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Self-esteem and blood pressure, cholesterol, thyroxine and leukocytes

Dorothy Louise Vela-Melton

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SELF-ESTEEM AND BLOOD PRESSURE, CHOLESTEROL,
THYROXINE AND LEUKOCYTES

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

by
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ABSTRACT

Most current models in health psychology assume that self-esteem (SE) mediates stress and stress adversely affects physical health. This study examined the direct effect of SE on blood pressure (BP), cholesterol, thyroxine and leukocyte levels. Medical records were used for evaluation. In a pilot study, a SE measure was developed using selected items from the Beck Depression Inventory, Taylor Manifest Anxiety Scale and SCL-R-90 along with the Rosenberg Self-Esteem Scale. The final set of SE items were chosen by item analysis and used to analyze the physiological data. Defensiveness (DEF) from the Marlowe-Crowne Social Desirability Scale controlled the self-reported data. SE was only significant in the interaction between SE and DEF on diastolic BP. Neither SE or DEF had significant effects on either systolic BP, cholesterol, or leukocyte levels. Results demonstrate the effects of DEF and NA in self-reports is unrelated to actual findings, in contrast to self-reported health indices. The lack of findings may reflect the measure of SE used in the present study.
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INTRODUCTION

In recent years there has been resurgent interest in self-esteem. In 1986, California passed AB-3659, Chapter 1065 which created the State Task Force on Self-Esteem and Personal and Social Responsibility. This law mandated that each County form a Self-Esteem Task Force to identify existing successful programs (or develop new ones) that promote positive self-esteem in all areas of the population. Since then several other states and two countries have followed California's lead to develop programs to promote high self-esteem in their communities.

Is self-esteem related to physical health? Relationships have been found between various other personality constellations and physical health, such as Type A personality type (Rosenman, 1978), the repressive coping style (Weinberger, 1990), depression (Rice, 1987), anxiety (Silthanen, 1984), negative affect (Campbell & Fehr, 1990), and dispositional optimism (Schier, Matthews, Owens, Magovern, Lefebre, Abbott & Carver, 1989). These personality measures are likely to be strong correlates of self-esteem; however, the relationships of global self-esteem to physical health measures such as blood pressure, cholesterol, thyroxine
or leukocyte levels have not been directly investigated.

The relationship between self-esteem and psychological health has been well documented (e.g., Cramer, 1985; Miller, Kreitman, Ingham & Sashidharan, 1989). For example, Miller, et al., (1989) investigated types of life events associated with low self-esteem, the role of life events and self-esteem in onset of psychiatric disorders, and the significance of prior psychiatric disorders in determining onset of current psychiatric disorders in 340 women. The onset of major depression was best predicted by an interaction between high total stress and low self-esteem. Cramer (1985) found in two studies that subjects who had high self-esteem suffered less from various psychological symptoms.

One area in which the relationship between self-esteem and physical health has been addressed indirectly is through its mediation of the stress effects on physical health (Brown, 1988; Greenberg, 1990). Brown (1988), for one, demonstrated that self-concept mediated the effects of stressful events on physical health. Persons with "uncertain" self-concepts were more vulnerable to stress-induced deteriorations in health than those with a strong sense of identity. Greenberg
(1990) states that the "every essence of stress manage-
ment requires confidence in yourself and in your deci-
sions to control your life effectively" (p. 135).

Another area that is related to the possible rela-
tionship between self-esteem and physical health is
a large body of research studying major life events and
physical health. In general, this research shows that
major life events adversely affect physical health.
These results have been found in different popula-
tions with a variety of methodologies (for reviews, see
Jemmott & Locke, 1984; Maes, Vingerhoets, & Van Heck,
1987). Negative life events have been shown to have
adverse effects on physical health, and the self-con-
cept is a mediator for those effects (Brown, 1988).
Positive life events have been shown to increase ill-
ness in subjects with low self-esteem who may fear
success may be shortlived or not controllable, whereas
positive life events have been linked to better health
among subjects with high self-esteem (Brown & McGill,
1989).

Central to mediating the stress incurred from life
events are perceptions of control over them. A good
deal of research indicates that perceptions of control
also promote physical well-being, especially during
stressful times, such as negative life events (for
reviews, see Rodin, 1986; Taylor, 1986). Not only are controllable events seen as less stressful than uncontrollable ones (Brown & Siegel, 1988), but also many of the cognitive, affective, and motivational deficits that accompany exposure to aversive events are reduced in magnitude when individuals believe they have a controlling response (Seligman, 1975). Physiological reactivity also appears to be reduced when individuals believe that stressful events can be controlled (Frankenhaeuser, 1981). Persons of high self-esteem may have increased feelings of control over themselves and their environment, hence, have lower physiological reactivity.

