Pleasure-Arousal-Dominance: A General Framework for Describing and Measuring Individual Differences in Temperament

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Evidence bearing on the Pleasure-Arousal-Dominance (PAD) Emotional State Model was reviewed and showed that its three nearly orthogonal dimensions provided a sufficiently comprehensive description of emotional states. Temperament was defined as average emotional state across a representative sample of life situations. The Plea-sure-Arousability-Dominance (PAD) Temperament Model was described. Evidence relating the PAD Temperament Model to 59 individual difference measures was reviewed. Formulas were offered for use of P, A, and D temperament scores to compute and predict a variety of personality scores (e.g., Anxiety, Depression, Panic, Somatization, Empathy, Affiliation, Achievement, Extroversion, Arousal Seeking, Loneliness, Neuroticism, Suicide Proneness, Binge Eating, Substance Abuse, Emotional Stability, Dependency, Aggressiveness, and Fidgeting).

An essential requirement of any integrated science is the availability of a few basic dimensions suitable for analyses of all its problems. Indeed, the fundamental difference between the natural and social sciences is that natural sciences have such basic dimensions (e.g., length, time, mass), whereas social sciences do not. Mehrabian (1980) noted that study of affect or emotions was handicapped for decades because of behaviorist bias, despite strong, though somewhat unsystematic, clinician interest in the subject. He suggested that this neglected area of human function could possibly yield a useful set of basic dimensions for psychology. His rationale was that affective or emotional states constitute the substrate of, and are operative in, any human function. To demonstrate the heuristic value of emotions as the foundation for the analysis of behavior, Mehrabian (1980; 1991a) used analogous sets of scales to describe (a) emotions, (b) persons, and (c) situations. A narrow segment of his approach, dealing with emotions and temperament, will follow.

FOUNDATIONS OF THE PAD TEMPERAMENT MODEL

Distinguishing Emotions and Temperament

The state versus trait distinction is useful for characterizing differences between emotions and temperament. "Emotional states" refer to transitory conditions of the

organism—conditions that can vary substantially, and even rapidly, over the course of a day (e.g., feeling alert versus tired, hungry versus sated, happy versus unhappy). In contrast, "emotional traits" (i.e., "temperament" or characteristic emotional predispositions) are stable over periods of years or even a lifetime.

From a measurement standpoint, *emotional traits* (or temperament) can be inferred by measuring and averaging an individual's *emotional states* across a wide and representative sample of everyday situations (Mehrabian, 1978a). Since a combination of discrete emotional states (e.g., anger, depression, elation, fear, relaxation) cannot be averaged meaningfully, a conceptual system is needed to identify basic dimension of emotions. Once such basic dimensions are available, averages of emotional states across situations can be obtained readily.

Rationale for Basic Dimensions of Emotional States

A substantial body of available evidence helped to formulate a general framework for emotional states. The semantic-differential factors of evaluation, activity, and potency were replicated consistently in studies of judgments of highly diverse stimuli. Early studies, which, for instance, investigated reactions to concepts, sonar signals, or paintings, yielded the same three factors (Osgood, Suci, & Tannenbaum, 1957; Snider & Osgood, 1969). Subsequent work showed that the same or similar sets of three factors could be used to describe emotions and social cues, including postures, body positions, facial and vocal expressions, gestures, and movements (e.g., Bush, 1973; Mehrabian, 1972; Mehrabian & Ksionzky, 1974; Osgood, 1966; Williams & Sundene, 1965). Essentially, the semantic differential factors were affective dimensions and provided the foundation for (metaphorical) comparisons of objects and events in highly distinct realms of experience (Osgood, 1969). For instance, subjects matched (grouped) highly distinct stimuli in different sense modalities by relying on common emotional connotations of the stimuli (Osgood, 1960).

In agreement with Osgood (1960; 1969), Mehrabian and Russell (1974a, chapter 2) noted that the semantic differential factors emerged in diverse experimental settings because they dealt with affective reactions and because such reactions were operative in any situation. Accordingly, preliminary measures (six items each) for emotional-state counterparts of each of the three semantic-differential factors were developed (Mehrabian & Russell, 1974a, table 2.3).

The first of the latter three scales assessed State Pleasure-displeasure, defined as positive versus negative affective states (e.g., excitement, relaxation, love, and tranquility versus cruelty, humiliation, disinterest, and boredom). Pleasure-displeasure corresponded to cognitive judgments of evaluation, with higher evaluations of stimuli being associated with greater pleasure induced by the stimuli.

Judgments of high-low stimulus activity corresponded to State Arousal-nonarousal, defined in terms of level of mental alertness and physical activity (e.g., sleep, inactivity, boredom, and relaxation at the lower end versus wakefulness, bodily tension, strenuous exercise, and concentration at the higher end). A measure of stimulus "information rate" designed to assess stimulus activity correlated positively with State Arousal (Mehrabian & Russell, 1974b).

Finally, judgments of stimulus potency corresponded to State Dominance-submissiveness—higher potency stimuli eliciting lower dominance responses. Dominance-submissiveness was defined as a feeling of control and influence over one's surroundings and others versus feeling controlled or influenced by situations and others (e.g., anger, relaxation, power, and boldness versus anxiety, infatuation, fear, and loneliness).

The State Pleasure, State Arousal, and State Dominance scales accounted for 27, 23, and 14 percent of variance, respectively, in emotional responses to various everyday settings. Furthermore, absolute values of the intercorrelations among the three scales were .07, .03, and .18, showing considerable independence among the scales (Mehrabian & Russell, 1974a, p. 26).

The Pleasure-Arousal-Dominance (PAD) Emotional State Model (figure 1) was tested in relationship to 42 verbal-report scales of emotional response developed by other investigators. Findings showed that almost all the reliable variance in the 42 scales was explained in terms of the three PAD scales (Russell & Mehrabian, 1977a). The latter results were interpreted as indicating that the PAD Emotional State Model provided a reasonably general characterization and measurement of emotional states. In a subsequent comprehensive study, Russell (1980) showed that two dimensions of the PAD Model (State Pleasure and State Arousal) helped account for a substantial portion of the variance in self-reported affective states. He also attributed part of the remaining unexplained variance to social orientation and control (identified by Sjoberg & Svensson, 1976) and/or State Dominance (identified by Mehrabian & Russell, 1974a).

Finally, Shaver et al. (1987) studied 135 emotion terms using multidimensional scaling analyses. Two-dimensional, as well as three-dimensional, solutions were explored. The coordinates in the two-dimensional solution were labeled "Evaluation" and "Intensity." Those in the three-dimensional solution were labeled "Evaluation," "Potency," and "Activity." The three-dimensional representation was "shown to be statistically justifiable and highly interpretable" (p. 1072). Further, in comparing their two- and three-dimensional solutions, Shaver et al. concluded that "The three-dimensional solution helps to differentiate between what the cluster analysis suggests are separate basic-emotion categories, and it is clearly more informative as a representation of emotion knowledge than the two-dimensional solution" (p. 1071).

Mehrabian (1995c) used the Item Pre-calibration Method (Mehrabian, 1978a) to expand and improve the preliminary PAD emotion scales. He selected pairs of emotion terms that differed on only one of the three PAD dimensions while being nearly equal with respect to the remaining two. Each pair of emotion terms constituted an item of one of the three PAD emotion scales and was presented to subjects in semantic differential format. Subjects used 80 systematically selected situation descriptions to describe their feelings using the PAD scales.

A succession of three studies (Mehrabian, 1995c) led to progressive refinement of scale items and resulted in the following three PAD emotion scales: a 16-item State Pleasure Scale (eight positively, and eight negatively, worded items), a 9-item State Arousal Scale (four positively, and five negatively, worded items), and a 9-item State Dominance Scale (four positively, and five negatively, worded items). Reliabilities

FIGURE 1
Three Faces of Emotion:
A Representation of the Pleasure-Arousal-Dominance Emotional State Model
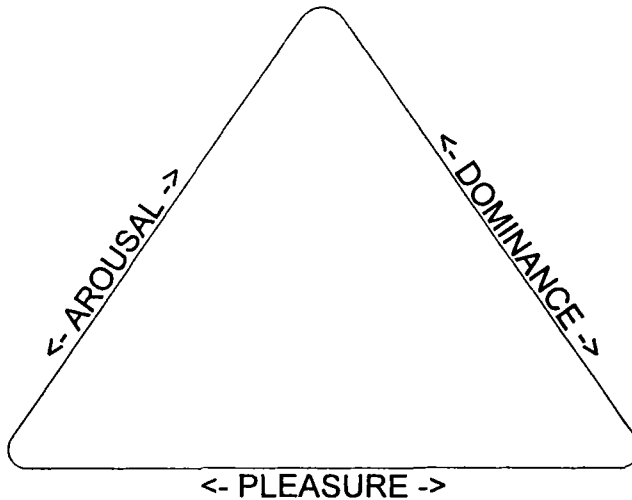
were .97 for the State Pleasure Scale, .89 for the State Arousal Scale, and .80 for the State Dominance Scale. Factor analysis of all 34 items from the three scales yielded three factors (Pleasure, Arousal, Dominance) that accounted for 58% of the total variance. Absolute values of the factor intercorrelations did not exceed .05. Furthermore, absolute values of intercorrelations among the three total scale scores did not exceed .07.

In sum, the three factors of the semantic differential (Osgood, Suci, & Tannenbaum, 1957) have provided a useful foundation for the general description of emotions. Although use of only two of these factors has been tempting because of greater simplicity, adequate characterization of important distinctions among certain clusters of affect (e.g., fear, sadness, anger) has necessitated a three-dimensional representation. Furthermore, diminishing returns from additional factors (in terms of explained variance) did not justify the added theoretical complexity (Mehrabian, 1995c). Thus, sufficient explanation of variance, conceptual economy, and diminishing returns dictated that three dimensions constituted the optimum number for describing emotions.

