CHAPTER 12

GENERAL AFFECTIVE DISPOSITIONS IN PHYSICAL AND PSYCHOLOGICAL HEALTH

Lee Anna Clark
David Watson

Several years ago, we reviewed the literatures relating "a number of apparently diverse personality scales—variously called trait anxiety, neuroticism, ego strength, general maladjustment, repression-sensitization, and social desirability" (Watson & Clark, 1984, p. 465) and concluded that these dimensions all represented facets of a broad underlying construct, which we termed negative affectivity (NA), following Tellegen (1982). Since then, a remarkable number of articles have been published that support and extend our view of NA as a stable and pervasive mood-dispositional dimension. In this chapter, we will discuss developments that have taken place in the intervening years. We will first summarize the key points of our original presentation for readers unfamiliar with this work. We will then discuss, from both substantive and methodological viewpoints, research that further documents the breadth and stability of the NA construct, including studies that have investigated its genetic etiology. Some of this work suggests that the influence of NA is even more pervasive than we had originally envisioned. Other studies indicate that NA may act as a confound (an underlying "third variable") leading to spurious correlations between variables previously thought to be more causally related to one another.

As we will see, the NA construct has important and broad implications for health. However, despite the pervasiveness of NA, a single dimension certainly cannot account for all health-related phenomena. Among other things, the importance of a second broad dimension, positive affectivity (PA), has become increasingly apparent. Positive Affectivity forms the core of extraversion, with components of well-being, energy, social dominance, affiliation, and perhaps achievement motivation and adventurousness (Watson & Clark, in press). It is noteworthy that, as regards health, NA has been shown to be related primarily to indices of poor physical and psychological health. Similarly, the low end of the PA dimension has been related to several indices of poor functioning. However, it is significant that when measures of positive health are considered, the PA dimension appears to play the more important role. Thus, we will also discuss research developments that regard the distinctive and complementary dimen-
sion of PA. Finally, we will place NA and PA in the context of a larger, three-factor model that is emerging at the interface of research in emotion, personality, psychiatry, and neurophysiology, and discuss directions for future research.

NEGATIVE AFFECTIVITY AS A "MOOD-DISPOSITIONAL" DIMENSION

We take no credit for "discovering" the basic phenomenon of NA. Earlier writers such as Eysenck, Block, Guilford, and Cattell all recognized the importance of this major personality dimension. What we have contributed to the field is conceptual—an interpretation of the NA construct as fundamentally an emotion-based trait. As such it can be linked to research into emotional states, emotional disturbance, and factors that affect both inter- and intra-individual variation in emotional experience. Further, although emotion-centered, the interplay between affect and cognition is critical to a full understanding of the NA construct.

Central Features

The single most important feature of NA is the pervasive tendency to experience a wide variety of negative and upsetting emotions. Distressed mood states such as anxiety, tension or jitteriness, and worry are central, but anger, frustration, hostility, contempt, disgust, guilt, worthlessness, dissatisfaction, feelings of rejection, sadness, loneliness, discomfort, irritability, and so forth also are frequently experienced by high NA individuals, even in the absence of obvious stressors (see Watson & Clark, 1984, Tables 5–7; Watson & Tellegen, 1985).

Closely associated with these emotional experiences is a negative self-concept and a propensity to self-criticalness (see Watson & Clark, 1984, Table 3). People high in NA tend to be dissatisfied with themselves and describe themselves unfavorably. They are also likely to be more introspective than low NA individuals, and tend to dwell particularly on their mistakes and failings (Block, 1965). There is also evidence that this negative bias is not limited to the self, but extends to encompass a more negative worldview. For example, high NA individuals interpret ambiguous stimuli more negatively (Goodstein, 1954; Phares, 1961), and rate their peers less favorably (Bass & Fielder, 1961; Kaplan, 1968). They are also more likely than those low in NA to view people (especially themselves) as victims of negative events (Crocker, Alloy, & Kayne, 1988).

Distinctive Characteristics

In addition to these substantive features, it is important to recognize several distinctive characteristics of the NA construct. First, NA is simultaneously a very broad and yet cohesive dimension. Although it manifests itself in such diverse areas as emotions, cognitions, social attitudes, self- and worldview, and behavioral adjustment, it nonetheless is a unitary concept. Measures of the various components of NA are intercorrelated to the point that a strong general factor almost inevitably emerges in factor analytic studies, and any self-report instrument with an evaluative component will almost invariably be correlated with measures of NA.

Second, as a mood-based disposition NA exhibits an unusual combination of stability and change. In the short run (up to 6 months), NA is highly stable, with average test-retest coefficients around .80. However, over periods of 1 to 5 years, stability falls to about .60 (Watson & Clark, 1984, Table 2). Yet, it is noteworthy that long-term stabilities (over 20 years) are only slightly less, averaging around .50 (Schuerger, Zarrella, & Hotz, 1989). A recent meta-analysis also suggests that NA exhibits somewhat less stability than extraversion/PA: Over all time frames the average test-retest coefficient was .64 for anxiety/NA compared with .72 for extraversion/PA (Schuerger et al., 1989). Although genetics undoubtedly play a role in the long-term stabilities of these and other personality traits, the major factors inducing changes on these dimensions are still unknown.

Third, the negative emotions regularly experienced by those high in NA are not simply strong reactions to stressful situations. Although high NA individuals do report more state (i.e., transient, short-term) negative affect in such situations, they do not report greater increases in state NA when exposed to stressors. Rather, those high in trait NA consistently report higher levels of state NA across all types of situations, both stressful and nonstressful (Watson & Clark, 1984, Tables 6 & 7). This suggests a higher basal level of negative emotional experience rather than a greater reactivity. It is likely that this not only reflects an endogenous (i.e., biological) propen-
sity, but also a psychological bias toward interpreting objectively nonthreatening situations as stressful, although the etiologies of these tendencies are unclear.

The strong and consistent relation between trait and state measures of NA is one of the primary arguments supporting our interpretation of the NA construct as mood dispositional. It is important to note that this relation is observed not only when trait and state NA are measured simultaneously, but even with time lapses of up to 10 years (Costa & McCrae, 1980; Aldwin, Levenson, Sprio, & Bossé, 1989). This, of course, follows logically from the previous two characteristics. Given that trait NA is relatively stable and consistently related to average state NA levels, it is not surprising that we observe a certain stability in the state-trait—and even in the state-state—relation.

Finally, it is important to emphasize that NA is based primarily in subjective experience. Although a number of objective correlates have been established, the “power” of NA lies in the inescapability of the individual’s phenomenological world. The pervasiveness of NA results from the consistent ways in which high or low NA persons experience, interpret, and reflect on themselves and the world around them.

Summary of Recent Developments

In 1984 we sought to reveal the core of the NA construct, to sharpen our understanding of its most central features, and to highlight areas in which further research was needed. Since that time, two major trends have emerged in research on the NA construct. One type of research has investigated the many convergent correlations of NA (although not always under the NA label). For example, a large number of studies have documented the role of NA in marital and job satisfaction, in attributional coping style, and in perceptions of social support, daily hassles, stress, physical symptoms, and so forth. This research has led to an awareness that some observed correlations may stem from an underlying component (i.e., NA) common to the two variables. That is, if two apparently distinct constructs both contain a self-evaluative element, high NA individuals will tend to rate themselves negatively on both dimensions—and low NA persons will not—because of the pervasive negative cognitive set associated with NA. The influence of this set will thus lead to the variables being at least moderately correlated. However, in terms of the true relation between the variables (i.e., if they were both objectively defined, with the common NA element removed), the observed correlation would be spuriously high. Nevertheless, such correlations also help to reveal the range of phenomena affected by NA.

The second line of research has been concerned primarily with differentiating NA from its companion dimension, PA. These studies have served the twofold purpose of (a) demonstrating that NA is not simply a generalized good versus bad response bias, but is specifically oriented toward negativity; and (b) examining the specific convergent correlates of PA in order to understand this distinct and complementary dimension more fully. Together, these two research strategies have clarified those areas in which NA and PA, respectively, play a more central role, and also have revealed domains in which both dimensions are important. We will discuss each of these broad research trends in turn, and then direct our attention toward more comprehensive models of emotional experience that integrate findings from the biological, intrapsychic, and interpersonal domains.

FURTHER DELINEATION OF THE NA CONSTRUCT

The Pervasiveness of NA

NA and Diverse Affective States and Traits: A Hierarchical Model

At the level of state emotions, there has been significant debate between the “discrete emotions” theorists (e.g., Izard, 1972) and those who view emotions in terms of two or three broad dimensions. Watson and Tellegen (1985), however, have suggested that the two positions can be reconciled with the adoption of a hierarchical model, in which Positive and Negative Affect represents higher order dimensions comprised of several lower order, more specific emotions, such as Interest and Enjoyment (PA) or Anger and Fear (NA). In addition, some discrete emotions (e.g., Surprise, Sadness) may load significantly on both factors. A similar structure appears to apply at the level of affective traits, although this has not been as well documented as for affective states. One difficulty in reviewing this area is that researchers do not always indicate clearly the time frame of their measures, so it is not always known whether they are assessing affective traits, mood states, or
something in between, such as subjects' affect over the past week or 6 months.