As an example of perceptions of control mediating the stress of a life event, Schier, et al. (1989) investigated the perceptions of dispositional optimism in which control is theorized as playing an important role in 51 men who experienced coronary artery bypass surgery. They found that dispositional optimism was associated with faster rates of recovery and return to normal life activities, but also with the quality of postsurgical life.

Thus, it appears that self-esteem mediates the effects of stress and life events, and there is abundant literature that documents the effects of stress on
physical health (for review, see Rice, 1987). Whether the effects of self-esteem on physical health may be more direct is not known. The purpose of this study was not to study the effects of stress or perceived control, but rather to investigate directly the relationship between self-esteem and selected physiological measures.

**The Self-Concept**

According to Rosenberg & Kaplan (1982), the self-concept is "the totality of the individual's thoughts and feelings with reference to himself or herself as an object" (p. xiii). It is not only what an individual thinks of her/himself, but also how she/he thinks others evaluate him/her.

Various theorists have classified the self-concept into broad areas. One of the most familiar distinctions is between the conscious and unconscious concepts (through dreams and associations, one may learn one's underlying thoughts and feelings about oneself). A second distinction is between the inner and outer world of thoughts and feelings or in terms of social exterior or overt public qualities, that is, self-monitoring or self-focusing (Rosenberg & Kaplan, 1982).

Another aspect of the self-concept is whether it is encased in a single-body or extends beyond it. In
other words, what are the boundaries of the self and how far does it extend? Cooley (1902) used the term "to appropriate" to express the process by which an individual takes objects into the self. The self is said to expand and contract with experience. New external elements are incorporated into the self, some even becoming central while others are devalued and excluded. The term commonly assigned to this phenomena is ego-extensions. William James (1890) describes: "Our fame, our children, the work of our hands may be as dear to us as our bodies are and arouse the same feeling as the same acts of reprisal if attacked" (p. 291).

The elemental components of the self that expand and contract through experience and incur constant assessment in terms of cognitive concepts were delineated by Markus (1977): "Self-schemata are cognitive generalizations about the self, derived from past experience, that organize and guide the processing of self-related information contained in the individual’s social experiences" (p. 64). The self-schemata is the self-concept because it is one’s frame of reference. It serves as an anchor for adjusting to one’s current daily experience. Individuals pay attention to certain things and not others; interpret facts one way rather
than another; accept or reject information about themselves; and generally respond to the concrete experiences of life in terms of their pre-established ideas of what they are like. Such self-schemata in Markus' terms "organize, summarize and explain behavior" and it makes no difference if the component is positive, negative or neutral. Self-schemata within an attribution theory framework can be viewed as "implicit theories used by individuals to make sense of their own past behavior and to direct the course of future behavior" (p. 78).

A number of theorists (Epstein, 1973; Lecky, 1945; Swann, 1987) agree that the self-concept acts largely to organize and guide personal experience. It develops as a conceptual tool that individuals use to understand their own behavior and the behavior of others toward them. Carl Rogers (1959) agrees with these writers that the structure of the self is shaped through interaction with the environment, particularly the environment composed of parents and significant others; and although it is fluid, it retains a patterned, gestalt-like quality to it.

In more specific terms, self-conceptions (a) aid in processing personal information (Markus, 1977), (b) provide individuals a basis for present (Gergen, 1971)
and future behavior (Markus & Nurius, 1986); and (c) influence the course of social interaction insofar that individuals react to one another on the basis of identities they project (Swann, 1987). Collectively, these functions allow individuals to deal more efficiently with, and better predict and control, their social world (Brown & McGill, 1989), or from a functional framework, well-adjusted individuals might be defined as efficacious social problem-solvers who experience little dysphoric affect or self-control problems (Rosenbaum, 1980).

**Self-Esteem**

The judgment aspect of the self-concept is self-esteem. Although self-esteem can be considered to have various components (Rosenberg & Kaplan, 1982), it is also acknowledged as a global measure of an individual's self-evaluation (Rosenberg, 1965). That is, when individuals consider their intelligence (self-schemata), the judgment of positive, negative or neutral forms the self-esteem about their intelligence. This judgment then contributes to or affects global self-esteem in terms of its relative importance to the self-concept (Kaplan, 1975). Further, the judgment involves not only what individuals feel about themself, but also how they feel others view them (Bandura, 1977).
Kaplan (1975) states that the desire for self-esteem is universal and characterizes a dominant motive. In all past and contemporary cultures, self-esteem characteristically develops as a result of processes set in motion by the child's initial dependence upon others for satisfactions of basic physical needs present at birth. However, this is not to say that the development of self-esteem is inevitable. According to Kaplan, if the adults in the child's experience are invariable (uniformly positive/negative regardless of the child's behavior) or inconsistent (child's behavior evokes positive responses or sometimes negative responses), the child might not learn to associate particular behaviors on her/his part with particular adult attitudes toward her/him and thus might not develop the need for positive attitudinal responses from others or the need for positive self-attitudes (the need for other's approval).