Rationale for Basic Dimensions of Temperament

The field of personality description and measurement is replete with attempts aimed at providing general descriptive systems. The advent of factor analysis provided much impetus to such efforts, but researchers quickly recognized that factor analysis, in itself, could not be used to establish the superiority of one set of personality factors over others. The results of factor analysis are limited by the pool of items or variables that are factored. In particular, deliberate or inadvertent overemphasis of certain groups of variables will result in the extraction of factors related to the overemphasized

variables. For instance, a theorist who includes a disproportionately large number of achievement and affiliation items in his/her supposedly general sample of items will "discover" achievement and affiliation to be two major personality factors.

Indeed, the currently popular Big-five personality factors and measures (e.g., Costa & McCrae, 1992; Goldberg, 1992) have been criticized for this very reason. The Big-five derive from work by Tupes and Christal (1961) who admitted that the factors they had identified were not the only basic personality factors (p. 12). Furthermore, Boyle, Stankov, and Cattell (1995) noted that (a) Tupes and Christal used questionable factor analytic procedures and (b) Norman's (1963) widely cited replication of, and justification for, Tupes and Christal's Big-five was achieved, simply because Norman selected variables that were know to load on the Big-five. Thus, proponents of the Big-five seem to have been overzealous in their adherence to that approach and to have overlooked the fundamental bias in variable selection that produced the apparent consensus regarding five basic personality factors.

The semantic differential factors of Evaluation, Activity, and Potency (EAP) differ substantially from force-fitted factorial approaches to personality description. *The EAP factors did not emerge from studies of personality or any personality-oriented theory or bias*; instead, they were identified repeatedly in highly diverse areas of psychological study. Thus, it is difficult to dismiss widespread replications and generality of the EAP factors as being the outcome of a particular investigator's (or like-minded group's) experimental or theoretical bias. Instead, Mehrabian (1980; 1991a) suggested that the latter factors emerged repeatedly in diverse areas of psychological study *because they dealt with emotions and because emotions mediate relationships among any set of stimuli, on the one hand, and behaviors, on the other.*

If emotions can be described adequately in terms of pleasure-displeasure (the counterpart of Evaluation), arousal-nonarousal (the counterpart of stimulus Activity), and dominance-submissiveness (the inverse of stimulus Potency), then, identification of basic dimensions of temperament follows simply and logically (Mehrabian, 1978a). Temperament can be defined as an individual's generalized emotional predisposition and be assessed in terms of characteristic patterns and/or averages of the states of pleasure, arousal, and dominance across representative life situations. Needless to say, alternative rotations of the PAD emotion and temperament factors are possible and can result in recurrent "re-inventions of the wheel" in the form of "new and basic dimensions" of emotion or personality.

THE PAD TEMPERAMENT SCALES

Three nearly orthogonal measures of Trait Pleasure-displeasure, Trait Arousability, and Trait Dominance-submissiveness have been developed. The Trait Pleasure-displeasure Scale (Mehrabian, 1978a; 1994a) indexes the relative predominance of positive versus negative affective states across a representative sample of life situations. It is composed of 22 adjective pairs (e.g., "affectionate-nasty" or "snobbish-generous"). The precalibrated adjectives in each pair differ only with respect to pleasure-displeasure, but are equal with respect to arousal-nonarousal and dominance-submissiveness.

The adjective pairs are presented to subjects in semantic differential format and subjects show *how they feel in general* by placing a check mark in one of nine spaces separating each pair of adjectives.

The Trait Arousability Scale (Mehrabian, 1977; 1994b; 1995a) is a measure of how easily a person is aroused by "high information" (i.e., complex, changing, and/or unexpected—Mehrabian & Russell, 1974b) stimuli and how slowly his/her arousal returns to baseline levels. The 34-item Trait Arousability Scale can be viewed as measuring emotionality, but, without the negative bias that, typically, is present in measures of emotionality. Sample items of the scale are, "I get happy or sad easily (+)," or "I am not affected much by the positive or negative mood of a crowd (–)."

The Trait Dominance-submissiveness Scale (Mehrabian & Hines, 1978; Mehrabian, 1994c) assesses a person's characteristic feelings of control and influence over his life circumstances versus feelings of being controlled and influenced by others or events. Sample items of the 26-item Trait Dominance Scale are, "I go my own way instead of following others (+)," and "Sometimes I hesitate to express my ideas (–)."

Reliabilities of the PAD temperament scales. Alpha internal consistency/reliability coefficients for the three scales are as follows: .93 for the Trait Pleasure-displeasure Scale (Mehrabian, 1994a), .90 for the Trait Arousability Scale (Mehrabian, 1994b), and .91 for the Trait Dominance-submissiveness Scale (Mehrabian, 1994c).

Intercorrelations among the PAD temperament scales. Intercorrelations among the three PAD scales are generally less than .20 in absolute value. In one recent study, the Trait Pleasure Scale correlated .03 with the Trait Arousability Scale, and correlated .15 with the Trait Dominance Scale; the Trait Arousability Scale correlated .07 with the Trait Dominance Scale (Mehrabian, 1995b).

Social desirability correlations of the PAD temperament scales. The Crowne and Marlowe (1960) Social Desirability Scale and the PAD temperament scales were administered to 75 subjects by Mehrabian (1995b). The Social Desirability Scale correlated .22 with the Trait Pleasure Scale, –.04 with the Trait Arousability Scale, and .10 with the Trait Dominance Scale. None of these three correlations attained the .05 level of significance, although the Social Desirability/Trait Pleasure correlation was of borderline significance. In another study, the Social Desirability Scale correlated .34 ($p < .01$) with the Trait Pleasure Scale, –.19 ($p > .05$) with the Trait Arousability Scale, and .21 ($p > .05$) with the Trait Dominance Scale (Mehrabian, 1996b). Thus, correlations of the PAD temperament scales with the Social Desirability Scale were satisfactorily low.

THE PAD TEMPERAMENT SPACE

Trait Pleasure, Trait Arousability, and Trait Dominance define three nearly independent axes of a temperament space. Points in this space define individuals, segments or regions of the space define personality types, and straight lines drawn through the intersection point of the three axes define various personality dimensions.

To illustrate some of the personality types in the space, it is helpful to dichotomize

each of the three axes, as follows: +P and –P for pleasant and unpleasant, +A and –A for arousable and unarousable, and +D and –D for dominant and submissive, temperament, respectively. Next, the following labels can be used to describe the resulting octants of temperament space (Mehrabian, 1987; 1991a):

- Exuberant (+P+A+D) vs. Bored (–P–A–D)
- Dependent (+P+A–D) vs. Disdainful (–P–A+D)
- Relaxed (+P–A+D) vs. Anxious (–P+A–D)
- Docile (+P–A–D) vs. Hostile (–P+A+D)

It should be noted also that, in the PAD Temperament Model, Trait Pleasure-displeasure also serves as a general index of psychological adjustment-maladjustment. Individuals with pleasant temperaments are categorized as psychologically adjusted, whereas those with unpleasant temperaments are considered maladjusted. Thus, Exuberant, Dependent, Relaxed, and Docile temperament types illustrate four distinct categories of psychological adjustment, whereas Bored, Disdainful, Anxious, and Hostile types exemplify four categories of psychological maladjustment.

Mehrabian (1991b) provided detailed illustrations of the eight personality types previously noted and related these to categories of psychological adjustment/maladjustment in common use.

ANALYSIS OF PERSONALITY SCALES IN THE PAD
TEMPERAMENT MODEL

Extensive studies have been conducted in our laboratory to relate the PAD Temperament Model to existing personality scales. These data will be summarized using linear regression equations. In each equation, a given personality scale (e.g., a measure of Affiliation) is described as a function of a linear combination of Trait Pleasure (P), Trait Arousability (A), and Trait Dominance (D) Scale scores.

With very few exceptions, all the following equations are written for standardized variables and .05-level significant effects. Quantities in parentheses to the right of each equation are multiple-regression coefficients.

Personality Scales that Relate Primarily to Only One of Three Axes in Temperament Space

The simplest equations are those representing personality measures that relate only, or primarily, to one of the three PAD temperament scales. The latter personality measures are noted in the following three sections that deal with Trait Pleasure, Trait Arousability, and Trait Dominance, respectively.

Scales Weighted Mostly by Trait Pleasure

Mehrabian (1995b) obtained equations 1 and 2a, given below, for the Wiggins,

Trapnell, and Phillips (1988) Nurturance Scale and for Goldberg's (1992) Big-five Agreeableness factor. Results for the Agreeableness Scale were replicated in a second study (Mehrabian, 1996b) and are given in equation 2b. Equation 2c was derived by weighting the data in equations 2a and 2b equally. Equation 3 for Jackson's (1967) Defendence (or defensiveness) Scale is taken from Mehrabian and O'Reilly (1980) and is set apart from the first four equations because of its opposite relationship with Trait Pleasure.

1.	Nurturance (Wiggins et al.)	=	.71 P	+.12 A		(.73)
2a.	Agreeableness (Goldberg)	=	.71 P		−.15 D	(.70)
2b.	Agreeableness (Goldberg)	=	.76 P	+.17 A	−.20 D	(.76)
2c.	Agreeableness (Goldberg)	=	.73 P	+.11 A	−.18 D	(.73)
3.	Defendence (Jackson, 1967)	=	−.24 P			(.24)
4.	Alcohol Use (Mehrabian, 1994f)	=	−.21 P			(.21)

It is seen that Nurturance and Agreeableness are strong positive correlates of Trait Pleasure-displeasure. Nurturance also involves a small, though significant, positive Trait Arousability component. Also, Agreeableness involves small, though significant, elements of arousability and submissiveness (equation 2c).

Two additional individual differences relate only to unpleasant temperament characteristics. Defendence (being suspicious and expecting others to do one harm) is a weak negative correlate of Trait Pleasure. Furthermore, findings with an unselected sample of normal subjects have shown that Alcohol Use is a weak negative correlate of Trait Pleasure (Mehrabian, 1994f).