Support for the overlap among negative emotions (both state and trait) has been abundant. Gotlib (1984) reviewed a large number of studies and presented data suggesting the presence of a broad general factor underlying many common measures related to psychopathology, such as depression, anxiety, fear, loneliness, and even (un)assertiveness. Similar results have been obtained with other sets of measures that only partially overlap with Gotlib's (e.g., Nezu, Nezu, & Nezu, 1986; Tanaka-Matsumi & Kameoka, 1986). Similarly, evidence for a large NA or Neuroticism factor in the personality literature is ubiquitous, and actually dates back a number of years (e.g., Comrey & Duffy, 1968; Comrey, Jamison, & King, 1968; Noller, Law, & Comrey, 1987; Zuckerman, Kuhlman, & Camac, 1988). Scales that load on this higher order dimension carry such diverse names as Inferiority, Pessimism, Tense-Relaxed, Emotionally (Un)Stable, Apprehensive, Anger/Hostility, and Emotionality.

Although most of these studies are student based, the findings have been replicated in other populations as well, including community-residing married individuals (Folkman & Lazarus, 1986; Schaefer & Burnett, 1987), factory workers (Siegel, 1986), children and adolescents (e.g., Bernstein, Garfinkel, & Hoberman, 1989; Eason, Finch, Brasted, & Saylor, 1985; Rowlinson & Felner, 1988), and psychiatric populations (see Clark & Watson, in press, for a review of this literature focusing particularly on anxiety and depression). Not have the data been limited to strictly correlational studies. For example, "depressive" mood inductions yielded increases on all three subscales—depression, anxiety, and hostility—of the Multiple Affect Adjective Check List (MAACL) (Finman & Berkowitz, 1989). In his review, Gotlib (1984) also noted a number of studies that demonstrated generalized affective improvement as a result of therapies targeted at more specific deficits.

However, these studies provide only half the picture. The relations among specific affect scales are rarely so high as to suggest that the measures are interchangeable. Rather, consistent with a hierarchical model, they typically range from .40 to .60, suggesting that there is some degree of lower order specificity not accounted for by the higher order construct. Further, differentiation among measures with a common NA component may be increased under at least three conditions.

1. When highly specific affects are assessed, intercorrelations among them are decreased. For example, Clark and Watson (in press) present data showing that when the measurement of anxiety focuses on its perceived physiological component (i.e., jumpy, shaky, easily rattled), it is less highly correlated with both depression and more general NA measures. Measures of harm-avoidance (i.e., physical danger anxiety or timidity) are also somewhat distinct from general NA (Tellegen, 1985; Zuckerman et al., 1988). Similarly, specific hostility or aggression scales can show a reasonable convergent/discriminant pattern in relation to measures of depression and anxiety (e.g., Smith & Frohn, 1985; Zuckerman et al., 1988).

2. When the affective component is reduced relative to the total scale content (e.g., the measures focus on cognitions, life events, interpersonal relationships, etc., rather than on mood per se), discrimination is increased. Given that NA is primarily mood based, this is not surprising. Nevertheless, the NA component of overtly nonaffective measures is by no means inconsequential. This point will be discussed subsequently.

3. When observer ratings are used rather than self-report, NA-based scales tend to be less highly correlated. This is, of course, consistent with the primarily subjective nature of NA, but it must also be emphasized that it is a relative statement. For example, correlations between clinician-rated Hamilton Depression and Anxiety scales average about .70 (Clark & Watson, in press). Moreover, substantial overlap among patients remains, even using the rescored Hamilton scales (revised to improve discrimination). Beck, Brown, Steer, Eidelson, and Riskind (1987) examined over 600 patients diagnosed with either an anxiety or a depressive disorder, and found that only about one half had Hamilton scores that were different in the direction consistent with their diagnosis by .5 standard deviations or more.

Furthermore, even when greater differentiation by observers is found, its meaning warrants careful examination. For example, Saylor, Finch, Baskin, Furey, and Kelly (1984) found a better convergent/discriminant pattern among their peer and teacher ratings of depression and anger than in self-report. However, an inspection of the measures reveals that the self-report measures were mood based, whereas the observers rated aggressive, acting-out behaviors for the anger measure, and behaviors such as playing alone or sleeping in class for depression. Consequently, neither the
difference in the convergent/discriminant patterns nor the poor self-observer correlations are surprising, because rather different variables were assessed with the two methods. This type of measurement discrepancy is quite common, and needs to be more widely acknowledged, rather than using the resulting inconsistency to denigrate either type of rating as unreliable or invalid.

**NA and Nonmood Variables: Methodological Issues**

Before reviewing the various substantive areas that have been related to NA (e.g., coping, hardness, optimism), it is worthwhile to note certain methodological issues that they share. Most striking is a common historical pattern, beginning with the hypothesis that a given variable is related to either physical or to psychological health. Typically, early research in an area would establish that, indeed, the variable of interest was related to poorer health, but at a rather low level. Researchers would then argue that this low level of relation was due to the fact that the hypothesized predictor was measured nomothetically, whereas individuals make widely varying interpretations of the same events, social structures, or situations. Moreover, it was argued, they also possess different personality traits or coping skills for dealing with the vicissitudes of life, and because objective measures did not take these sources of variance into account, the hypothesized relation was attenuated. In response, researchers usually adopted one of two strategies in order to clarify the relation of interest.

One strategy was to measure subjects’ perceptions of the variable(s) directly. For example, ratings of the stressfulness of an event were obtained rather than a simple report on their occurrence, or perceived social support was assessed rather than descriptions of social networks. Similarly, for the dependent variable self-reported symptoms were commonly substituted for physician or clinician ratings. The result was typically a dramatic increase in the level of observed relation between the variable of interest and the physical or psychological health measure. However, it was quickly recognized that embedded in these conceptual revisions was a potential confound. If individuals posed a generalized self- or worldview, their pervasive interpretive/perceptual stance would result in a correlation between any subjectively rated variables. As we shall see, a number of researchers in diverse areas have conceptualized this underlying variable as NA or some highly related variable, such as neuroticism or maladaptive distress (e.g., Allred & Smith, 1989; Cohen & Wills, 1985; Costa & McCrae, 1987; Depue & Monroe, 1986; Dohrenwend & Shrout, 1985; Rhodewalt & Zone, 1989).

A second strategy has been to measure the mediating personality trait or cognitive/behavioral style independently, entering it into the equation as a moderator variable. This strategy has generally met with less overt success, unless implemented together with the use of self-perception measures (e.g., Schmied & Lawler, 1986). In this case the hypothetically intervening trait often has been shown to be correlated directly with the variables of interest (due to the shared NA component) rather than exerting an interactive or buffering effect (e.g., Allred & Smith, 1989; Brewin, 1985; Funk & Houston, 1987).

In sum, these strategies have led to the hoped-for higher correlations, but at a cost. To the extent that we can show our “independent” and “dependent” variables to be confounded by NA, we have expanded our understanding of the NA construct, but have not learned much about the real consequences of objectively rated stressors, social support, coping strategies, and so forth, or about the antecedents of actual physical or mental health. Because it appears unlikely that any single factor will be discovered that will account for a large percentage of the variance in objective health measures, future research that avoids these pitfalls will probably yield more modest empirical findings, but will nevertheless represent a more significant conceptual advance.

**NA and Nonmood Variables: Substantive Issues**

The following reviews are not intended to be exhaustive, either in terms of the areas covered, or in the coverage of each area. Rather, they are meant to illustrate the range and diversity of health research that is relevant to the NA concept. Although most of the variables we will examine have been related to measures of both physical and mental health, most research in a given area has focused on one arena or the other. Of course, the relation of these two types of health is itself a major topic. As a purely practical strategy, we will first discuss the relation of physical and mental health, then review variables that have been proposed as especially relevant to physical health, followed by those that have been researched primarily in relation to mental health.
NA in relation to physical and mental health. In the minds of many, high NA is synonymous with psychopathology. Although this is an oversimplification, it contains more than a kernel of truth. Most NA-type measures are labeled in psychopathological terms (e.g., anxiety, depression, neuroticism, psychasthenia, dysfunctional attitudes, symptom checklists, etc.), and an item inspection of those that bear more wholesomely-sounding labels (e.g., ego resiliency, social desirability) suggests that their authors intended these positive qualities to be inferred from the lack of negative ones. It is important to emphasize, however, that whereas most psychiatric patients score high on measures of NA (the exceptions tend to be psychopathic or manic in character), not all who score high on NA measures are patients. The dimension is one of subjective distress, not overt adjustment, and many individuals continue to function despite their internal misery. Conversely, low NA individuals have not been widely studied, but this group probably includes defensive people who will not acknowledge personal failings even to themselves, and people with certain types of personality disorders (e.g., narcissistic, histrionic) who are more likely to make others miserable than to report personal distress themselves. Nevertheless, NA scales are widely used as measures of psychopathology, and because reasonably strong convergent relations have consistently been demonstrated between NA measures and diverse clinical ratings of psychopathology, we will follow that tradition here.

