADITIONAL DESCRIPTIONS**

**Antisocial Personality**

Antisocial personality is defined here as the personality variant characterized by the basic response characteristics of high novelty seeking, low harm avoidance, and low reward dependence. This combination is associated with second-order traits of impulsive-aggressive, oppositional, and opportunistic behavior. This description is essentially identical to the traditional concept of the "primary psychopath" described by Cleckley and others.

Antisocial personality as defined here is a more narrow group than current *DSM-III* criteria based on the behavioral descriptions of Robins. Robins' criteria correspond most closely to the second-order cluster of impulsive-aggressive traits, and do not distinguish well between individuals with high and low reward dependence. In other words, overt antisocial behavior is frequently seen in both antisocial personality and histrionic personality. It is also occasionally seen in passive-aggressive or explosive personalities as defined here, particularly when the latter are complicated by abuse of alcohol and other drugs that reduce harm-avoidant behavior.

**Histrionic Personality**

Histrionic personality is defined here in terms of the basic response patterns of high novelty seeking, low harm avoidance, and high reward dependence, which are associated with the second-order traits of being impulsive, gullible or emotionally vulnerable, and narcissistic. This corresponds closely to the *DSM-III* and ICD descriptions of histrionic or hysterical personality. These traditional groups are also characterized by their narcissistic traits (dramatic, attention-seeking, self-indulgent, vain), vulnerability and emotional dependence (dependent, seeking reassurance, warm, and charming), and impulsive-aggressive traits (craving for activity and excitement, angry outbursts, and suicidal behavior).

The *DSM-III* description of borderline personality disorder also shows a similar combination of traits, with the emotional dependence and identity disturbance relatively more prominent than the narcissistic traits. It remains questionable whether borderline personality is really distinct from histrionic personality and other clinical groups. Quantitative ratings along each basic response dimension would be useful to specify possible differences in the degree of deviation along one or more personality dimensions.

**Passive-Aggressive Personality**

Passive-aggressive personality is defined here in terms of the basic response characteristics of being high on all three dimensions, which is associated with second-order traits of being narcissistic, hypothyamic, and passive-avoidant. The passive-avoidant trait cluster includes behavior that is deferential and ingratiating; use of indirect methods of manipulation such as pouting, postponing, forgetting, or inefficiency; social avoidance caused by fear of rejection; and frequent outbursts of verbal anger that are partially inhibited. Systematic description of patients with passive-aggressive personality shows that they are characterized by the full combination of traits described herein. Passive-aggressive subjects were described as being high in novelty seeking ("impulsive," "sudden, unpremeditated action," "frequent outburts of verbal anger," "neglects responsibilities"), as well as high in both harm avoidance and reward dependence or passive-avoidant (no physical aggression but indirectly "manipulative"). As expected of individuals high in all three dimensions, they were easily distressed ("nervous") and moody ("gloomy, cries often"), without meeting full criteria for major depression.

The *DSM-III* currently defines the disorder only in terms of traits in the second-order passive-avoidant cluster. Consequently, this broad definition yields a highly heterogeneous group. In particular, the broad *DSM-III* definition leads to overlap with passive-dependent personality, which differs in terms of novelty-seeking behavior. In contrast, the ICD does not distinguish sharply between explosive and passive-aggressive personalities, which differ in reward dependence.

**Explosive Personality**

Explosive personality is defined here in terms of the basic response characteristics of high novelty seeking, high harm avoidance, and low reward dependence, which are associated with the second-order traits of being alienated, opportunistic, and hypothyamic. This corresponds to the ICD description of individuals who are characterized by their difficulty in inhibiting their outbursts of rage. These individuals are moody and experience frequent unfriendly feelings toward others. However, the ICD description does not sharply distinguish between hypothymic individuals who are socially involved or high in reward dependence (passive-aggressive) and those who are low in reward dependence or socially detached (explosive). To emphasize the utility of this distinction, I have elsewhere suggested that a more specific name for this group would be "explosive schizoid personality" to reduce heterogeneity in individuals who are called explosive or schizoid. Furthermore, individuals who are low in reward dependence may be regarded as schizoid simply because they are emotionally cool and socially detached. However, this term either needs to be qualified by associated variation in other traits or should be used more restrictively.