Scales Weighted Mostly by Trait Arousability

Personality traits and individual differences that relate primarily to Trait Arousability include the following:

5.	Mysticism	=	+.30 A		(.30)
6.	Drug Use (Mehrabian, 1994f)	=	+.33 A		(.33)
7.	Obesity	=	+.20 A		(.20)
8.	Sex (male = 1, female = 0)	=	−.28 A	+.15 D	(.33)

Mehrabian, Stefl, and Mullen (1996) defined "Mysticism" as a predisposition to *believe without foundation,* "evidenced by reliance on vague or incomprehensible, magical, esoteric, alien, and unfounded concepts and hypotheses to understand and explain one's own and others' experiences" (Mehrabian et al., 1996, p.5). Equation 5 shows that the sole significant temperament component of Mysticism is Trait Arousability; that is, individuals who are more predisposed to use magical, esoteric, and unfounded ideas tend to be more arousable. Absence of a significant Trait Plea-

sure component in equation 5 shows that Mysticism is unrelated to psychological adjustment-maladjustment.

Equation 6 shows that habitual levels of Drug Use correlate positively with Trait Arousability (Mehrabian, 1994f). Alcohol, marijuana, barbiturates, and opiates reduce arousal (e.g., Russell & Mehrabian, 1977b). Furthermore, frequent use of stimulants such as caffeine, nicotine, amphetamines, or cocaine also has a paradoxical arousal-reducing effect (e.g., Mehrabian, 1986). Thus, habitual recreational drug use in the general population has the net effect of arousal reduction; furthermore, arousal reduction is reinforcing in "stressful" life situations (i.e., situations that induce displeasure, high arousal, and submissiveness). Since the detrimental effects of stress are more pronounced for more arousable persons (e.g., Mehrabian & Ross, 1979), such persons are more likely to be tempted by recreational drugs in their efforts to achieve temporary and partial relief from stress. Drug use may have been ascribed erroneously to stimulation or arousal seeking because the latter are positive correlates of Trait Arousability (note equation 26 for the Arousal Seeking Scale).

Mehrabian, Nahum, and Duke (1986) developed a measure of Predisposition to Obesity (i.e., the tendency to gain weight easily) as a basic factor of individual characteristics related to eating. The factor was composed of the following attributes, including negatively worded (–) items: being overweight, having to diet, having to exercise to maintain a normal weight; being naturally thin (–), eating as much as desired without gaining weight (–). Equation 7 is taken from Mehrabian, Nahum, and Duke (1986, Table 4) and shows that individuals who are more predisposed to obesity tend to be more arousable. Finally, equation 8, taken from Mehrabian and O'Reilly (1980), indicates that men tend to be less arousable and more dominant than women.

Scales Weighted Mostly by Trait Dominance

Personality scales and individual differences relating primarily to Trait Dominance are illustrated by the following:

9. Dominance (Wiggins et al.)	= .16 P	+.62 D	(.66)
10. Dominance (Jackson, 1967)	=	+.72 D	(.72)
11. Endurance (Jackson, 1967)	=	+.39 D	(.39)
12. Autonomy (Jackson, 1967)	= −.14 A	+.32 D	(.37)
13. Sensitivity to Rejection	= .14 A	−.71 D	(.74)
14. Conformity (Mehrabian & Stefl)	=	−.68 D	(.68)
15. Harm avoidance (Jackson, 1967)	=	-.40 D	(.40)
16. Cognitive Structure (Jackson)	=	−.32 D	(.32)
17. Social Recognition (Jackson)	=	−.18 D	(.18)
18. Age (Mehrabian & Blum, 1996)	=	−.16 D	(.16)

Equations 13 through 18 are set apart from equations 9 through 12 because the two sets of equations tap roughly opposing sets of traits. Equation 9, taken from Mehrabian (1995b), shows that Wiggins's Dominance Scale also includes a small positive contri-

bution from Trait Pleasure. Equations 10 through 13 are taken from Mehrabian and O'Reilly (1980). Jackson's (1967) Dominance Scale relates only to Trait Dominance. Based on Equation 11, Jackson's (1967) Endurance Scale (persevering, patient and unrelenting, determined) can be interpreted as being a component of a general measure of Trait Dominance. Jackson's Autonomy Scale (independent, rebellious, avoids restraints and confinement, enjoys being free) also relates positively to Trait Dominance. In addition, Equation 12 shows more Autonomous persons to be less arousable.

Equation 13 represents Mehrabian's (1970) Sensitivity to Rejection Scale. Reviewing evidence bearing on that scale, Mehrabian (1994e) concluded that Sensitivity to Rejection is simply a general measure of social submissiveness and, understandably, is a strong negative correlate of Trait Dominance. Equation 14, taken from Mehrabian and Stefl (1995), shows Conformity to be only a negative correlate of Trait Dominance. The latter finding suggests that Conformity can be viewed simply as being an important component of the general Trait of Dominance-submissiveness.

Equations 15 through 17 are taken from Mehrabian and O'Reilly (1980). Jackson's (1967) scales in this group have the following definitions: Harm avoidance (desire for personal safety and avoidance of activities that involve a risk of bodily harm), Cognitive Structure (avoidance of ambiguity or uncertainty, desire for clarity, perfectionism), Social Recognition (concerns about reputation and respectability, socially proper, agreeable). All three of the latter scales assess submissiveness and are unrelated to Trait Pleasure or to Trait Arousability.

Prohaska, Parham, and Teitelman (1984) used the Mehrabian Achieving Tendency Scale (Mehrabian, 1994–95) and found that the elderly were less achievement oriented than a comparison sample of younger adults. Since Achieving Tendency relates primarily to Trait Dominance—see equations 50 and 51 below), the latter finding implied possible decrements in Trait Dominance in advancing age.

Following this line of reasoning, Mehrabian and Blum (1996) proposed a simple, yet general, formulation of the effects of aging on personality and/or temperament. They suggested that the elderly, compared with the middle-aged or young, are less likely to feel they have control over their activities and life circumstances and, instead, are more likely to feel controlled by others and situations. Thus, it was hypothesized that Trait Dominance and personality traits weighted highly by Trait Dominance (e.g., Achieving Tendency) tend to decline in advancing years.

Hypothesized relationships of age with Trait Dominance and Achieving Tendency were supported in three studies by Mehrabian and Blum. In particular, their Study Two used a large sample of 332 subjects ranging in age from 20 to 85 years. Significant negative age/Trait Dominance relationships were obtained for both sexes and the magnitude of the effect for both sexes is given in equation 18.

Although the effect in equation 18 is weak, it nevertheless provides a very general conceptualization of the effects of age on temperament. For instance, consider the basic diagonals in three-dimensional temperament space. Individuals who possess Exuberant (+P+A+D), Relaxed (+P–A+D), Disdainful (–P–A+D), and Hostile (–P+A+D) temperaments are likely to show less of these characteristics with advanc-

ing age. In contrast, those who are Dependent (+P+A–D), Docile (+P–A–D), Bored (–P–A–D), and Anxious (–P+A–D) are likely to exhibit more of these characteristics with advancing age.

PERSONALITY SCALES THAT RELATE TO THE EXUBERANT (+P+A+D) VERSUS BORED (–P–A–D) DIAGONAL IN TEMPERAMENT SPACE

A large number of personality scales represent lines extending from the Exuberant (+P+A+D) octant in temperament space to the Bored (–P–A–D) octant in that space. The latter measures can be grouped, broadly, into scales that deal with (a) interpersonal orientations and (b) general orientations to situations. The following two groups of scales are listed separately. Categorization of scales into the two groups is somewhat arbitrary and approximate. Some of the scales exhibit significant components on only two of the three temperament dimensions and others (e.g., Extroversion, Intellect) encompass both interpersonal and situational orientations.

Scales that Describe Interpersonal Orientations

The following personality scales tend to characterize important aspects of an individual's interpersonal orientation, although they also can be highly suggestive of a person's habitual ways of dealing with situations.

19.	Extroversion (Eysenck et al.)	= .21 P	+.17 A	+.50 D	(.60)
20a.	Extroversion (Goldberg)	= .31 P		+.45 D	(.59)
20b.	Extroversion (Goldberg)	= .24 P		+.72 D	(.83)
20c.	Extroversion (Goldberg)	= .30 P		+.58 D	(.71)
21.	Exhibition (Jackson, 1967)	= .11 P	+.11 A	+.60 D	(.64)
22.	Affiliation (Jackson, 1967)	= .44 P	+.20 A	+.26 D	(.59)
23.	Affiliation (Mehrabian, 1970)	= .47 P	+.24 A		(.54)
24.	Nurturance (Jackson, 1967)	= .41 P	+.12 A	+.17 D	(.49)
25.	Empathic Tendency (Mehrabian)	= .23 P	+.59 A		(.65)

Extroversion. Equation 19, taken from Mehrabian and O'Reilly (1980), shows the Extroversion Scale (Eysenck & Eysenck, 1968) is weighted mostly by Trait Dominance. Mehrabian (1971) videorecorded and scored nonverbal behaviors of individuals in face-to-face interactions. An important behavioral factor in the study was postural relaxation because it consistently had been shown to be a primary nonverbal indicator of dominant-submissive feelings (e.g., Mehrabian, 1972; 1981). Findings for the Postural Relaxation factor (arm position asymmetry + sideways body lean + reclining body lean while seated) showed that more extroverted persons were more relaxed in face-to-face communications. Together, then, the latter findings showed that extroverts (classified according to the Eysenck Extroversion Scale) were behaviorally more dominant in face-to-face interactions with others. The results in equation 19 corroborated

the Extroversion/dominance relationship in showing that the Eysenck Extroversion Scale was, indeed, primarily a measure of Trait Dominance.