The relation of self-reported symptom measures, objective health measures, and NA is more complex. Because Watson and Pennebaker (1989) have recently reviewed this extensive literature, we shall only summarize their findings here. Self-report health complaint scales typically ask subjects to rate the frequency or intensity of a number of common physical symptoms and complaints. Considerable research validating these scales against objective criteria such as medical records has yielded encouraging data, leading to widespread use of self-report measures in health research. However, while statistically significant, the convergence between self-reports of illness and more objective indices is generally modest. Thus, when a correlation is found between stress or optimism and self-rated illness, for example, it may not be warranted to infer a relation between these variables and actual health status.

Moreover, other evidence suggests that these self-reports contain a strong subjective component, which is clearly identifiable as NA based. In fact, the level of relation is sufficiently strong that Watson and Pennebaker (1989) have proposed extending the NA construct to include not only negative moods and psychological distress, but psychologically expressed distress as well. However, as regards actual health status, this subjective, NA-related component appears to represent largely invalid variance. That is, intermediate or longer term health and health-related measures (e.g., immune system functioning, serum blood counts, heart attacks, disease incidence rates, mortality rates, health behaviors, etc.) show nonsignificant or inconsistent relations with NA. Clarifying the inconsistencies will be an important area for future research. At the same time, these results suggest that we must reexamine studies investigating the antecedents or correlates of health. If the predictor variables themselves contain an NA component (and we will show that many do), their correlation with self-reported health may be most parsimoniously explained by this shared variance. That is, such measures may represent facets of Watson and Pennebaker's (1989) proposed dimension of somatopsychic distress.

Life stress and daily hassles. The relation between health and life stress/daily hassles is one of the most hotly debated topics in health psychology, and the question of whether stress measures (especially the widely used Daily Hassles Scale; Kanner, Coyne, Schaeffer, & Lazarus, 1981) is confounded with pathology has been a particular concern. In essence, B. P. Dohrenwend and colleagues (e.g., Dohrenwend & Shrot, 1985; Dohrenwend, Dohrenwend, Dodson, & Shrot, 1984) have argued that because many hassles/stress items can themselves be viewed as symptoms of pathology, correlations between hassles and disorder are attributable to this overlap. Lazarus and colleagues (e.g., Delongis, Folkman, & Lazarus, 1988; Lazarus, Delongis, Folkman, & Gruen, 1985) have responded that specific item content is less important than the more general process of appraising the situation as stressful.

Viewed within the larger context of the NA construct, however, the two positions appear more complementary than contradictory. The chronic disturbances associated with high NA are themselves hassles and surely generate considerable stress; further, high NA people do appear to be predisposed to view life's microstresses as hassles.
Because the essence of NA is a propensity to experience negative emotions and to view the world and oneself through this negative lens, the particular field of expression is less important than the pervasive negativity itself. Just as psychological and physical complaints form a common dimension of somatopsychic distress, perceived stress and daily hassles are further content areas that fall under the broad influence of NA. Depue and Monroe (1986) speculate that the breadth of this dimension may stem from a "general susceptibility to medical and psychological disorders, . . . a heightened [biological] vulnerability to the development of several conditions over a lifetime" (p. 48).

This synthetic view has several implications, each of which is supported by data. First, if item content is less important than generalized negative emotional experience, then negative affect should be correlated equally with physical symptom and stress measures, which in turn should themselves be correlated. In support of this point, Watson and Pennebaker (1989) report that the average intercorrelation between NA and three physical symptom measures was .43, whereas NA's correlation with the Hassles Frequency scale was .42. Hassles and physical symptoms were also significantly correlated (range = .31 to .36). Rowlinson and Felner (1988) reported even stronger data on this point in a sample of 682 adolescents. They found intercorrelations ranging only from .50 to .56 among a composite NA measure, a physical symptom measure, and hassles. Thus, in both data sets these three conceptually distinct domains are all intercorrelated, suggesting they share a common core, which we would argue is the NA dimension.

A second implication of this view is that the correlations between stress and physical symptoms or NA should not be strongly affected by whether or not the stress scale contains specifically pathological content. As a test of this notion, Rowlinson and Felner (1988) divided the hassles by whether they were symptomatic or non-symptomatic of psychological disorder, and by whether they were controllable or not. They then correlated each of these hassles subscales with an NA measure, a physical symptom measure, and a life events checklist. The results strongly confirmed our second implication: The hassles subscales were all highly intercorrelated (.70 or higher), and their correlational patterns with the other measures were virtually identical. To those accustomed to thinking in terms of substantive relations between distinct content domains, these findings may be disconcerting because they appear to undermine our ability to study the mutual causal influences among mood, stress, and health. However, if we accept the pervasiveness and power of emotionality in determining individual responses, we are then in a position to grapple with the issue of how emotions "homogenize" subjective experience, and to go beyond self-report in measuring the antecedents, moderators, and consequences of this experience.

This brings us to a third implication. If specific item content is secondary to the emotional/evaluative component of self-report scales, then we should expect to find other domains that overlap in a similar way with NA, stress, and somatic distress. Several subsequent topics to be discussed provide good evidence for the existence of such domains. The reader is also referred to Depue and Monroe (1986) for further discussion of the problem of chronic disturbance in conceptualizing and measuring life stress.

Finally, if NA, stress, and reported health all share a common base, then they should show similar levels of stability over time. In a longitudinal study of 75 community couples, in which hassles, physical complaints, and mood were assessed every 4 days for 6 months, autocorrelations of .77, .61, and .50 were reported, respectively (Delongis et al., 1988). The fact that the level of daily hassles and reported symptoms exhibit such a high degree of stability (even higher than mood in this case) supports the notion that these measures are tapping a strong underlying disposition, such as NA.

Hardiness. Of the various areas that we are considering, hardiness (Kobasa, 1979) has perhaps been subjected to the greatest criticism. Among the chief concerns have been (a) the multidimensional nature of the hardiness concept; (b) the fact that the proposed substructure of challenge, commitment, and control is not reflected in the empirical relations among the component scales; and (c) that the subscales have dissimilar correlational patterns with other variables in the model (e.g., Funk & Houston, 1987; Hull, VanTreuren, & Vrinnelli, 1987; Schmied & Lawler, 1986). Another frequently cited problem is that certain aspects of the hardiness concept must be inferred from measures assessing opposite characteristics; for example, measures of commitment are actually scales tapping alienation from self and work.
(Allred & Smith, 1989; Funk & Houston, 1987). Despite these methodological problems, however, most studies have found that hardiness is moderately correlated with self-reported health, as predicted by the hardiness theory. An exception is Schmied and Lawler (1986) who found no hardiness-illness correlation, for reasons that are unclear.

More problematic for the hardiness concept is its overlap with NA. Descriptions of the nonhardy individual are congruent with those for high NA: alienated, helpless, threatened, passive, and avoidant (Kobasa, Maddi, & Kahn, 1982). Moreover, correlations of various measures of NA with hardiness ranging from .30 to .40 have been reported (similar to the level of association among NA, stress, and physical health), with the Alienation and Powerlessness subscales tending to be the most strongly related (Allred & Smith, 1989; Funk & Houston, 1987; Hull et al., 1987; Rhodelwalt & Zone, 1989; Schmied & Lawler, 1986). Moreover, when NA is partialled out of the hardiness-health relation, the two variables are no longer related (Funk & Houston, 1987; Rhodelwalt & Zone, 1989). This suggests that hardiness is related to health complaint scales primarily through their shared NA component.

Data regarding the hardiness-stress relation also suggest that hardiness overlaps with NA. Hardiness has been proposed to affect illness primarily via its effects on the appraisal of potentially stressful life events (e.g., Kobasa, 1979; Kobasa et al., 1982). That is, nonhardy subjects are expected to perceive the same events as more stressful, thus leading to higher levels of illness. Clearly, our NA-based model would make this same prediction. Data reported by Rhodelwalt and Zone (1989) address this issue. Their women subjects reported the same number and type of stressful events regardless of their hardiness score. (This is the usual, although not universal, finding. Schmied and Lawler, 1986, for example, reported a .39 correlation between number of stressful life events and hardiness.) However, women low in hardiness rated the events as more undesirable, less controllable, and more difficult to adjust to.