**Obsessional Personality**

Obsessional personality is narrowly defined here in terms of the basic response characteristics of low novelty seeking, high harm avoidance, and low reward dependence, which is associated with the second-order traits of being rigid, alienated, and self-effacing. The second-order cluster of "rigid-patient" traits caused by the combination of low novelty seeking and high harm avoidance includes patient or unassertive behavior and preoccupation with maintaining order and safety by attention to rules and organizational...
details. The information-processing style associated with this second-order cluster corresponds closely to broad definitions of obsessional personality.67 Here a further distinction is made between rigid individuals who are high in reward dependence (passive-dependent individuals who are also scrupulous and avoidant) and those who are low in reward dependence (obsessional who are also self-effacing and alienated). This distinction corresponds closely to the traditional differentiation of “oral” or passive-dependent traits from “anal” or obsessive traits.45,69 Traditional obsessional traits include being self-effacing (ie, unable to express warm emotions) and alienated (obstinate, self-willed, aloof), as well as rigid and orderly.4 This traditional distinction is clinically important, because rigid individuals who are low in reward dependence are at greater risk for compulsive rituals than are those with passive-dependent personality.70

Obsessional and explosive personalities are alienated in that they cynically view the world as an unfriendly place for everyone in general, but they are not suspicious or paranoid in the sense of actively seeking confirmation of preconceived ideas that they have been singled out as special targets for harm or abuse. This distinction between paranoid and obsessional thinking has been well described by Shapiro.71

Schizoid Personality

Schizoid disorder is narrowly defined here in terms of being low on all three basic response dimensions, which is associated with the second-order traits of being oppositional, hyperthymic, and self-effacing. Schizoid individuals are highly resistant to social pressures to conform to the wishes of others because they are socially detached (low reward dependence), self-confident (low harm avoidance), and rigid (low novelty seeking). In addition, schizoid individuals are described as self-effacing because they prefer privacy and have a restricted ability to express warm feelings. This description corresponds closely with the definitions of schizoid personality in both the DSM-III and ICD, which require low reward dependence (emotional aloofness and absence of warm tender feelings for others, few friends, indifference to praise) and possibly low harm avoidance (indifference to criticism). However, despite the correspondence in concept, the DSM-III criteria do not strictly require anything but low reward dependence.

Accordingly, clinical groups identified with such a broad definition are highly heterogeneous.63-64 Elsewhere, I have recommended that the term impermeable schizoid be used to make clear the more restrictive definition suggested here.34

Cyclothymic Personality

Cyclothymic personality is defined here in terms of the basic response characteristics of low novelty seeking, low harm avoidance, and high reward dependence, which are associated with the second-order traits of being scrupulous and usually hyperthymic but gullible and vulnerable to frustration and rejection. Such individuals are warm and socially sympathetic but highly self-confident authoritarians. Although they are usually cheerful and optimistic, they are also moody or dysphoric in response to being cheated or rejected. This corresponds closely to classical descriptions of cyclothymic personality.57-58

However, current criteria in the DSM-III and ICD do not strictly distinguish between such a stable temperamental variant and mild endogenous mood disorder without the associated temperamental variant. In fact, in the DSM-III, cyclothymic disorder is listed only with affective disorders, not personality disorders. Reliable methods are available for identifying a broadly defined group of individuals with subclinical affective disorders.74 However, it should be possible to distinguish between the personality disorder defined here and mild affective disorders without the associated personality variant. Individuals with the personality variant should have other personality traits that are not necessarily associated with mood disturbances. For example, cyclothymic personality should be associated with being frugal (low novelty seeking) and persistent (high reward dependence), with the dysphoric states being reactive to frustrating loss of expected rewards, rather than autonomous.

Passive-Dependent Personality

Passive-dependent personality is defined here in terms of the basic response characteristics of low novelty seeking, high harm avoidance, and high reward dependence, which is associated with second-order traits of being scrupulous, rigid, and passive-avoidant. Thus, the combination of high reward dependence and high harm avoidance is associated with such individuals being highly submissive, deferential, ingratiating, and highly sensitive to criticism, frustration, or punishment. This corresponds closely to descriptions of dependent personality in the DSM-III and ICD. However, obsessional traits of scrupulosity and rigidity are also prominent in this definition, but apparently are assigned to a separate category in the DSM-III and ICD. This full combination of traits corresponds closely to the triad of oral character traits.

The full triad has also been termed anxious personality based on the premorbid personalities of individuals with anxiety neurosis. Such individuals are described as having lifelong traits of being sensitive and socially sympathetic and overly conscientious or perfectionistic, and being neurotic introverts who are emotionally dependent and passively avoidant.10,15,70 Passive-dependent personality is more strongly associated with anxiety neurosis (ie, anxiety states uncomplicated by compulsions), whereas obsessive personality is more strongly associated with obsessive neurosis, so the distinction is clinically important.

THE CONCEPT OF AN INTERMEDIATE ADAPTIVE OPTIMUM

The close correspondence between traditional personality categories and those predicted as extreme variants of normal personality traits suggests that adaptive and maladaptive personality traits have the same underlying biogenetic structure. If the biogenetic structure for adaptive and maladaptive traits is the same, then what distinguishes normal from abnormal personalities? Consideration of the characteristics summarized in Figs 1 through 3 suggests that all extremes on these dimensions may be either an advantage or a disadvantage, depending on the situation. For example, an individual high in novelty seeking and low in harm avoidance may do well as an explorer or soldier, but would be ill-suited to work as an accountant, which requires careful and exact tabulation and long periods of tedious inactivity. The individuals who can adapt most flexibly to the full range of possible environmental situations are those who have average values on all three dimensions.