Equation 20a is taken from Mehrabian (1995b). The latter results were replicated in a second study (Mehrabian, 1996b) and are given in equation 20b. Equation 20c was derived by weighting the data in equations 20a and 20b equally and shows that Goldberg's (1992) Big-five Extroversion Factor resembles the Eysenck Extroversion Scale in important respects: both scales include positive contributions from Trait Dominance and Trait Pleasure, with Trait Dominance being weighted about twice as much as Trait Pleasure. However, Goldberg's Extroversion lacks a significant contribution from Trait Arousability.

Exhibition and affiliation. Equations 21 through 23 are taken from Mehrabian and O'Reilly (1980). Exhibitionism (wanting to be the center of attention, have an audience, draw attention to oneself, be dramatic) is weighted primarily by Trait Dominance, although it does have significant positive contributions from Trait Pleasure and Trait Arousability.

Affiliation (equation 22), as measured by Jackson (1967), resembles Extroversion in that it includes a significant Trait Dominance component. In contrast, Affiliation (equation 23), as measured by Mehrabian (1970), was designed to be a relatively pure measure of characteristic interpersonal approach-avoidance, while being neutral with respect to predispositions to control and/or influence others. Understandably, then, Mehrabian's (1970; 1994e) Affiliative Tendency Scale does not relate to Trait Dominance.

Most importantly, both Affiliation scales (equations 22 and 23) show Trait Pleasure and Trait Arousability to be positive correlates of Affiliation, with Trait Pleasure weighted about twice as much as Trait Arousability. Mehrabian (1994e) reviewed evidence showing that high-low Affiliative Tendency includes the following intercorrelated characteristics: (a) generalized positive-negative social expectations, (b) positive-negative interpersonal behaviors correlated with those expectations, and (c) positive-negative feedback received from others that supports the generalized expectations.

Overall, then, positive correlations of Affiliation scales with the Trait Pleasure Scale (equations 22 and 23) show that positive-negative social expectations and Trait Pleasure-displeasure are correlated positively. In this context, it is expected that personality scales involving generalized positive interpersonal orientations (liking others, wanting to be with others, wanting to be helpful to others, depending on others, empathizing with others) should have a positive Trait Pleasure component. In addition and, secondarily, such scales are also expected to have a positive Trait Arousability component.

Jackson's (1967) Defendence Scale (expecting that others mean one harm, vigilance to defend oneself, easily offended, unable to accept criticism) illustrates generalized negative interpersonal orientations and, as expected, was found to be a negative correlate of Trait Pleasure (equation 3). More extreme variants of Defendence, including pathological suspiciousness and paranoia, also illustrate generalized negative interpersonal orientations and are hypothesized to include unpleasant, arousable, and dominant temperament characteristics. Finally, adults who were abused as children are expected

to have learned to generalize the negative social expectations of their childhood to social relationships in general. The unpleasant temperament characteristics associated with such generalized negative social expectations are, in turn, expected to be manifested in generally negative social (and possibly abusive) behaviors towards others, including their own offspring.

Nurturance and empathic tendency. Equations 24 and 25 are taken from Mehrabian and O'Reilly (1980). The expectation of pleasant and arousable characteristics for individuals with positive interpersonal orientations was confirmed for Jackson's (1967) Nurturance Scale and for Mehrabian and Epstein's (1972) Emotional Empathic Tendency Scale. Nurturance (giving sympathy, helping others in need, caring for children or the infirm) has a pattern of +P, +D, and +A coefficients decreasing in magnitudes that is also evident in Jackson's Affiliation Scale (equation 22). The two scales (Affiliation and Nurturance) differ mainly in that the PAD coefficients for Nurturance are slightly weaker than the PAD coefficients for Affiliation. Thus, the two scales, despite differences in content and label, are nearly identical when analyzed within the PAD Temperament Model. Incidentally, the weaker weights for Nurturance in comparison to Affiliation are probably due to lower reliability of the Nurturance Scale.

The preceding comparison of Jackson's (1967) Affiliation and Nurturance scales (equations 22 and 24) illustrates use of the PAD Model to analyze the "temperament ingredients" of various scales. Such analyses help identify substantial similarities among scales that have different labels (e.g., equations 9 and 10 for Dominance and equation 14 for Conformity) or, alternatively, help identify significant differences among scales that have similar labels (e.g., differences in Trait Dominance coefficients in equations 22 and 23 above).

"Temperament ingredients" analysis using the PAD Temperament Model is useful in comparing equation 1 for Wiggins's, with equation 24 for Jackson's, Nurturance Scale. Both scales exhibit significant positive Trait Pleasure and Trait Arousability components, with Trait Pleasure weighted more in each case. Furthermore, Jackson's Nurturance Scale includes a positive Trait Dominance component and is consistent with his definition of Nurturance that clearly implies taking a more dominant role vis-à-vis those nurtured. In comparison, Wiggins's Nurturance Scale lacks a Trait Dominance component, thus appearing to be a less valid measure of Nurturance insofar as it includes a less appropriate balance of PAD components for nurturance as previously defined.

Equation 25 provides the temperament coefficients for the Emotional Empathic Tendency Scale (Mehrabian & Epstein, 1972). The latter scale was developed to assess vicarious emotional reactions to others' emotional experiences (e.g., feeling unhappy or sad in response to another's misfortune or feeling pleased and gratified by another's success). Emotional Empathy, then, represents arousability in response to unusual (emotional) interpersonal cues. Thus, it is not surprising that equation 25 shows Emotional Empathy to be weighted primarily by Trait Arousability. The positive Trait Pleasure component in equation 25 suggests that empathic individuals also tend to be interpersonally positive.

Scales that Describe Orientations to Situations

The following personality scales also relate to the Exuberant-Bored diagonal but, instead of characterizing specific interpersonal orientations, tend to characterize ways in which individuals generally relate to situations.

26.	Arousal Seeking (Mehrabian)	= .14 P	+.26 A	+.55 D	(.63)
27.	Change (Jackson, 1967)	= .14 P	+.14 A	+.44 D	(.50)
28.	Play (Jackson, 1967)	= .13 P	+.18 A	+.28 D	(.37)
29.	Sentience (Jackson, 1967)	= .25 P	+.36 A	+.27 D	(.53)
30a.	Intellect (Goldberg)	= .21 P	+.24 A	+.37 D	(.53)
30b.	Intellect (Goldberg)	=	+.28 A	+.60 D	(.59)
30c.	Intellect (Goldberg)	= .14 P	+.20 A	+.48 D	(.54)
31.	Understanding (Jackson, 1967)	=	+.14 A	+.37 D	(.38)
32.	Impulsivity (Jackson, 1967)	=	+.25 A	+.29 D	(.36)
33.	Physically Active (Mehrabian)	= .26 P		+.40 D	

Arousal and change seeking, playfulness, and sentience. Equations 26 through 29 are taken from Mehrabian and O'Reilly (1980). Whereas scales dealing with positive interpersonal orientations (e.g., Affiliation, Nurturance), noted in the previous section, are weighted highly by Trait Pleasure, scales dealing with Change and Arousal Seeking are weighted more by Trait Dominance. Jackson's (1967) Change Scale (liking new and varied experiences) and Mehrabian's (1978b) measure of Arousal Seeking Tendency (seeking change, unusual stimuli, risk, new environments, and having a general sensual orientation) exhibit similar sets of PAD emphases. The temperament components of Jackson's (1967) Play Scale (engaging in games, sports, social activities, and other amusements just for fun, being light-hearted and easy-going) resemble those for Arousal Seeking and Change, but involve a weaker Trait Dominance component.

Sentience (or a general sensuous orientation) includes a nearly balanced positive contribution from all three PAD components and, thus, provides the closest approximation to the Exuberant (+P+A+D) diagonal in temperament space.

Intellect, understanding, and impulsivity. Equation 30a for the Big-five Intellect factor (Goldberg, 1992), taken from Mehrabian (1995b), was augmented by equation 30b, which was based on additional findings from a replication study (Mehrabian, 1996b). Equation 30c was derived by weighting the data in equations 30a and 30b equally. Although Goldberg's (1992) Big-five Extroversion factor lacks a significant contribution from Trait Arousability (note equation 20c), his measure of Intellect or Sophistication, at least in terms of its PAD components, constitutes a superior index of Extroversion. The latter assertion is justified by the very high similarity in the PAD coefficients for Eysenck's Extroversion Scale (equation 19) and for Goldberg's Intellect or Sophistication factor (equation 30c).

Thus, Extroversion and Intellect, two of the so-called Big-five personality factors

that exhibit considerable overlap in terms of their Trait Dominance and Trait Pleasure components, are significantly and positively intercorrelated (e.g., $r = .31$, $p < .05$, Mehrabian, 1995b, Table 1), and have questionable labels.

Equation 31 shows that an individualls tendency to seek and value Understanding (desire for knowledge and synthesis of ideas) correlates positively with Trait Dominance and, to a lesser degree, with Trait Arousability. The positive relationship between Trait Dominance and Understanding suggests that the latter trait is more likely to be a characteristic of those who have a greater habitual tendency to control their affairs and environments.

Impulsivity (acting without deliberation, readily expressing one's wishes and feelings, being emotionally expressive) involves almost equal positive contributions from Trait Dominance and Trait Arousability (equation 32). Thus, more impulsive persons are more dominant, not being deterred by social or situational constraints in expressing their wishes, attitudes, and emotions. Furthermore, they are more arousable, which is manifested, in part, by greater volatility of their emotional expressions.

Physical activity. Equation 33 is based on correlations provided by Mehrabian, Nahum, and Duke (1986, Table 4) and shows that greater habitual levels of physical activity tend to be associated with more dominant and more pleasant temperament characteristics. The coefficients for Trait Pleasure and Trait Dominance in equation 33 are estimates only and represent correlations of the latter scales, respectively, with the dependent measure. Since, however, Trait Pleasure (P) and Trait Dominance (D) have a low intercorrelation (e.g., Mehrabian, 1995b), the estimates in equation 33 constitute close approximations to coefficients that would have been obtained from a regression analysis.