How then do we choose between these models? Three factors argue for an NA-based interpretation of the data. First, although both make similar predictions regarding relations among hardiness/NA, stress, and health, the NA-based model is the more parsimonious. Rather than hypothesizing buffering effects, the NA model simply suggests that trait NA (low hardiness), the experience of negative life events, and illness reports are all a function of a common underlying dimension. Second, the data suggest that NA measures may capture more of the relevant variance. That is, stressful life events remain correlated with illness when hardiness is partialled out, but not when the effect of NA is removed (Rhodelwalt & Zone, 1989). A final and related point is that a number of conceptual and measurement problems remain unresolved for hardiness. Given the available evidence, it seems at the least, that significant aspects of the hardiness concept may be fruitfully viewed as falling within the NA domain. Let us add, however, that the original conceptualization of hardiness (although not its measurement) bears a strong resemblance to PA, and hardiness researchers may wish to consider developing measures of the positive end of the dimension along these lines.

Optimism/pessimism. Of all the constructs that we are considering, optimism/pessimism is perhaps the one most clearly synonymous with NA. Certainly the two constructs overlap conceptually. Optimism/pessimism has been operationalized in terms of general positive versus negative expectations (Scheier & Carver, 1985), and people with negative expectations (pessimists) are expected to focus on these expectancies and on the distress associated with them (Scheier, Weintraub, & Carver, 1986). This view of optimism/pessimism clearly represents it as an important facet of NA.

The two constructs also overlap psychometrically. In our original paper, we noted a correlation of $-.87$ between clinical ratings of optimism and an NA measure (Eriksen, 1955). Similarly, in introducing their optimism measure—the Life Orientation Test (LOT)—Scheier and Carver (1985) reported correlations of around $|50|$ with measures of depression, perceived stress, hopelessness, and self-esteem. Authors of the Generalized Expectancy for Success Scale (GESS; Fibel & Hales, 1978)—a measure conceptually similar to the LOT—also reported correlations ranging from $20$ to $74 (M = .46)$ with measures of depression, anxiety, suicidal ideation, and hopelessness. Additionally, significant correlations with hardiness have been reported (Hull et al., 1987). In a thorough examination of the convergent/discriminant validity of measures of optimism and NA, Smith, Pope, Rhodelwalt, and Poulton (1989) concluded that, as currently assessed, optimism was “diffi-
culty if not impossible to distinguish" from NA (p. 645).

As was the case with hardness, predictions regarding the relation of optimism with health have been supported (e.g., Carver & Gaines, 1987; Scheier & Carver, 1985, 1987). However, these coefficients again most likely reflect a common NA component. Smith et al. (1989) reported that optimism-symptom report correlations disappeared (or, in one case, reversed direction) when NA was partialled out. However, the opposite was not true; that is, NA-symptom correlations remained significant even when the effects of both the LOT and GESS were removed. They hypothesized that this pattern emerged because the optimism scales were weaker measures of the general NA trait than were more traditional measures of the construct.

It is important to emphasize that identifying optimism as an aspect of NA in no way implies that optimism research is somehow invalid or unimportant. On the contrary, it was precisely through this process of identifying nominally diverse but psychometrically equivalent scales that we elaborated the NA dimension in the first place. Thus, the recognition that optimism is another facet of NA permits us to integrate optimism research into our understanding of this important and pervasive construct. We should also point out that optimism has been conceptualized as positive versus negative expectations, whereas it has been shown in such diverse realms as major and minor life events, self-statements and attributions, and mood and arousal states that positive and negative phenomena are rarely opposites and are in fact frequently unrelated. Thus, it might prove fruitful for research on optimism if separate measures of negative and positive expectations were developed. We predict that they would show a convergent/discriminant pattern with NA and PA, respectively.

Coping. Although both hardness and optimism are believed to mediate health outcomes, the hypothesized mechanisms differ. As mentioned earlier, hardness is thought to operate through differential appraisal of stressful events, and we have shown how this is consistent with an NA-based interpretation of hardness. Optimism, however, has been hypothesized to affect health through differential responses to stress. Specifically, optimists are expected to cope more persistently and effectively, whereas pessimists may exhibit behavioral withdrawal, and/or focus on expressing their feelings in response to stress (Scheier et al., 1986).

The predictions for pessimists are quite compatible with those that would be made for high NA individuals. For example, we mentioned earlier that high NA individuals are more introspective and ruminative than those low in NA. Moreover, behavioral withdrawal may reflect feelings of helplessness associated with depression, which has been shown to have a strong NA component (Watson, Clark, & Carey, 1988). A finding of positive behavioral consequences for low NA, on the other hand, would extend our view of the NA construct.

The available data, however, provide mixed support for these predictions. First, the reported correlations between various measures of coping and optimism/NA are more variable and generally lower (typically ranging from .15 to .30) than any of the other intercorrelations we have been considering (e.g., Parkes, 1986; Scheier et al., 1986). However, one study that used a measure of psychological symptoms as the NA scale found somewhat higher correlations—up to .50, with an average around .30 (Folkman, Lazarus, Gruen, & Delongis, 1986). Second, although the results have been somewhat inconsistent across studies, optimism/NA appears to be more strongly related to what have variously been called avoidance or emotion-based coping strategies than to approach or problem-focused strategies (Folkman et al., 1986; Holahan & Moos, 1985; Scheier & Carver, 1985). These findings support the idea that NA is primarily mood based rather than being a behavioral dimension, although it is certainly not devoid of behavioral consequences. As we suggested earlier, however, stronger support for the predictions of the optimism model might be obtained if positive and negative expectations were assessed separately. We will present data later in support of this notion.

Attributional style and pathogenic cognitions. The literature on attributional style and its relation to depression in particular, and to NA more generally, is enormous. A full review is obviously beyond our scope, so we will highlight only a few points suggesting that (a) the so-called depressive attributional style (i.e., the tendency to make stable, internal, and global attribution about negative events) is not specific to depression but is more generally related to negative affective states; and (b) this attributional style is better viewed as a facet of depression/NA rather than as a separate causal variable as originally proposed (Abramson, Seligman, & Teasdale, 1978).
Until recently, research into "depressive" attributions has focused solely on convergent validity; that is, on testing the basic hypothesis that certain types of attributions are more frequent in depressives than in normals. Most studies have provided support for this basic hypothesis (for reviews see Coyne & Gotlib, 1983; Sweeney, Anderson, & Bailey, 1986). However, data regarding the ability of attributional measures to discriminate among various types of patient groups has been quite mixed, and varies in part as a function of the specific measure used (see Heimberg, Klosko, Dodge, Becker, & Barlow, 1989; Hollon, Kendall, & Lumry, 1986). In particular, the ability of attributional style to differentiate anxious and depressed patient groups is generally quite low, unless specific attention has been paid to the issue of discrimination.

For example, Heimberg et al. (1989) compared patients who had either depression (dysthymia) or one of several anxiety diagnoses (agoraphobia, panic, or social phobia) on the Attributional Style Questionnaire (ASQ; Peterson, Semmel, von-Baeyer, Abramson, Metalsky, & Seligman, 1982). Patient scores were all higher (i.e., in the supposedly depressive direction) than those of a normal control group, but did not differ among each other. That is, nondepressed but anxious patients exhibited the same global attributional style that has theoretically been associated with depression. This suggests that the style may be more diffusely related to NA and not specific to depression. This is not surprising, of course, because depression itself has been shown to be highly saturated with NA (Watson, Clark, & Carey, 1988; Watson, Clark, & Tellegen, 1988). This conclusion is further supported by the strong correlations found among measures of attributional style, depression, other NA scales, and health complaints (Hollon et al., 1986; Nezu et al., 1986).

Similarly, Snyder and Higgins (1988) have presented evidence indicating that the classical negative attributional style is the obverse of the prototypic excuse-making pattern, which is broadly related to self-esteem maintenance, as well as to lower levels of negative affect/anxiety and depression. In this context, it is also noteworthy that some of the original researchers in the attributional domain now refer instead to "pessimistic explanatory style," and have reported a significant long-term relation with physical health ratings (Peterson, Seligman, & Vaillant, 1988).

Recent research into pathogenic cognitions has focused specifically on differentiating the types of self-statements/attributions that are made by depressed versus anxious patients (e.g., Beck et al., 1987; Greenberg & Beck, 1989). As was discussed earlier with regard to mood and syndromal measures of depression and anxiety, these studies have demonstrated that by paying particular attention to discriminant validity, correlations between types of specific negative cognitions can be reduced, but rarely below .40. In other words, a strong general factor inevitably emerges.

Although an empirical association has been established between attributional style and depression/NA, the causal model hypothesized to underlie this relation (i.e., that in the face of a stressful event, those with a depressive attributional style are more likely to become depressed) has met with much less success (see Brewin, 1985, for a comprehensive review). One difficulty with the model is that the necessity of a precipitating event has not been demonstrated, in part because it is hard to rule out alternative explanations. However, several corollary hypotheses that make fewer assumptions and do not require the presence of a stressful event have been well supported (Brewin, 1985). A second, more serious problem is that depressive attributions, while exhibiting a certain traitlike stability, also appear to fluctuate with depressed mood, and may follow rather than precede the onset of depression. For example, Hollon et al. (1986) reported that remitted bipolar and unipolar depressives both scored the same as normal controls on the Automatic Thoughts Questionnaire (ATQ; Hollon & Kendall, 1980). Further, if initial depression scores are controlled, cognitive attribution measures are no longer able to predict subsequent depression (Peterson, Schwartz, & Seligman, 1981). Thus, such cognitions appear to represent a symptom of depression rather than a causal factor.