In other words, the adaptive optimum overall is expected to be for intermediate or nearly average values. Variants at either extreme (high or low) may excel in special situations but will be at a relative disadvantage overall. The expectation of an intermediate adaptive optimum is supported by the negative-feedback relationships described earlier between the systems for behavioral activation, maintenance, and inhibition. Also, an intermediate adaptive optimum is
supported by the observed pattern of inheritance of adaptive personality traits in the general population. The inheritance of such traits is consistent with additive polygenic and nonfamilial environmental effects, as expected when extreme high and extreme low values are equally disadvantageous overall. From an evolutionary perspective, balanced selection against either extreme results in the mean values and variability of the trait remaining stable across successive generations. Such balanced selection and intermediate adaptive optima may explain the persistence of extreme variants in the population.

Schizotypal and paranoid personality do not appear to be extreme variants of adaptive personality traits. Schizotypal and paranoid traits involve distorted or defective information processing regardless of the situation. This suggests that they would be more appropriately classified with schizophrenic and paranoid disorders.

**IMPORTANCE OF SOCIAL LEARNING FOR SUCCESSFUL ADAPTATION**

Polygenic contributions and nonfamilial environment, but not family environment or social learning, have been found to be substantial determinants of adaptive personality traits in random samples of the general population. In contrast, adoption studies show that family environment and social learning do influence the risk of social impairment from personality disorders such as antisocial personality or histrionic personality. For example, the risk of antisocial behavior in adulthood is increased by low social status, lax or inconsistent discipline, instability of the early home environment, or being reared by a criminal parent, even when the biologic parent background is taken into account. Similarly, social modeling of abnormal sick role behavior seems to increase the risk of disability from somatization in individuals with histrionic traits. This suggests the hypothesis that personality disorders may be extreme variants of personality traits that are maladaptive because of inflexible responses to particular situations and additional influences from inconsistent or inappropriate social learning.

Elsewhere, I have reviewed evidence suggesting that aversive conditioning serves the maturation function of increasing harm-avoidant behavior and decreasing novelty seeking and reward dependence. As a result of this sensitization or maturation process, individuals exposed to consistent aversive conditioning become more cautious, less exploratory and impulsive, and less sensitive to peer pressures. For example, if a child who is high in novelty seeking and low in harm avoidance receives strict and consistent discipline, he is less likely to persist in extremely impulsive or aggressive behavior.

Conversely, a child who is high in harm avoidance and reward dependence is likely either to develop chronic anxiety from long-term sensitization in an aversive or hostile situation in which safety and danger cannot be reliably distinguished or to develop reactive depression from frustration when there is loss of control over rewards and gratification. Such a child is most likely to avoid disability when provided with “desensitization” in a reassuring and consistently supportive environment. Modification of behavior in response to experience is an important adaptive mechanism, and may account for the importance of social opportunity and family environment in the risk of impairment from personality traits.

**FREQUENCY OF PERSONALITY VARIANTS**

The rating approach described here permits quantitative ratings of the three basic dimensions (Tables 1 through 3). It also permits identification of deviant clinical subgroups using explicit criteria. If the categorical approach is used, it is reasonable to question whether we need to identify variants besides the third-order clusters that correspond closely to the most consistently recognized traditional categories. For example, should we distinguish variants such as the second-order narcisissitic, or avoidant, clusters? Some of these second-order clusters do appear in the DSM-III but others do not. Omission of some probably results from cultural biases and prior lack of a systematic method for defining categories.

The expected frequency of these second-order clusters in the general population suggests that they should be included in a comprehensive system. If the theoretical assumption of three independent normal distributions is granted, some simple calculations permit a guess about what we might expect for the frequency of different variants. Specifically, if we designate the proportion of the population with nearly average values on each one of the dimensions as p and the remainder on each one of the dimensions as q, then the frequency of being average on all three dimensions is $p^3$, the frequency of being nonaverage on only one dimension is $3pq^2$, the frequency of being nonaverage on exactly two dimensions is $3pq^2$, and the frequency of being nonaverage on all three dimensions is $q^3$. If about half of the population is nearly average ($p = q = 1/2$), then among every eight people in the general population we expect one to be nearly average on all three dimensions, three to be deviant (high or low) on one dimension, three to be deviant on two dimensions, and one to be deviant on all three. There are eight possible three-way combinations, and $6 \times 2 = 12$ possible two-way combinations. Therefore, about $(1/4) \times (1/4)$ or 2% of the population have each three-way combination, and $(1/4) \times (1/2)$ or 8% have each two-way combination. Such calculations should be considered at best as crude guesses because of the assumption of multivariate normality and the neglect of possible developmental modification from environmental contributions. Also, not all extreme variants will have enough disability to warrant a diagnosis of personality disorder. However, these calculations do suggest that the recognition of the second-order clusters is likely to be of as much practical importance as the recognition of the more traditional third-order clusters.