Mehrabian, Nahum, and Duke's (1986) results were corroborated in a study of individuals who habitually engaged in strenuous sports. Mehrabian and Bekken (1986) compared the temperament characteristics of persons who, at the time of testing, had an extended history of regular and heavy participation in aerobics, running, or weight lifting. There were no significant temperament differences among the six cells constituting the 2 Sex (male, female) × 3 Sport (aerobics, running, weight lifting) conditions. However, temperaments of athletes as a group differed significantly from general population norms. The mean standardized Trait Pleasure score of athletes (.32) and the mean standardized Trait Dominance score of athletes (.40) significantly exceeded the corresponding population means of zero. The trait Arousability mean for athletes (−.04) did not differ significantly from the population mean. Thus, as in equation 33, compared with Trait Pleasure, Trait Dominance was a stronger discriminator of physically active persons. Also, consistent with results given in equation 33, Trait Arousability did not discriminate between active and nonactive persons.

Together, findings from the Mehrabian, Nahum, and Duke (1986) and Mehrabian and Bekken (1986) studies consistently showed that more physically active persons or those who more regularly participated in strenuous sports tended to have more dominant and more pleasant temperament characteristics, listed in order of importance. Comparison of the latter findings (e.g., equation 33) for Physical Activity with equa-

tions 38 and 39 for Depression (forthcoming) shows that the two sets of personality characteristics differ diametrically in terms of dominant and pleasant temperament characteristics. Conceivably, then, regular programs of physical activity and sports may be beneficial for those suffering from depression. Indeed, studies, reviewed by Mehrabian and Bekken (1986), have shown that exercise can help improve affect.

PERSONALITY SCALES THAT RELATE TO THE RELAXED (+P–A+D) VERSUS ANXIOUS (–P+A–D) DIAGONAL IN TEMPERAMENT SPACE

Assignment of personality scales to the following group is, once again, somewhat arbitrary, insofar as some of the scales exhibited significant relationships with only one or two of the PAD temperament components.

34. Neuroticism (Eysenck)	$= -.26$ P	$+.49$ A	$-.25$ D	(.63)
35. Trait Anxiety (Spielberger)	$= -.43$ P	$+.29$ A	$-.37$ D	(.69)
36. Trait Anxiety (Mehrabian)	$= -.47$ P	$+.33$ A	$-.18$ D	(.65)
37. Test Anxiety (Mandler et al.)	$=$	$+.24$ A	$-.20$ D	(.33)
38. Depression (Mehrabian & Bernath)	$= -.42$ P	$+.09$ A	$-.37$ D	(.55)
39. Depression (Mehrabian, 1995f)	$= -.50$ P	$+.13$ A	$-.36$ D	(.71)
40. Loneliness (Russell et al.)	$= -.50$ P		$-.15$ D	(.55)
41. Panic (Mehrabian, 1994g)	$= -.26$ P	$+.37$ A		(.45)
42. Somatization (Mehrabian, 1994g)	$= -.31$ P	$+.29$ A		(.42)
43. Shyness (Cheek, 1983)	$= -.29$ P	$+.13$ A	$-.56$ D	(.67)
44. Globality (Mehrabian et al.)	$= -.28$ P	$+.35$ A	$-.31$ D	(.66)
45. Suicide Proneness	$=$ –P	$+$A	$-$D	
46. Lethality of suicide attempt	$=$	$+.48$ A		(.48)
47. Binge Eater (Mehrabian et al.)	$= -.25$ P	$+.22$ A	$-.20$ D	
48. Anorexic (Mehrabian et al.)	$= -.26$ P	$+.16$ A		

The Anxious Pole

Neuroticism, trait anxiety, depression, and loneliness. Equations 34 and 35 are taken from Mehrabian and O'Reilly (1980) and equation 36 is taken from Mehrabian (1996b). These three equations show that Neuroticism (Eysenck & Eysenck, 1968) and Trait Anxiety (Mehrabian, 1994d; Spielberger, Gorsuch, & Lushene, 1970) involve varying degrees of unpleasant, arousable, and submissive temperament characteristics. Thus, the three scales represent variants of the Anxious (-P+A–D) versus Relaxed (+P–A+D) temperament diagonal.

The Test Anxiety Questionnaire (Mandler & Sarason, 1952) has often been used as a general measure of Trait Anxiety. Findings for the Test Anxiety Questionnaire (TAQ) in equation 37 are taken from Mehrabian and O'Reilly (1980). It is seen that the TAQ is only a weak indicator of arousable and submissive characteristics and lacks a significant unpleasantness component. Thus, the TAQ is an inadequate and, probably,

misleading measure of Trait Anxiety.

Mehrabian and Bernath (1991) explored the PAD temperament components of depression by investigating a variety of depression scales in common use. Factor analysis of the depression scales yielded a primary-level Depression factor. Equation 38 provides an analysis of the latter Depression factor in terms of the PAD Model and is based on averaged regression coefficients from two studies (Mehrabian & Bernath, Table 4).

Equation 39 represents the temperament components of Mehrabian's Depression Scale (Mehrabian, 1996a). The results given in equations 38 and 39 are very similar and show that Depression consists of unpleasant, submissive, and marginally arousable temperament characteristics, listed in order of importance. (Trait Arousability was not significant in equation 38, but was marginally significant in equation 39). Construct validity of Mehrabian's Depression Scale (1994d) is evident in the comparison, insofar as the temperament components of the scale (equation 39) are almost identical to the temperament components of a Depression factor extracted from seven commonly used measures of depression (equation 38).

Historically, definition and measurement of the distinctive attributes of Depression versus Trait Anxiety have been difficult. Indeed, Mehrabian and Bernath's (1991) analysis of commonly used Depression scales showed that the latter included two primary-level factors: depression and anxiety. The present analysis of Depression in terms of the PAD Temperament Model yields a quantifiable distinction between Depression and Trait Anxiety. Equations 38 and 39 for Depression show that Depression is a weak positive correlate of Trait Arousability. In contrast, emotional *states* that resemble anxiety (e.g., being upset, distressed, bewildered, humiliated, in pain) consistently have been shown to be composed of unpleasant, aroused, and submissive PAD components (e.g., Mehrabian, 1995c). Furthermore, emotional *traits* associated with anxiety have also been shown to include positive Trait Arousability components. For instance, equations 35 and 36 for the Spielberger et al. (1970) and Mehrabian (1994d) Trait Anxiety scales showed significant positive contributions from Trait Arousability. Indeed, Trait Arousability was a significantly stronger component of the Trait Anxiety Scale in equation 36 than it was of the Depression Scale in equation 39. Furthermore, submissiveness was a stronger component of the Depression Scale (equation 39) than of the Trait Anxiety Scale (equation 36) (Mehrabian, 1996a).

Equation 40, taken from Mehrabian and Stefl (1995), shows that Loneliness (Russell et al., 1980) resembles Depression in terms of its significant temperament components. It differs from Depression, however, in that more submissiveness is associated with Depression than with Loneliness. Furthermore, unlike Depression, Loneliness is neutral with respect to Trait Arousability.

Panic, somatization and fainting. Equations 41 and 42 contain the PAD temperament components of the Panic and Somatization scales (Mehrabian, 1994g). "Panic attack" is defined as an unexpected and extremely intense episode of anxiety that lasts for brief periods (a few minutes to an hour). In contrast, "Somatization" refers to frequent, varied, and long-lasting somatic complaints that have no basis in physical dysfunction. These definitions suggest a relationship between Panic Disorder and Trait

Anxiety. Furthermore, insofar as Trait Anxiety is associated with worrying, complaints, and general preoccupation with negative affective states, a parallel relationship between Somatization Disorder and Trait Anxiety is also expected.

Results in equations 41 and 42 show that Panic and Somatization indeed resemble Trait Anxiety in that all three characteristics involve unpleasant and arousable temperament qualities. However, for the generally healthy subjects in Mehrabian's (1994g) study, unlike Trait Anxiety, Panic and Somatization were not associated with submissiveness. More importantly, equations 41 and 42 show that, despite lack of overlap in scale contents, the Panic and Somatization scales are nearly indistinguishable in terms of their PAD temperament components.

It may be of some interest to speculate about possible differences in feinting spells and panic attacks. Feinting can be brought on by extreme congestion and heat, by exiting from an air-conditioned building into a very hot street, or vice versa. Although panic attacks can include feinting or near-feinting, they are distinguished from feinting by the strong and palpable anxiety associated with panic that is absent during normal feinting episodes. Thus, it is hypothesized that individuals who are more susceptible to feinting are more arousable and, unlike those who are panic prone, are neutral with respect to Trait Pleasure.

Shyness. Temperament components of Cheek's (1983) Shyness Scale, taken from Mehrabian and Stefl (1995), are given in equation 43 and show that it resembles Trait Anxiety. However, it is important to note that submissiveness is the strongest component of *shyness*—a stronger component than it is of Trait Anxiety or Neuroticism scales. A study by Bruch, Gorsky, Collins, and Berger (1989) provided strong corroboration of the present temperament-based similarities among Shyness, Trait Anxiety, and Neuroticism. Bruch et al. found Shyness to be a very consistent predictor of behavioral, physiological, and cognitive indicators of anxiety.

Globality, the cognitive counterpart of Trait Anxiety. Mehrabian, Stefl, and Mullen (1996) used the concept of "Globality-differentiation" to characterize adult individual differences in cognitive development and to develop a corresponding scale. "Globality-differentiation" was defined, specifically, in terms of fusion versus differentiation of: (a) reality versus fantasy, (b) cognition, emotion, and behavior (e.g., emotional thinking and emotional action or impulsivity), and (c) self versus other.

Equation 44 shows that the temperament components of Globality-differentiation were highly similar to those for Trait Anxiety and Neuroticism (equations 34 through 36). Thus, Globality represents the cognitive counterpart of Trait Anxiety and/or Neuroticism (the emotional component). Together, Globality plus Trait Anxiety or Neuroticism compose the cognitive and emotional components, respectively, of a very general and important personality trait.