Taken together, the data suggest that attributional style and related cognitive factors are neither specific to, nor causal factors in, depression. Having said this, we must emphasize that we do not reject the more dynamic view that negative moods and cognitions are mutually reinforcing in a kind of progressive negative cycle. We do, however, feel that affective experience represents the center of the process. Brewin (1985) concluded that attributions were more directly related to depressed mood than the original model hypothesized, and "may reflect a positive or negative coping style" (p. 308). We would go one step further
and suggest that this style represents an important cognitive facet of the larger affective dimension of NA. Similarly, Carver (1989) has suggested that the components of attributional style may each be imperfect manifestations of a latent variable—he proposes optimism/pessimism—that actually underlies its behavioral effects.

Finally, it should be noted that not all of the research into negative cognitions has focused on causal attributions. For example, Emmons and King (1988) investigated individuals’ stated personal strivings (goals), and derived several experience sampling-based measures of rumination, ambivalence, and conflict related to these strivings. They then correlated these measures with state and trait NA and PA scales and symptom ratings, and found that all four indices were related to the NA and symptom scales, but none was correlated with the PA scales.

**Social support and loneliness.** Like hardiness, social support was conceived originally as a buffer against stress; specifically, as protecting people from the adverse physical and psychological effects of negative life events. Thus, under high stress conditions, individuals with adequate social support were hypothesized to have fewer health problems than those without such support. A large number of studies relevant to this hypothesis were reviewed by Cohen and Wills (1985) who concluded that evidence for a buffering effect appeared only if the perceived availability of social support was assessed. That is, little evidence for a buffering effect was provided if social support was measured strictly in terms of the presence and extent of a subject’s social network.

Data such as these are consistent with the widely accepted notion that social support is primarily a subjective state rather than an objective circumstance (Heller, Swindle, & Dusenbury, 1986; Thoits, 1985; Turner, Frankel, & Levin, 1983). Sarason, Sarason, and Shearin (1986) also have provided evidence that social support is itself an individual differences variable, with properties of stability and cross-situational consistency similar to those of more traditional trait measures. For example, 3-year stability coefficients for the number of, and satisfaction with, social contacts were .67 and .55, respectively, which represent a degree of stability typical of NA measures.

Moreover, other data suggest that perceptions of current social support are relatively consistent, regardless of who is providing the support (Ruehlman & Wolchik, 1988). Further, Sarason et al. (1986) found that subjects’ retrospective ratings of childhood relationships with their parents were significantly correlated with current number of social contacts and satisfaction with current relationships. Thus, recollections of childhood relationships were more or less congruent with interpersonal experiences as young adults.

In addition to having traitlike properties, social support measures have been shown to be negatively correlated with NA (Sarason et al., 1986; Vinokur, Schul, & Caplan, 1987). (And, not surprisingly, social conflict measures and NA are positively correlated; Cohen & Wills, 1985.) Furthermore, social support is negatively related to loneliness (Sarason et al., 1986; Stokes, 1985), which itself has been shown to correlate with a number of other NA measures (Gotlib, 1984; Stokes, 1985). Although these correlations are by no means so high as to suggest that loneliness, low social support, and NA are indistinguishable constructs, they do indicate that negative affective tone broadens influences ratings of diverse content relevant to subjectively perceived experience in interpersonal relations.

Beyond this, however, NA and social support appear to be related in at least one additional way. As mentioned earlier, Cohen and Wills (1985) found a buffering effect for social support only when support perceptions were targeted. However, when structural measures were used to assess social support, they found that social support and pathology were directly related—that is, individuals reporting few social contacts also reported more pathology, regardless of stress level. This is congruent with the fact that low levels of social support are often taken as symptoms of psychological disorders, as well as contributing to them (American Psychiatric Association, 1987). In an insightful discussion of what they term the “person-environment covariance problem,” Depue and Monroe (1986) addressed this issue of how personality variables can effect social support. They noted that “the association between events, social support, and chronic disorder is not unidirectional, flowing from input variables to disorder” (p. 43). That is, disorder (either physical or psychological) can generate low levels of social support as well as stem from them (Dohrenwend et al., 1984; Monroe & Steiner, 1986).

Another important finding of the Cohen and Wills (1985) review was that evidence for the effect of social support was most clear when the out-
come measure was self-reported psychological distress; that is, NA. Social support was less clearly related to self-reported physical symptoms, and was completely unrelated to objectively assessed health problems. Altogether these results strongly suggest that the assessment of social support cannot be divorced from the measurement of individual differences in NA. Not only may social support help buffer against the experience of physical and psychological distress (including loneliness) in the face of multiple life changes, but conversely, NA may play an important role both in general perceptions of social support and in the creation and maintenance of social networks.

Marital, job, and life satisfaction. At this point in our review, it will not surprise the reader to learn that measures of subjective satisfaction with various life domains are each correlated with measures of NA. Moreover, they are themselves intercorrelated, most likely because of their overlapping NA component. Both job and marital satisfaction have been shown to be important facets of a more general life satisfaction (Diener, 1984; Schaefer & Burnett, 1987). Life satisfaction is a significant predictor of job satisfaction even when major demographic and job design variables are controlled, and job satisfaction, in turn, has been found to predict later life satisfaction in retirement (Schmitt & Pulakos, 1985). Similarly, “marriage and family satisfaction is one of the most important predictors of subjective well-being” (Diener, 1984, p. 556).

Both marital and job satisfaction exhibit a trait-like degree of stability and/or cross-situational consistency. For example, Schaefer and Burnett (1987) reported a 3-year stability coefficient of .56 for marital satisfaction (compared with .72 for their composite NA measure). Various facets of job satisfaction have been found to be reasonably stable over time periods ranging from 16 months (Schneider & Dachler, 1978) to 5 years (Staw & Ross, 1985). Moreover, Staw and Ross (1985) demonstrated consistent employee attitudes even when workers had changed employers and/or occupations.

Various measures of satisfaction also show similar levels of association with NA (Brief, Burke, George, Robinson, & Webster, 1988), and NA-related variables such as hassles (Zika & Chamberlain, 1987), and self-esteem, a core characteristic of (low) NA (Diener, 1984). Moreover, these relations can be observed both concurrently and prospectively. For example, Watson and Keltner (1989) found that NA was significantly correlated with certain facets of job satisfaction assessed both concurrently and at an average of 2 years later. Similarly, Schaefer and Burnett (1987) reported a - .50 correlation between NA and marital satisfaction when measured simultaneously, which dropped only to - .44 with a 3-year lag. Thus, the lagged relation between NA and marital satisfaction was only slightly less than the stability of marital satisfaction itself (.56). In this regard, the results of a study by Staw, Bell, and Clausen (1986) are especially impressive. They found that an affective disposition scale assessed in adolescence was a significant predictor of job satisfaction nearly 50 years later, even after controlling for objective differences in job conditions.

Relations between marital satisfaction and depressive symptoms also have been well documented, using both cross-sectional and longitudinal designs (e.g., Ilfeld, 1977; Monroe, Bromet, Connell, & Steiner, 1986). As with social support, it is likely that the observed correlations between NA and various domains of life satisfaction reflect both the broad influence of the NA dimension in subjective experience, and also the fact that some of the core characteristics of high NA itself contribute, in a causal sense, to difficulties in marital, job, and other life situations. Conversely, it also seems plausible that substantial levels of prolonged marital and/or job difficulties may lead to higher NA levels (Watson & Keltner, 1989).

Summary. We have reviewed a number of interrelated substantive areas broadly in the domain of physical and psychological health, and have presented extensive evidence to suggest that—although originally proposed as conceptually distinct—these constructs actually share a good deal of common variance. We have interpreted this overlap as reflecting NA: a pervasive tendency to report negative emotional states and to interpret experiences with a negativistic bias. We have shown not only that NA markers are significantly correlated with measures of these diverse constructs, but also that this shared NA component accounts for most of the observed cross-domain correlations. That is, when this inexorable non-specific emotional/evaluative component of self-report scales is controlled, correlations among other variables are eliminated or substantially reduced.

Thus, the data indicate that the NA component
of self-report scales is sufficiently strong that it emerges regardless of the substantive domain, and that the general affective tone of assessed material is as important (or more important) than the specific item content. We emphasize that we are not thereby implying that social support, hardiness, and coping are all simply measures of NA, that they are all the same thing, or that it is fruitless to distinguish among pessimistic attributions, health complaints, and stress. Rather, what we wish to convey is that underlying these seemingly diverse phenomena is a very powerful dimension of individual differences that binds them to one another in ways that are both simple and obvious, subtle and complex. This situation frustrates simplistic efforts to study the relations among diverse constructs; nevertheless, if we are to progress in our understanding of how behaviors, cognitions, interpersonal relations, and exogenous environmental variables influence health, we must first grapple with the broad influence of this mood-based disposition.