**COMMENT**

The close correspondence between extreme variants of normal personality traits and traditional personality disorders suggests that the underlying biogenetic structure of adaptive personality traits and maladaptive personality traits may be the same. The only observed exceptions are schizotypal and paranoid traits, which appear to be relatively discrete defects rather than adaptive variants. The relationship of personality variants to schizophrenic and affective psychoses has been discussed in more detail elsewhere.

The degree of correspondence with traditional descriptions is surprising given the nonsystematic nature of the clinical approach to classification. Whether the general theory of personality described here is true, the hypothesis has heuristic value because it simplifies, systematizes, and quantifies the description and diagnosis of personality variants. The systematic method described here could be used to guide future revisions of the DSM-III and the ICD based on fundamental stimulus-response characteristics rather than culture bound traditions. This approach has a number of other implications for both clinical practice and research on personality and psychopathology.
Future Directions for Clinical Practice

The most basic implication of this approach is that quantitative ratings of personality dimensions can be used in conjunction with categorical labels. Use of the categorical labels is an efficient way of grouping individuals and of communicating descriptive information to others. However, quantitative ratings of the basic response characteristics may have fewer pejorative connotations and provide more information about the degree of response bias on each dimension. This encourages assessment of response patterns in individuals with successful adaptation as well as those with social impairments. Such assessment can be extremely helpful in patient management, whether that management is based on cognitive, behavioral, and/or pharmacologic approaches. In fact, the theoretical perspective described here is intended to integrate and unify psychological and neurobiological approaches to patient assessment and treatment.

The TIPS was developed to aid clinicians in acquiring a thorough understanding of the concepts described herein. It can be adapted for clinical interviews by experienced clinicians, or it can be used by less experienced interviewers as a verbatim schedule or modified for use as a self-report instrument like the TPQ. Once the concepts are well understood, an experienced clinician can make assessments of a patient more efficiently in discussions that are individualized to the particular setting and subject. However, it is uncertain whether such individualized assessments are as reliable as standardized interviews or self-reports like the TPQ.

Future Directions for Research on Personality

The formulation of variation in personality in terms of basic patterns of response to conditioned signals of punishment, reward, and novelty should facilitate tests of the theory. First, further work applying the TIPS and TPQ in clinical and general population samples is needed to clarify the psychometric properties of the instruments and to develop versions for children. Clinical rating scales of personality in children have already been shown to have the same tridimensional structure demonstrated here in adults, to be moderately stable from the age of 10 years into adulthood, and to be predictive of adult behavioral adjustment. Next, tests of the theoretical constructs can be carried out by correlating ratings of the personality dimensions with performance in both information-processing and conditioning paradigms designed to assess responses to novel, aversive, and rewarding stimuli. The neuroanatomic localization of such response functions could be assessed in part by positron-emission tomography or topographical analysis of event-related potentials of the electroencephalogram under a variety of stimulus conditions. Such studies should be carried out in populations that are successfully adapted, as well as impaired groups. Comparison of inheritance in both successfully adapted and impaired individuals could provide tests of the hypothesis that social learning and family environment are important determinants of the risk of psychopathology or functional impairment.

Research on clinical applications would also be warranted because of the implication that therapy can be specialized to take into account the particular response characteristics of the individual in treatment. Use of quantitative measures for such assessment should increase the power to test the effect of differences in personality traits on individual differences in response to treatment.

Overall, the theory outlined here should facilitate the integration of research in a number of specialty areas of psychology, psychiatry, and the neurosciences. This is meant to address the challenge that makes psychiatry such a unique field of clinical science: our need to understand how behavior is modified by experience or how man learns to adapt to changes in his environment. More practically, the method described here should simplify the efforts of clinicians to describe personality variation systematically. It is much easier to quantify variation along three dimensions that are systematically defined in terms of basic response characteristics than it is to try to remember the details of criteria for numerous arbitrary categories.

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References


64. Torgersen S: Genetic and nosological aspects of schizotypal and borderline personality disorders: A twin study. Arch Gen Psychiatry 1984;41:546-554.


80. Mair RG, Langlais PJ, Mazurek MF, Beal MF, Martin JB, McEntee WV: Reduced concentrations of arginine vasopressin and MHG in lumbar CSF of patients with Korsakoff's psychosis. Life Sci, in press.