Suicidal characteristics. Results of a study of the temperament characteristics of suicide-prone individuals, taken from Mehrabian and Weinstein (1985), are summarized in equations 45 and 46. No coefficients are given in equation 45 because the results were based on *t*-tests comparing controls with suicide-prone persons. Compared with controls, suicide-prone individuals were significantly more arousable, less pleasant, and less dominant, with these three effects listed in decreasing order of

importance, that is, with greater arousability being the strongest discriminator between the two groups. Corroborating the importance of high arousability as a discriminator of suicide attempters was an additional finding that lethality of suicide attempts correlated .48 ($p < .05$) with Trait Arousability (equation 46).

Thus, the PAD Temperament Model provides additional clarification of relationships among Depression (equations 38 and 39), Trait Anxiety and Neuroticism (equations 34 through 36), and Suicidal characteristics (equations 45 and 46). The latter findings run counter to the conventional clinical wisdom that associates high suicide risks with Depression. Instead, the risk of suicide attempts appears to be greater for anxious or neurotic, than for depressive, individuals, as defined here. Attribution of high suicide risk to Depression probably has been due to inadequate diagnosis and/or distinction of Depression versus Trait Anxiety. Our data suggest that although unpleasant and submissive temperament characteristics contribute to suicidal tendencies, the risk of suicide attempts increases substantially when the latter characteristics are associated with high arousability.

It also should be noted that, in addition to high arousability, changes in life circumstances can also increase the risk of suicide attempts. High-information (i.e., complex, changing, unexpected) events (Mehrabian & Russell, 1974b) induce high arousal states. Thus, a depressive, as defined here, could experience continued high levels of arousal caused by loss of a mate, a job, or other persistent economic or interpersonal difficulties. In combination with the unpleasant and submissive characteristics of the depressive, situationally induced high arousal could thus result in the depressive becoming suicidal. The preceding analysis notwithstanding, our PAD analyses suggest that severe life stresses are more likely to drive the anxious or neurotic, than the depressive, to suicide.

Eating disorders. Coefficients for P, A, and D in equations 47 and 48 are taken from Mehrabian, Nahum, and Duke (1986, Table 4). The latter coefficients are estimates only and represent correlations of P, A, and D, respectively, with the dependent measures. These findings show that individuals with extreme scores on measures of Binge Eating and Predisposition to Anorexia exhibited temperament attributes similar to those of Trait Anxiety. Binge eaters, in particular, evidenced significant unpleasant, arousable, and submissive temperament qualities, whereas those Predisposed to Anorexia showed unpleasant and arousable characteristics only. The latter findings suggest that persons suffering from eating disorders are likely to manifest personality characteristics similar to those of the anxious and/or neurotic.

Overall, results given in equations 34 through 48 suggest that differential diagnosis of many of the characteristics (e.g., Neuroticism, Trait Anxiety, Depression, Loneliness, Panic, Somatization, Shyness, Globality, Suicide Proneness) is likely to be difficult. Alternatively, extreme manifestation of any one of these problems is likely to involve some or all of the remaining problems as well. Availability of the PAD Temperament Model and the preceding equations can thus be of some assistance when it is theoretically or clinically important to achieve more accurate differentiation among the various problem categories.

The Relaxed Pole

In the PAD Model, the opposite pole of Anxious (–P+A–D) is Relaxed (+P–A+D). A Relaxed temperament, then, represents an important variant of psychological health. Equations 49 through 54 are grouped separately and approximate a Relaxed temperament constellation.

49a. Emotional Stability (Goldberg)	= .37 P	–.44 A		(.57)
49b. Emotional Stability (Goldberg)	= .50 P	–.55 A		(.73)
49c. Emotional Stability (Goldberg)	= .46 P	–.48 A		(.64)
50. Achievement (Jackson, 1967)	=		+.31 D	(.31)
51. Achievement (Mehrabian, 1994f)	= .13 P		+.60 D	(.63)
52a. Conscientiousness (Goldberg)	= .20 P			(.20)
52b. Conscientiousness (Goldberg)	= .29 P		+.28 D	(.46)
52c. Conscientiousness (Goldberg)	= .25 P		+.19 D	(.35)
53. Desirability (Jackson, 1967)	= .34 P		+.28 D	(.48)
54a. Social Desirability (Crowne)	= .34 P	–.26 A	+.17 D	(.48)
54b. Social Desirability (Crowne)	= .35 P	–.20 A		(.40)

Emotional stability. Equation 49a was obtained by Mehrabian (1995b) and shows the temperament components for the Big-five Emotional Stability factor (Goldberg, 1992). Results for the Emotional Stability factor were replicated in a second study (Mehrabian, 1996b) and are given in equation 49b. Equation 49c was derived by weighting the data in equations 49a and 49b equally. All three equations consistently show that the Emotional Stability factor lacks a significant dominance component and, thus, cannot be used as an adequate measure of (the converse of) Trait Anxiety and/or Neuroticism. It does, however, represent one variant of psychological adjustment, insofar as it is weighted positively by Trait Pleasure.

Achievement and conscientiousness. The two measures of Achievement in equations 50 and 51 also represent (somewhat inadequate) assessments of Relaxed temperament. More importantly, it is seen that Achievement consists primarily of Trait Dominance. Achievement, as measured by Mehrabian (1994–95), also includes a secondary, but nevertheless important, positive contribution from Trait Pleasure. Thus, our PAD-based analysis of Achievement suggests that Achievement requires dominant (and related competitive) characteristics that are more likely to be rewarded when accompanied by pleasantness.

Equation 52a for the Big-five Conscientiousness factor (Goldberg, 1992), taken from Mehrabian (1995b), was augmented by equation 52b, which was based on additional findings from a replication study (Mehrabian, 1996b). Equation 52c was derived by weighting the data in equations 52a and 52b equally. Conscientiousness (equation 52c) and Achievement (equation 51) exhibit a weak resemblance in their PAD components, insofar as both involve pleasant and dominant characteristics. Thus, Conscientiousness could be viewed as a component of Achievement, or vice versa. Conscientiousness and Achievement do differ, however, in that the former includes a near balance between pleasantness and dominance, whereas the latter favors dominance

over pleasantness.

Social desirability. Social Desirability and/or Approval Seeking Tendency (Crowne & Marlowe, 1960) are typically viewed as confounding variables in personality testing. Results in equations 53 and 54a are taken from Mehrabian and O'Reilly (1980); those in equation 54b are taken from Mehrabian (1996b). Together, these three equations show that Social Desirability or Approval Seeking resembles a Relaxed temperament. Thus, the characteristic desire to be liked and to make a good impression on others is associated with psychological adjustment. This, indeed, is the reason why measures of psychological maladjustment are typically weighted negatively ("confounded") by Social Desirability.

PAD-based analysis of Social Desirability and/or Approval Seeking shows these to be (a) important individual-difference characteristics that are indicative of psychological adjustment and (b) traits that require treatment on an equal footing with other personality scales in common use. It is instructive to note the following experience of the present author in this context. In the 1960s, he was asked to develop a set of personality scales to help identify the best workers in a conglomerate of telephone answering companies. Measures of Achieving Tendency (Mehrabian, 1968, 1994–95) and Affiliative Tendency (Mehrabian, 1970, 1994e) were augmented by the Social Desirability Scale (Crowne & Marlowe, 1960) and were correlated with supervisor ratings of employee effectiveness. Although the Social Desirability Scale had been included to ascertain biased responding to the "legitimate" Achievement and Affiliation personality scales, Social Desirability was found to be the sole and positive predictor of employee effectiveness in these work settings!

PERSONALITY SCALES THAT RELATE TO THE DEPENDENT (+P+A–D) VERSUS DISDAINFUL (–P–A+D) DIAGONAL IN TEMPERAMENT SPACE

Jackson's Succorance Scale ("frequently seeks the sympathy, protection, love, advice, and reassurance of other people," Jackson, 1967, Table 1) is essentially a measure of Dependency. Equation 55, taken from Mehrabian and O'Reilly (1980), provides the PAD components of the scale.

55. Succorance (Jackson, 1967) $= .20\,P +.23\,A -.34\,D$ (.45)

Thus, Dependency includes pleasant, arousable, and submissive characteristics. Dependency, then, is similar to Affiliation (equations 22 and 23), but differs from Affiliation in that it involves submissiveness. Low scores on Succorance or Dependency represent the Disdainful end of the Dependent-Disdainful diagonal.

PERSONALITY SCALES THAT RELATE TO THE DOCILE (+P–A–D) VERSUS HOSTILE (–P+A+D) DIAGONAL IN TEMPERAMENT SPACE

Aggression, hostility, violence, and abusiveness. Emotional states such as angry, catty, defiant, hostile, insolent, and nasty have been shown to consist of unpleasant,

aroused, and dominant emotional-state components (Mehrabian, 1995c). Thus, emotional *traits* of anger, aggression, or hostility are expected to be positively interrelated and to reflect unpleasant, arousable, and dominant PAD components.

Accordingly, Jackson's Aggression Scale ("enjoys combat and argument; easily annoyed; sometimes willing to hurt people to get his way," Jackson, 1967, Table 1) can be considered to be a measure of Hostility as well. Equation 56, taken from Mehrabian and O'Reilly (1980), provides the expected PAD components for this trait. Low hostility scores, in turn, can be indicative of Docility.

Jackson's Infrequency Scale ("Responds in implausible or pseudo-random manner, possibly due to carelessness . . . passive non-compliance," Jackson, 1967, Table 1) represents two of the temperament components of Aggression. Infrequency lacks the Trait Arousability (or emotionality) component of Aggression or Hostility and, thus, may be described as "hostility that lacks much emotional volatility." Viewed in this way, Infrequency is consistent with careless, inconsiderate, and damaging responses to lengthy questionnaires.

Although data are not available, it is important to note that violent and mentally or physically abusive persons are expected to have unpleasant, arousable, and dominant temperament characteristics. Similarly, Type A personality, defined as including achievement orientation, competitiveness, aggressiveness, hostility, impatience, and restlessness (Jenkins et al., 1974) is expected to involve unpleasant, arousable, and dominant temperament components.