Just as we did not “discover” NA, neither are we the first or only ones to struggle with the implications of its pervasiveness. We have already mentioned several reviews and factor analytic studies that reached similar conclusions regarding the diversity of measures tapping this broad dimension. In this context, we wish to state that, although labels are important insofar as they attempt to convey the essence of a construct, higher-order dimensions such as we are discussing here will never be adequately captured by a single term. We have chosen to call the construct Negative Affectivity because we believe its core is affective, but it is ultimately more important that psychologists recognize the existence and nature of this complex but ultimately homogeneous disposition than agree with its label.

Stability, Change, and the Genetic Basis of NA

One of the unsolved puzzles of the NA dimension is that it exhibits a fair degree of long-term stability, but also may show significant change over periods of 1 to 5 years. We have previously speculated that this may stem, at least in part, from the fact that NA is a mood-based trait. To the extent that transient mood variations affect trait scores, the result will be instability; in contrast, to the extent that individuals possess a typical mood level around which they fluctuate, stability will be evidenced. Further, some of the instability undoubtedly reflects true change on the dimension due to strong internal and/or external forces. For example, major life crises (e.g., a death in the family, unexpected and/or prolonged unemployment, divorce), devastating natural disasters, or, on the positive side, psychotherapy, may have the power to alter a person’s characteristic temperament for a period of time or more permanently. However, because such extreme events occur relatively infrequently, large-sample statistics indicate a good deal of stability. To test these hypotheses, it will be necessary to collect systematic data on many individuals on both state and trait NA over relatively long periods of time.

In this regard, collection of naturalistic data in large community samples will be important, but it is also difficult and time consuming. Therefore, it also may prove fruitful to study groups that would be expected to show broad temperamental changes in a somewhat shorter time frame (e.g., therapy patients). In this context it is noteworthy that Schuerger et al. (1989) found the NA levels of patients or prisoners to be less stable than those of normal subjects. Additionally, some studies have found greater stability with increasing age (Helson & Moane, 1987; Schuerger et al., 1989). Others, however, have not found any age-related effects (Costa, McCrae, & Arenberg, 1980; Finn, 1986), so this issue requires further consideration.

Investigation of various methodological factors that influence stability also is warranted. Observations of NA’s stability, or lack thereof, have not been based on a single, common scale, but on a multitude of measures, and average stability levels mask marked discrepancies across studies that may be measurement based. For example, as mentioned earlier, Schuerger et al.’s (1989) meta-analyses of measures of anxiety/adjustment yielded a mean 1- to 5-year retest correlation of about .60, whereas 6-year stabilities as high as .83, and 12-year stabilities of .70+, have been reported for several NA/neuroticism scales not included in the meta-analyses (Costa & McCrae, 1988; Costa et al., 1980). Inconsistencies of this magnitude suggest that the measures and methods used to determine stability deserve close scrutiny.

Given that NA is a broad-band dimension, scales designed to assess the trait vary considerably in their core characteristics. For example, some NA measures feature primarily affect, whereas others focus on more cognitive characteristics such as negative self-view; moreover, some are largely pathological in nature, whereas others assess more nor-
mal range NA variation. NA scales also vary in their item homogeneity. As a consequence of these content differences, two NA scales could have notably different stabilities despite being highly correlated at a given point in time. Systematic longitudinal study of diverse NA scales will be needed to clarify whether the observed variations in stability are due to the differential stabilities of the various facets of the construct, or to other psychometric properties of the scales used.

In sum, our knowledge of the many factors that contribute to the observed degree of stability and change in NA levels is still rudimentary. Further, as we document in the next section, genetic factors most certainly play an important etiological role, so a full understanding will require not only more careful descriptive work, but also will involve research into brain-behavior relations.

**Heritability of NA.** A number of large-scale studies investigating genetic factors in personality have recently been completed and have yielded remarkably convergent results despite their different methodologies. For example, Rose and colleagues (Rose, 1988; Rose, Koskenvuori, Kaprio, Sarna, & Langinvainio, 1988) studied monozygotic and dizygotic twins, whereas Loehlin, Willerman, and Horn (1987) used an adoption design. At least two studies (Pedersen, Plomin, McClearn, & Frilinger, 1988; Tellegen, Lykken, Bouchard, Wilcox, Segal, & Rich, 1988) have combined these methods, examining monozygotic and dizygotic twins raised either separately or apart. Fortunately for comparative purposes, measures of NA (neuroticism), and PA (extraversion) have been included in all recent genetic studies of personality, and the researchers have consistently concluded that there is significant genetic variation in these dimensions. Although the precise estimates of heritability have varied, it is generally agreed that the heritability of NA falls between .30 and .55, whereas that of PA falls more narrowly between about .35 and .50 (Pedersen et al., 1989; Rose, 1988; Tellegen et al., 1988).

Another consistent, and in some ways more disconcerting, conclusion of these studies is that the common familial (i.e., environmental) influence on personality is near zero for NA, and roughly half the size of the genetic component for PA (approximately 20%). This means that about half of the observed variability in these personality traits remains unexplained. Some of this residual variance is undoubtedly error, leading Tellegen et al. (1988) to estimate that only 15% to 30% of the trait variance can be attributed to unshared or unique environmental variation that is psychologically meaningful. These data challenge psychologists to identify any systematic exogenous factors that are operating in what are apparently highly individualized environments. If such factors can be isolated, they may ultimately solve the puzzle of what variables produce instability in NA levels.

**THE TWO-FACTOR MODEL**

We have concentrated this chapter on the NA dimension, updating and expanding our earlier work. Despite the fact that we remain impressed with the pervasiveness of this disposition, however, it has become increasingly clear that NA alone fails to capture significant aspects of both physical and mental health. In both the mood and personality literatures, a second major factor—state/trait PA, which is traditionally called extraversion—inevitably emerges as a separate and indispensable dimension. We view PA, like NA, as a mood-based disposition that has broad implications for behavior, cognitive processes, and interpersonal relations.

Despite its opposite-sounding name, it is important to note that PA is distinct from NA, not only psychometrically, but also in terms of the external variables with which it correlates. For example, PA—but not NA—is consistently related to current levels of social activity (Clark & Watson, 1988, 1989; Watson, 1988; Watson & Clark, in press), whereas PA is largely unrelated to health complaints and daily hassles, both of which, as we have seen, have strong NA components (Watson, 1988; Watson & Pennebaker, 1989). In the next section, we will recap the main features of PA, which we have set forth elsewhere (Watson & Clark, in press), and then discuss a few areas in which PA appears to have its major influence on health.

**Central Features**

Like NA, PA is a broad, higher order disposition that is composed of several primary traits. In addition to its core positive mood component, trait PA has at least five additional facets: Energy, Affiliation, Ascendance, Venturesomeness, and Ambition. The (lower order) PA component itself represents interindividual variation in the frequency and intensity of positive mood experi-
ences. Individuals high in this facet are joyful, enthusiastic, and—it is interesting to note—optimistic about the future. Energy—which includes feelings of active mental alertness and of wholehearted interest, as well as perceived health and vigor—is the other facet most highly related to positive mood. Affiliation and Ascendance, on the other hand, are most closely identified with the traditional view of extraversion, and reflect differences in sociability, interpersonal warmth, social dominance, and exhibitionism. Venturesomeness represents tendencies toward boldness and excitement-seeking, whereas Ambition reflects individual differences in mastery-seeking and perseverance.

The pattern of intercorrelations among these primary traits provides a strong argument for viewing PA as the core underlying component (Watson & Clark, in press). Specifically, they all tend to be more highly related to PA than to each other. Furthermore, they are all significantly correlated with measures of state PA (Costa & McCrae, 1984; Watson & Clark, in press). For example, in a sample of 528 undergraduates, the correlation of state PA with Goldberg’s (cited in McCrae & Costa, 1985) higher order PA scale (which he terms surgency, following Cattell) was .61, while the correlations of the individual facets with state PA averaged about .37, ranging from .58 (unenergetic vs. energetic) to .25 (humble vs. proud). In contrast, the average correlation of the facets with state NA was −.14 (Watson & Clark, in press).

PA and Affective Disorder

Studies of affective disorder have yielded compelling data regarding the important role that PA plays in mental health. Two lines of research are of particular interest. The first involves the differentiation of depression from other NA-related phenomena, particularly anxiety. In the previous section, we frequently treated depression as a facet of NA. From a strictly convergent viewpoint, this is irrefutable. Measures of the depressive syndrome correlate highly with anxiety and other NA scales (e.g., Clark, 1989; Clark & Watson, in press; Gotlib, 1984; Nezu et al., 1986), and specific depressive symptoms and diagnoses have as strong an NA component as do anxiety symptoms and diagnoses (Watson, Clark, & Carey, 1988). However, when both NA and PA are considered, it becomes possible to distinguish depression from other NA phenomena because depression has an additional (low) PA component. That is, PA is (negatively) correlated with depression measures (Blumberg & Izard, 1986; Tellegen, 1985; Watson, Clark, & Tellegen, 1988), and also with depressive symptoms and diagnoses (Bowman & Luteijn, 1986; Hall, 1977; Watson, Clark, & Carey, 1988), whereas anxiety measures, symptoms, and diagnoses are essentially uncorrelated with PA (Hall, 1977; Tellegen, 1985; Watson, Clark, & Carey, 1988).

In a test of the “cognitive specificity” hypothesis, Greenberg and Beck (1989) reported that depressed and anxious patients responded similarly to material that was theoretically anxiety related, whereas only depressed patients showed the expected effect for depression-related material. If we assume that the anxiety materials were largely NA based, whereas the “depression” materials were strongly PA oriented, these data are congruent with the above view. That is, both anxious and depressed patients frequently exhibit negative thoughts, but “low PA cognitions” are common only in depressed patients.

A second, related area of research on PA and affective disorder has been pursued by Depue and colleagues, who have provided data suggesting that the various components of the higher order PA dimension (outlined earlier) covary systematically in bipolar disorder (Depue, Krauss, &Spoont, 1987). That is, in manic states one observes not only elevated mood, but also heightened energy, hyperactivity, increased social interest, exhibitionism, excitement-seeking, inflated ambition, and so forth, whereas depression is characterized by low mood and energy, decreased activity and interest, social withdrawal, avoidance of stimulation, and feelings of worthlessness. This bipolar dimension, which Depue terms behavioral engagement (BE), has been identified in normal as well as clinical populations (Depue et al., 1987; Depue, Krauss, Spoont, & Arbis, 1989).

The conceptual links between Depue’s BE dimension and PA/Extraversion are quite clear, and empirical evidence supporting their relation is being amassed. For example, we have found state and/or trait PA to be related to several of the behavioral components of BE, including hedonia (e.g., heightened interest in social activity, sex, food), (decreased) sleep, and increased activity (e.g., exercise) (Clark & Watson, 1988, 1989; Watson, 1988; Watson & Clark, in press). Furthermore, Depue and colleagues are now involved in an extensive analysis of the personality dimen-
sions related to the BE construct, including PA/Extraversion. Direct confirmation of this relation will provide further evidence of the importance of the PA dimension for mental health.

**PA, Health, and Health-Related Variables**

In our examination of the various correlates of NA, we noted several health-related variables that appeared to have an additional PA component, which we will now examine more closely. First, the descriptive conceptualizations of both hardiness and optimism have strong PA features, and it is unfortunate that the measures developed to assess these constructs have not focused more on these positive emotional aspects. However, some data suggest that the standard (composite) hardiness scale may already contain a significant PA component. Alred and Smith (1989) compared the self-statements of hardy and nonhardy individuals who had been assigned to a high- or low-stress condition. As expected, a main effect for hardiness was found for negative self-statements, which disappeared when NA was controlled. However, a significant interaction was found for positive self-statements that was not a function of NA. Both groups were similar under low stress conditions, but under high stress conditions, nonhardy subjects made fewer positive self-statements, even when NA was controlled. This type of effect is seldom if ever found when pure NA markers are studied in relation to positive behaviors. These data therefore suggest that hardiness includes a PA component as well.

In our discussion of NA and coping, we reported findings that supported the notion of NA as primarily a mood-based rather than a behavioral dimension. In contrast, although PA is also a mood-centered disposition, it appears to have stronger associations with behavior in general and with positive behaviors in particular (Clark & Watson, 1988, 1989). Thus, the positive coping style hypothesized for optimists may actually be characteristic of the high PA person rather than the low NA person. To test this notion, it would be necessary to develop optimism measures that focused specifically on positive expectations, as was discussed earlier. McCrae and Costa (1986) specifically studied coping in an NA/PA framework, and presented data relevant to this issue. In two studies, they obtained measures of trait and state NA and PA, as well as ratings regarding the use of 27 specific coping strategies. They found that a greater number of strategies were reliably related to trait NA than to trait PA (30% vs. 15%), but that the coping strategies typically used by high NA individuals also were rated the least effective. In contrast, those that were associated with trait PA tended to be among the most effective. Moreover, subjects' use of "neurotic" and "mature" coping strategies were differentially correlated with state NA and PA, respectively. Finally, when trait NA and PA were partialled out of these relations, neurotic coping was no longer associated with state NA, but mature coping remained significantly correlated with state PA. This suggests that the distress associated with neurotic coping is largely a function of the high NA personality trait, but that positive mood may be independently influenced both by trait PA and by the use of effective coping strategies. These results are generally consistent with the optimism model, but to support that model directly, the findings would need to be replicated using a measure of positive expectations.

Given the strong relation that has been found between PA and social activity (mentioned earlier), it seems that PA also should be relevant to social support. Indeed, theoretical writings in the area have not neglected PA-related aspects of social support. For example, Thoits (1985) noted that perceived support should influence self-evaluations of "lovability, importance, and competence" (p. 58), all of which are positive, PA-relevant qualities (see also Heller et al., 1986). Because the support literature has focused primarily on indices of ill health and psychopathology as outcome measures, however, the positive affective component of social support has not been widely assessed or studied.

Nevertheless, existing data, while preliminary, suggest that it may indeed be fruitful to examine the PA component of social support. First, extraversion has been shown to correlate positively with social support variables and negatively with loneliness (Stokes, 1985). Further, results from a few studies that have examined positive outcomes, and/or have assessed the positive and negative aspects of interpersonal relations separately, suggest the utility of these distinctions. For example, Rook (1984) found that measures specifically tapping positive emotional support (e.g., encouragement) were related to an index of well-being, whereas those assessing purely instrumental support were not.
In a study of personal projects that obtained separate measures of perceived support and hindrance (Ruehlman & Wolchik, 1988), only hindrance was correlated with a distress (i.e., NA) scale, whereas a well-being (i.e., PA) measure was equally related to both hindrance (negatively) and support (positively). Unfortunately, the distress and well-being scales used were significantly correlated with one another, and so were not pure measures of the NA and PA constructs; otherwise, an even stronger convergent/discriminant pattern might have emerged. When ratings of the projects themselves were factor analyzed, separate factors of mastery (absorbing, enjoyable; i.e., PA-related) and strain (difficulty, stress; i.e., NA-related) were obtained. These factors also showed a weak convergent/discriminant pattern with the well-being and distress scales, respectively.

In sum, social support is a promising area for investigation of the individual and combined relations of NA and PA to health. Because social interactions can have both positive and negative aspects, it will be particularly important to assess these qualities separately. Similarly, we would expect the clearest results if positive and negative health outcomes also were distinguished from one another.

Finally, we cited a number of studies earlier showing that NA is a significant correlate of subjective well-being or life satisfaction, as well as its various subareas, such as job or marital satisfaction. However, well-being is conceptualized as more than the mere absence of distress; that is, it is intended to be primarily a positively valenced construct (Diener, 1984) and should therefore be strongly PA related. Indeed, considerable work suggests that life satisfaction is a complex entity, resulting from a subjective averaging of the individual’s positive and negative affective experiences (Andrews & Withey, 1976).

In simple, global assessments of satisfaction, however, positive and negative responses are confounded, so that the results of research using single-dimension scales of satisfaction (and depression) are ambiguous as to whether the findings are due primarily to NA, PA, or to some combination of these dispositions. For example, prospective studies examining the premorbid personalities of cancer patients have yielded mixed results (Watson & Pennebaker, 1989). When relatively pure NA markers have been used to assess premorbid personality, the results have been negative. However, when affectively complex constructs—such as life satisfaction and depression—were assessed premorbidly, positive associations with cancer were found in some, but not all, cases. On the basis of these data, we suggest that it is the PA component of these latter constructs that is actually associated with the development of cancer. However, without confirmation from studies using clear NA and PA markers, this conclusion remains speculative.

Two studies of job satisfaction illustrate how the separate effects of NA and PA can be disentangled through multivariate assessment. First, Brief and Roberson (1989) found significant correlations between several indices of job satisfaction and measures of both state NA and PA, with the PA-satisfaction correlations slightly higher in every case. Using a prospective design, Watson and Keltner (1989) assessed trait NA and PA approximately 2 years before obtaining both multidimensional and general measures of job satisfaction; trait affect also was reassessed at this point. When measured concurrently, NA was somewhat more highly related to the various facets of job satisfaction, but in the prospective analyses PA appeared equally important. Moreover, NA and PA tended to be correlated with different facets of job satisfaction. Finally, it is noteworthy that the general job satisfaction measure was more highly related to PA than to NA, both concurrently and prospectively.