56. Aggression (Jackson, 1967) $= -.36\,P \;+.20\,A \;+.28\,D$ (.43)
57. Infrequency (Jackson, 1967) $= -.14\,P \qquad\qquad +.17\,D$ (.20)
58. Fidgeting $= -.26\,P \;+.22\,A$ (.35)
59. Extraneous Activities $= -.20\,P \;+.24\,A \;+.20\,D$ (.36)

Fidgeting. Mehrabian and Friedman (1986) defined "fidgeting" broadly as engaging in actions peripheral or nonessential to ongoing focal tasks or events. They applied the state-trait distinction to fidgeting to distinguish situationally induced and transitory variations in fidgeting from individual differences in habitual tendency to fidget. Findings they reviewed had shown that experimentally induced frustration, tension, discomfort, or irritation (i.e., –P+A–D states) produced increased fidgeting. To investigate fidgeting as a trait, they developed a 40-item questionnaire measure of Fidgeting Tendency (e.g., "I frequently rub my neck" (+), "I often click my teeth" (+), "I have a lot of restless movements" (+), "I don't tap or drum on things" (–), "I hardly ever rub my scalp" (–)). Equation 58, taken from Mehrabian and Friedman, represents the PAD temperament components of Fidgeting Tendency and shows that it may be associated with either or both of Anxious (–P+A–D) and Hostile (-P+A+D) temperaments.

Consistent with their broad-based definition of fidgeting, Mehrabian and Friedman also devised seven measures of individual tendencies to engage in extraneous and peripheral actions while engaged in a central or focal task: Consuming Alcoholic Drinks, Cigarette Smoking, Eating, Listening to Music or Watching TV, Daydreaming, Restlessness, and Insomnia (e.g., "I drink when I am talking with others socially"

(+), "I eat whenever I go to movies, shows, concerts, etc." (+), "Whenever possible, I have music to accompany my daily activities" (+), "I often daydream when my attention is demanded elsewhere" (+)). The sum of the latter seven scales assessed an overall individual tendency to engage in Extraneous Activities and was found to have the PAD temperament components given in equation 59.

Fidgeting and the tendency to engage in Extraneous Activities were conceptually related and intercorrelated positively. Thus, the combined weight of equations 58 and 59 suggested these traits were likely to be associated with Hostility (–P+A+D) that is manifested, specifically, in a low tolerance for routine, boring, or confining activities.

COMPUTATION (PREDICTION) OF PERSONALITY SCALE SCORES USING SUBJECTS' PAD SCORES

Computation of PAD Diagonal Scores

Equations 19 through 59 were grouped with reference to the four diagonals in PAD Temperament Space. Typically, the scales representing each diagonal are not ideal measures for the diagonal. Availability of PAD temperament scores for a subject, however, allows ready computation of idealized diagonal scores. The following equations can be used to compute scores relating to each of the four diagonals.

60. Exuberant-Bored $= .577 \times (+P +A +D)$
61. Dependent-Disdainful $= .577 \times (+P +A -D)$
62. Relaxed-Anxious $= .577 \times (+P -A +D)$
63. Docile-Hostile $= .577 \times (+P -A -D)$

To use equations 60 through 63, standardized subject scores on Trait Pleasure (P) (Mehrabian, 1994a), Trait Arousability (A) (Mehrabian, 1994b), and Trait Dominance (D) (Mehrabian, 1994c) are required. A subject's raw scores on the PAD scales can be converted to z scores, using the following equations:

64. Trait Pleasure z score $= $ (Trait Pleasure raw score $- 38) / 23$
65. Trait Arousability z score $= $ (Trait Arousability raw score $- 27) / 33$
66. Trait Dominance z score $= $ (Trait Dominance raw score $- 12) / 34$

If a subject's PAD z scores are P = 1.2, A = .5, D = -.8, application of equations 60 to 63 yields the following diagonal scores for the subject:

Exuberance $= .577 \times (1.2 + .5 - .8)$ $= .577 \times 0.9$ $= 0.52$
Dependency $= .577 \times (1.2 + .5 + .8)$ $= .577 \times 2.5$ $= 1.44$
Relaxation $= .577 \times (1.2 - .5 - .8)$ $= .577 \times (-.1)$ $= -.06$
Docility $= .577 \times (1.2 - .5 + .8)$ $= .577 \times 1.5$ $= .87$

This subject, then, has a moderately high z score of .52 on Exuberance, a very high z

score of 1.44 on Dependency, a neutral score on Relaxation, and a high z score on Docility. If the four diagonals are reversed, the same subject's scores are described as follows: -.52 for Boredom; -1.44 for Disdain; .06 for Anxiety; and -.87 for Hostility.

Computation of Specific Personality Trait Scores

The Eysenck and Eysenck (1968) Extroversion Scale (equation 19, duplicated here for convenience) will be used to illustrate use of the PAD scores to compute specific personality scale scores for a subject.

19. Extroversion (Eysenck et al.)   = .21 P   +.17 A +.50 D

Once again, equations 64 to 66 need to be used to first compute PAD z scores. To compute Extroversion z scores it should be noted that the independent variables P, A, and D in equation 19 are nearly orthogonal and each has been transformed to a z score. In this case, the variance of Extroversion approximately equals the sum of the squares of the three coefficients in equation 19 (i.e., .323). The square root of .323 (i.e., .57) nearly equals the standard deviation of Extroversion as computed in equation 19. Thus, dividing each coefficient in equation 19 by .57 results in the following linear transformation for Extroversion, which generates predicted Extroversion scores with a mean of zero and a standard deviation of 1.0.

19b.   Extroversion (Eysenck et al.)   = .37 P   + .30 A + .88 D

For a subject with PAD z scores of P = –1, A = .5, D = 2, the predicted Extroversion score is as follows:

Extroversion = [.37×(-1) +.30×(.5) +.88×(2)] = 1.54 showing a very high Extroversion score that is 1.54 standard deviations above the population mean.

Consider another example. Equation 41 for the Panic Scale (Mehrabian, 1994g), reproduced below, has two significant coefficients.

41. Panic (Mehrabian, 1994g)   = –.26 P   +.37 A

The variance for the Panic Scale is estimated from the sum of the squares of the two coefficients in equation 41 (i.e., .205). The standard deviation for Panic is the square root of .205 (i.e., .45). To obtain predicted Panic z scores, the coefficients in equation 41 are divided by .45, yielding equation 41b.

41b. Panic (Mehrabian, 1994g)   = –.58 P   +.82 A

Using equation 41b, the Panic score of the above subject with PAD z scores of P = -1, A = .5, D = 2 is:

Panic   =   –.58 (–1) +.82 (.5)   =.99

showing a high Panic score of nearly one standard deviation above the population mean for the subject.

DISADVANTAGES AND ADVANTAGES OF COMPUTED PERSONALITY SCORES BASED ON THE PAD MODEL

Disadvantages. Multiple-regression coefficients, given in parentheses to the right of each equation, index the accuracy with which each dependent variable is predicted. It is important to note that unreliability levels of the four measures (dependent measure and three PAD scales) constituting each equation reduce the multiple-regression coefficient of the equation. If, for instance, a dependent variable has a low reliability coefficient, the multiple-regression coefficient for the equation representing that variable is bound to be low as well.

As already noted, reliabilities of the PAD temperament scales range from .90 to .93 (Mehrabian, 1994a; 1994b; 1994c). Reliabilities of the dependent measures vary considerably and are available from their authors. Together, the extent of unreliability-reliability in dependent and independent scales of each equation leads to understatement of true strengths of relationships in the equation.

It is possible to adjust multiple-regression coefficients upward to compensate for unreliability of the variables in each equation and to reflect true relationships. For instance, one can first compute "corrected" correlations from which each equation is derived and then recompute that equation and its multiple-regression coefficient. One approach to computing a "corrected" correlation between any pair of measures is to use Spearman's (1904) formula to *correct for attenuation*: divide the correlation between the two measures by the square root of the product of reliabilities of the two measures.

For instance, Goldberg's Intellect Scale correlated .27 with the Trait Pleasure Scale and reliabilities of the two scales were .86 and .91, respectively (Mehrabian, 1995b). The corrected correlation corresponding to the obtained value of .27 equals .27/.88 = .31. All correlations used to compute equation 30c could be corrected in this way and a new equation with higher beta weights and multiple-regression coefficient would result.

Multiple-regression coefficients for some of the equations previously given are so low that even corrected correlations would fail to yield satisfactory equations. However, in other cases, moderate-level multiple-regression coefficients, when corrected, could yield reasonably satisfactory levels of confidence for predicting dependent measures. In sum, caution needs to be exercised in using the preceding predictive equations and, in large part, must rest on a user's estimate of the unreliability of the dependent measure predicted.

Advantages. Computed personality scores, using procedures described here, are useful when a subject's scores on a variety of personality dimensions are desired. This may be the case when a specific individual is subjected to intensive scrutiny, as during clinical intervention. Clients can be administered the PAD scales during an initial interview and, once PAD scores are available, other trait scores can be computed readily over time and as they are needed.

The PAD scales tend to be opaque (i.e., nonobvious) in comparison to measures of psychopathology that typically have obvious undesirable connotations. Because of

their opaque quality, the three PAD scales, as already noted, exhibited low and generally nonsignificant correlations with the Social Desirability Scale (Mehrabian, 1995b, 1996b). The single exception was a significant Trait Pleasure/Social Desirability correlation in one of two studies ($r = .34$, $p < .01$) (Mehrabian, 1996b). Accordingly, the PAD scales may be used to compute various indexes of psychopathology (e.g., Trait Anxiety) when the tester expects clients will be tempted to give highly desirable responses. Such applications of the PAD scales are useful in court-ordered psychological evaluations or when clinicians expect a client will be inclined to understate or minimize his/her psychological problems.

Computed scores can be used also in business and industrial settings when there is a strong possibility that subjects will respond with socially desirable answers to gain employment or to receive promotions. For instance, Achievement scales are desirable for selecting employees in numerous business settings. Unfortunately, Achievement scale scores obtained during pre-employment interviews may be tainted by applicant eagerness to gain employment. When, however, Achievement scores are computed from PAD scores, candidates are far less likely to detect the test objectives, thus being less able to slant their responses in favorable directions.

Finally, computed PAD-based personality scores can be useful also when psychologically sophisticated individuals are tested for advanced placement (e.g., admission to graduate school or employment in highly sensitive positions). For instance, admissions procedures for applicants to graduate programs in clinical psychology often include an intensive personal interview with the very best applicants. Such interviews are typically designed to ascertain applicants' psychological strengths or weaknesses in reference to clinical training and practice. Interviewer impressions lack reliability and/or validity and psychological tests are likely to yield superior results. However, use of Anxiety, Depression, or Neuroticism (or, conversely, of Nurturance, Empathy, or Affiliation) scales is also likely to involve validity problems in this context. Once again, the PAD scales, by virtue of their indirect and opaque quality, may produce useful results in such situations.

SOME FINAL CONSIDERATIONS

Emotion/Cognition Relationships in the PAD Model

Emotional States. As noted, the Pleasure, Arousal, and Dominance emotional state dimensions and scales are analogues of Evaluation, Activity, and Potency, respectively (Osgood, Suci, & Tannenbaum, 1957). Our interpretation of the EAP factors is that they represent the lowest common denominators of cognitive judgments. Furthermore, a basic premise of the PAD model is that emotions are the developmental precursors of elementary cognitive judgments and constitute the foundation for the latter (e.g., Valdez & Mehrabian, 1994, p. 407). According to this premise, *judgments, preferences, or attitudes require an emotional foundation and cannot operate in an emotional vacuum.*

The latter (mutually reinforcing) correlation between emotions and cognitive judg-

ments is most evident when individuals operate intuitively and/or without the benefit of formal instruction and education. Such intuitive knowledge is evident in the phenomena of synesthesia (e.g., Osgood, 1960) and provides much of the foundation for ergonomics (e.g., moving a lever up increases speed [or opens] and moving it down reduces speed [or closes], up means louder and down means softer, brighter colors can be used to elicit greater attention or arousal, darker and more saturated colors can be used to connote greater dominance).

Emotional Traits—Temperament. Emotion/cognition relationships are evident also in each of the PAD temperament dimensions and scales. That is, each of the Trait Pleasure, Trait Arousability, and Trait Dominance scales includes or is correlated with specific individual cognitive characteristics.

Trait Pleasure. Although contents of the Trait Pleasure-displeasure Scale deal exclusively with positive versus negative emotions, it nevertheless is correlated with generalized positive-negative expectations (i.e., general optimistic-pessimistic characteristics). Evidence regarding positive intercorrelations among (a) Affiliative Tendency, (b) Trait Pleasure, (c) generalized positive-negative social expectations, (d) corresponding positive-negative interpersonal behaviors, and (e) positive-negative feedback received from others that supports the generalized expectations has been noted (Mehrabian, 1994e). Thus, generalized positive interpersonal expectations and, more broadly, generalized optimism-pessimism constitute the cognitive counterpart of Trait Pleasure-displeasure.

Trait Arousability. The Trait Arousability Scale was formulated originally as incorporating both emotional and cognitive counterparts (Mehrabian, 1977; 1995a). The emotional component of the trait was defined in terms of pattern of arousal response to "information-rate spikes" (i.e., temporary increases followed by equal decreases in complexity, variation, or novelty of stimuli). Higher arousability involved greater arousal amplitudes and longer durations of habituation to such information-rate spikes, such as a sonic boom, a near-miss accident, or a surprise gift package.

The cognitive component of Trait Arousability was defined in terms of "Stimulus Screening," which describes a state or a trait. As a state, Stimulus Screening refers to the process whereby an individual, depending on his/her ongoing activity, attends more to certain elements of a situation while ignoring or simply being unaware of others. As a trait, Stimulus Screening describes the degree to which an individual habitually filters or ignores less relevant stimuli (e.g., background noise while working or the texture of one's clothing while socializing).

Stimulus Screening and Trait Arousability are negatively correlated because those who habitually screen more (screeners) process less complex and less varied information in comparison to others who habitually screen less (nonscreeners). A substantial amount of evidence has been accumulated in support of the Stimulus Screening/Trait Arousability hypothesis (Mehrabian, 1977; 1995a).

Trait Dominance. The Trait Dominance Scale also includes correlated emotional and cognitive components. As with the Trait Pleasure Scale, emotion-based items of the Trait Dominance Scale deal with the characteristic or average tendency to feel

dominant versus submissive (e.g., feeling powerful, domineering, or bold versus feeling infatuated, timid, or surprised). In contrast, the cognitive-based items of the scale deal with *generalized expectations of control versus lack of control* in dealing with situations and others (e.g., "I control situations rather than let them control me").

Overview of the PAD Temperament Space

The three nearly orthogonal scales comprising the PAD Temperament Space provide a convenient way of visualizing, comparing, and contrasting personality measures. A few personality scales related primarily to only one of the PAD scales. Measures of Nurturance and Agreeableness were positive correlates, whereas Defendence (suspiciousness and defensiveness) and Alcohol Use were negative correlates, of the Trait Pleasure Scale.

Mysticism, Drug Use, and Obesity were positive correlates of Trait Arousability and women were more arousable than men. In addition, proneness to ordinary fainting episodes devoid of anxiety was hypothesized to be a positive correlate of Trait Arousability.

Dominance, Endurance, and Autonomy were positive correlates of the Trait Dominance Scale. In contrast, Sensitivity to Rejection, Conformity, Harmavoidance, Cognitive Structure (desire for clarity, avoidance of uncertainty), Social Recognition (concerns about social reputation and respectability), and age were negative correlates of the Trait Dominance Scale.

Many personality scales included two or more significant PAD components and, therefore, were grouped and analyzed in reference to the four diagonals in temperament space. By far the largest group of scales related to the Exuberant (+P+A+D) versus Bored (−P−A−D) diagonal. These included measures of Extroversion, Exhibition, Affiliation, Nurturance, Emotional Empathic Tendency, Arousal Seeking, Change (seeking), Play (or playfulness), Sentience (or sensuousness), (desire for) Understanding, Impulsivity, and the tendency to be Physically Active.

The second largest grouping of personality scales related to the Relaxed (+P−A+D) versus Anxious (−P+A−D) diagonal. The negatively scored end of this diagonal was exemplified by measures of Neuroticism, Trait Anxiety, Test Anxiety, Depression, Loneliness, Panic, Somatization, Shyness, Globality (adult cognitive immaturity), Suicide Proneness, Lethality of Suicide Attempts, Binge Eating, and Anorexia. The positively scored end was exemplified, but only approximately, by measures of Emotional Stability, Achievement, Conscientiousness, and Social Desirability.

The Dependent (+P+A−D) versus Disdainful (−P−A+D) diagonal was illustrated by Succorance (or dependency). Negatively scored examples of the Docile (+P−A−D) versus Hostile (−P+A+D) diagonal were measures of Aggression, Infrequency, Fidgeting, and the related tendency to engage in Extraneous Activities. Type A personality and individual tendencies to be violent or mentally or physically abusive were hypothesized to correspond to the Hostile end of the Hostile-Docile diagonal.

The differential concentration of scales along the four diagonals bears testimony to the influence and validity of Eysenck's (1970) concepts and measures of Extroversion

and Neuroticism as fundamental to personality description. In the PAD Temperament Model, idealized measures of Exuberant-Bored and Relaxed-Anxious temperament can be computed using equations 60 and 62, respectively. Computed Exuberant-Bored temperament scores highlight temperament characteristics similar to Extroversion but differ from the latter by virtue of equal weighting of P, A, and D temperament components. Similarly, Relaxed-Anxious temperament scores resemble the opposite of Neuroticism, but assign equal absolute weights to the P, A, and D temperament components. Extreme Bored and Anxious scores, in turn, represent two important variants of psychological maladjustment.

The low incidence of scales relating to the Dependent-Disdainful and the Docile-Hostile diagonals suggests greater neglect, rather than relative unimportance, of these two dimensions. Extreme Disdainful and Hostile scores, computed using equations 61 and 63, respectively, also represent two additional variants of psychological maladjustment. Both could represent variants of antisocial personality, with Hostile temperament probably being more descriptive of the violent antisocial personality type and Disdainful temperament being descriptive of the nonviolent white-collar criminal.

Psychopathology Mapped into the PAD Temperament Space

A systematic effort is currently underway to map the DSM-III Diagnostic classifications into PAD temperament space. This should help pinpoint basic similarities and differences among various aspects of psychopathology and, more importantly, provide a conceptual underpinning to diagnostic classifications. A few hypotheses are noted to illustrate some likely outcomes of such an undertaking. Manic disorder relates positively, and Depressive disorder relates negatively, to the Exuberant-Bored diagonal; Anxiety, Panic, and Somatization disorders relate negatively to the Relaxed-Anxious diagonal; Paranoid disorders relate negatively to the Docile-Hostile diagonal; Antisocial Personality, depending on the accompanying degree of violence, relates negatively to the Docile-Hostile (for violent) and to the Dependent-Disdainful (for nonviolent), diagonal; Attention Disorders relate positively to Trait Arousability (and low Stimulus Screening); Alcohol Abuse relates negatively to Trait Pleasure and Drug Abuse relates positively to Trait Arousability; and Schizophrenic disorders, including Catatonic disorder, relate primarily to extremely high Trait Arousability and, secondarily, to low Trait Pleasure. Identification of common and distinctive temperament components for various classifications of psychopathology also should help in the search for appropriate psychotropic drugs to treat seemingly dissimilar disorders that share very similar temperament components.

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