In this section, we have illustrated that it is necessary to go beyond NA and include a second mood-dispositional dimension—PA—in health research. In the last section, we will describe briefly how biobehavioral theorists are trying to link these dimensions with an emerging understanding of neuropsychological functioning. Finally, we will raise what we feel are some important questions that future researchers in this area should address.

TOWARD A COMPREHENSIVE MODEL OF EMOTIONALITY

A full discussion of the larger context in which the NA and PA dimensions exist must be reserved for another time and place. However, we would be remiss if we did not mention the rich tradition within which these constructs have developed and continue to evolve. We have already noted the link between NA and PA (which derive from Tellegen’s work on mood and personality) and the Eysenckian dimensions of Neuroticism and Extraversion,
respectively. Each of these models also contains a third higher order dimension, Constraint and Psychoticism (which are oppositely keyed from one another), respectively. Tellegen (1985) has described this dimension as an affect-relevant indicator of a person's 'preparedness' to respond to a range of emotion-related circumstances...with either caution, timidity, and respect or with recklessness, boldness, and defiance" (p. 697). Additionally, Gray (1971, 1985) has proposed a psychobiological model comprising three fundamental emotional systems that can be interpreted fairly directly as NA, PA, and Constraint (Tellegen, 1985). Finally, building on the work of these writers, Cloninger (1986, 1987a, 1987b) has outlined a three-factor biopsychosocial model for linking personality with psychopathology.

Although these dimensions are generally viewed as attempts to represent "real" entities, and not simply convenient psychometric fictions, research establishing their biological bases is still in its infancy. However, several directions appear promising. Based primarily on animal research, but also on investigations of the drug effects in human beings, Gray (1971, 1985) has linked NA (his Behavioral Inhibition System; BIS) with noradrenergic and serotonergic impulses to the septohippocampal system under conditions of stress. Cloninger's model appears highly congruent with regard to this system (although his scale is tipped toward measuring NA vs. PA, rather than high vs. low NA per se). However, there are more significant inconsistencies between the two models' views of PA and Constraint.

To understand these discrepancies, a brief review of the historical confusion between these dimensions will be helpful (see Watson & Clark, in press, for a fuller discussion). As we noted earlier, the higher order PA/Extraversion dimension contains a number of facets that are themselves only moderately correlated. Eysenck's original conception of Extraversion also contained a strong Impulsivity component, and his revised scale still taps this facet to a greater degree than other PA/Extraversion scales (Watson & Clark, in press). Although Impulsivity is now generally recognized to form part of the higher order Constraint dimension, the influence of this view lingers on. For example, both Gray and Cloninger propose the existence of a Behavioral Activating System (BAS), which they describe similarly as involving appetitive approach or approach learning, and also active avoidance or skilled escape behavior. However, they view the stimuli that activate this system, the relevant brain systems, and the corresponding personality dimensions differently, paralleling the current versus Eysenckian view of PA/Extraversion.

Specifically, Gray's model of the BAS appears to be largely congruent with current conceptualizations of PA/Extraversion, and his remaining third dimension ("Flight/Fight") can be linked with Constraint/Psychoticism (Gray, 1971; Tellegen, 1985). In contrast, Cloninger partially follows the old Eysenckian model, combining two components of PA/Extraversion—Positive Mood (specifically, feelings of excitement, interest, and enthusiasm) and Ascendance—with Impulsivity into a dimension he terms novelty seeking (Cloninger, 1987b). He then combines the Extraversion components of Sociability and Ambition into a third dimension, which he terms reward dependence. The neural substrates he proposes for these dimensions are also a blend of those put forth for PA and Constraint by Gray. Cloninger (1987a) has argued for his model on the general grounds that "underlying genetic variation does not correspond well to observed behavioral variation" (p. 413). However, no one expects brain-behavior associations to be simple, and the existing data do not clearly support or refute any particular model.

While these models have focused primarily on limbic system activity, Fox and Davidson (1984) have proposed a model of cortical hemispheric asymmetry. They conceptualize positive and negative affective states as representing approach and withdrawal tendencies, respectively, and link them with left and right frontal lobe processing. Leventhal and Tomarken (1986) review extensive evidence supporting the lateralization of emotional states, but also note the existence of competing models (e.g., Tucker & Williamson, 1984). In any case, all existing models (regarding both limbic and cortical systems) are still quite skeletal, and current links between mood-dispositions and brain represent informed speculations rather than empirically based conclusions.

Directions for Future Research

Although these discussions of brain-behavior relations may appear to take us far afield of our original topic, this research may eventually yield some exciting breakthroughs in our understanding of the psychological correlates and determinants of health. By linking personality/health research with work in neuroscience, we have the opportunity to make major advances in our basic under-
standing of emotional distress and well-being. In a recent recognition of the importance of such re-
search, the National Advisory Mental Health Council (NAMHC) identified 50 important ques-
tions for neuroscience to answer in the decade ahead, and a significant number involved the role of emotions or stress in physical or mental health (NAMHC, 1988). To cite but one, “What are the
detailed neuronal systems mediating basic drives and experiences such as pain, pleasure, attention,
and emotions?” (p. vii).

To this type of broad question, we would ap-
pend more specific—but no less fundamental—
questions such as, “Why, from a neurological per-
spective, is the NA dimension so broad and pervasive?” And “Why do these marked individ-
ual differences in the tendency to experience posi-
tive and negative emotions exist at all; for exam-
ple, evolutionarily speaking, are varying levels of the dimensions differentially adaptive?” Future
research in neuroscience will need to resolve the
inconsistencies between contrasting views of corti-
cal involvement in emotional behavior, and to de-
velop more comprehensive models that integrate
both cortical and limbic inputs. The knowledge
that half of the (phenotypic) variation stemming
from these neural structures/processes is geneti-
cally based may help to guide these inquiries.
Conversely, advances in neuropsychology will in-
form investigations into the basic question of
what, specifically, is inherited.

We wish to stress that we are not making the
reductionistic argument that our understanding of
psychological phenomena is complete only when
we have grasped the underlying biological mecha-
nisms. Rather we believe that biological and
psychological perspectives can be mutually en-
hancing. Theoretically and empirically sound be-
havioral/descriptive work is as critically important
to biological approaches as vice versa. Thus, it
also will be important to pursue answers to unre-
solved issues at the social, behavioral, and pheno-
menological levels. For example, much psycho-
metric work needs to be done to clarify relations
among the various personality traits hypothesized
to be associated with, or modifiers of, stress. We
have suggested that many have a large NA com-
ponent, but what of the remaining unexplained vari-
ance? For example, can measures of hardness or
optimism be developed that better reflect the PA
component in their respective conceptualizations?

Another important issue involves further exam-
ination of relations among subjective and objec-
tive measures of various phenomena. For exam-
ple, how can we separate the contributions of NA
and actual health status and so enhance our un-
derstanding of physical symptom reports? How
do social network variables interact with personal-
ity (both NA and PA) to produce perceived social
support, and further, how does personality affect
actual social networks? Finally, does the third ma-
jor higher order dimension, Constraint, play a
role in either physical or mental health? For exam-
ple, to the extent that this disposition represents
individual differences in behavioral and affective
regulation, it may be relevant to life-style diseases,
such as obesity and perhaps substance abuse, that
require conscious or habitual self-control, or to
personality disorders, in which dysregulation ap-
pears to be a major symptom dimension.

In conclusion, let us note that the theme of
separate systems regulating approach (PA) and
withdrawal/avoidance (NA) is common to several
models, both neurological and psychological, and
thus represents a potentially important avenue for
integration. Gray (and by extension, Tellegen),
Cloninger, Depue and colleagues, and Fox and
Davidson all utilize the concepts of approach and
avoidance in their models. Coping mechanisms
also were categorized into approach and with-
drawal/avoidance strategies, and optimists/pessi-
mists are hypothesized to use these strategies dif-
ferentially. Support systems also no doubt depend
heavily on individual differences in social ap-
proach and withdrawal tendencies. In this context,
it is interesting to recall that approach and avoid-
ance were central concepts in the early work of
Dollard and Miller (1950), examining relations be-
tween personality and psychopathology. Fur-
thermore, Tellegen (1985) has suggested that
“the real psychoanalytic model incorporates two
basic affect-signal systems,” one of which “con-
trols avoidance of distress” (anxiety/NA), the
other of which “controls the procurement of satis-
faction” (approach/PA) (p. 701). Clearly, we have
a long way to go in our understanding and integra-
tion of these diverse theoretical models and em-
pirical phenomena, but it is just as clear that great
strides are being made toward a comprehensive
biopsychosocial model of the major dimensions
of emotionality.

REFERENCES
Abramson, L. Y., Seligman, M. E. P., & Teasdale,
J. D. (1978). Learned helplessness in humans:
Critique and reformulation. Journal of Abnor-
mal Psychology, 87, 49–74.