According to Rogers (1959), the development of high self-esteem assures the tendency toward becoming an independent, self-actualized person with a compatible self-concept. This high self-esteem individual is unlikely to behave in ways which are inconsistent with the self-concept because this would frustrate the need for positive self-esteem. This was confirmed by Rosen-
berg's (1965) findings that adolescents with positive self-esteem had a more stable self-concept over time that those with negative self-esteem. Also, Campbell and Fehr (1988) found that the behavior of high self-esteem subjects via self-reports were consistent and congruent with partner and observer ratings, whereas the behavior of low self-esteem subjects was neither consistent or congruent with partner or observer ratings.

**Mechanisms Relating Self-Esteem to Health**

Although global self-esteem has never been directly related to health, disruptions to the self-concept and its effects on self-esteem are known to affect physical health and illness (Brown & Siegel, 1988; Frankenhaeuser, 1981; Seligman, 1975). Although these mechanisms were not examined in the present study, the above cited research indicates that perceptions of control during stressful or aversive life events mediate stress and its effects on physical health. This implies that a well-adjusted individual feels an ability to predict and control life events, especially stressful or aversive ones, and that this ability assists in the development of a strong, stable self-concept with high self-esteem. But, what happens to self-esteem and physical health when life events are
perceived as beyond one's control? What are the conditions of disruption of the self-concept and how does the disruptions affect self-esteem and physical health?

Carl Rogers (1959) states that when incoming experiences are recognized as incongruent with the self-concept, the experience becomes a threat to the individual's self-concept and self-esteem due to the conflict between his/her self-related perceptions and actual experience. As a result, the individual becomes potentially vulnerable to anxiety and personality disorganization if the current self-structure is not maintained.

"This goal is achieved by the perceptual distortion of the experience in awareness, in such a way as to reduce the incongruity between the experience and the structure of the self, or by the denial of any experience, thus denying any threat to the self" (Rogers, 1959, p. 204-205).

Changes to the self-concept have been examined by several authors (Engle, 1959; Kaplan, 1975). Kaplan (1975) describes both a positive self-concept (consisting mostly positive self-evaluations) and a negative self-concept (consisting of mostly negative self-evaluations). Further, individuals appear to change their self-attitudes over time in a positive direction rather than in a negative direction. But, when most subjects' are faced with experiences that could incur self-deval-
uating responses, a characteristic calculated response is to increase positive (and defend against negative) self-evaluation which increases positive (and decreases negative) self-attitudes. This may occur through readjustment of response patterns to more closely approximate positively valued goals, misperceptions of attitudes, behaviors, or circumstances, or a reordering of values. However, Engle (1959) reported some stability of self-concept over a two-year period in high school students noting that the most change in positive/negative self-concept occurred in the negative self-concept grouping.

However, readjusted self-evaluations are not the only defensive mechanism or coping style used to prevent disruptions of an established self-concept. An alternative method is to repress disruptions to the self concept. For example, Weinberger (1990) describes repressive individuals as "viewing themselves as the kind of persons who do not experience much subjective distress seems central to their self-concept" (p. 53). Haan (1985) states the critical transformation from suppression to repression occurs when "I prefer not to think about it" changes to "There is nothing to think about." Repressive coping individuals have been found in a majority of psychophysiological studies to be more
reactive than consciously distressed subjects (Hare, 1966; Lazarus & Alfert, 1964; Parsons, Fulgenzi, & Edelberg, 1969; Scarpetti, 1973), more reactive in cardiovascular, muscular, electrodermal, and cortical responses to laboratory stress (Schwartz, 1986), and hence, more at risk for physical illnesses such as asthma, hypertension and cancer than non-repressive individuals (Schwartz, 1986). Thus, repressive coping may be a mechanism to maintain high self-esteem that interferes with physiological functioning.

Another theory addressing self-devaluing self-perceptions that disrupt the self-concept is Higgins' (1987) self-discrepancy theory in which individuals distinguish between the "ideal/own self" and "ideal/other self" and between "ought/own self" and "ought/other self". Discrepancies between the actual/own self and ideal/(own or other) selves lead to dejection-related emotions, such as sadness, disappointment, frustration and shame. Higgins suggests that the person believes s/he have been unable to attain hopes, dreams or aspirations that either the person has set for him/herself or a significant person has set for them. When the discrepancy between actual and ought self is revealed, the individual experiences agitation-related emotions, such as fear, anxiety or
guilt. In these cases according to Higgins, the person believes that s/he has failed to live up to standards set for good, dutiful or responsible behavior set by oneself or others. These agitated emotions stem from the experience of feeling that one is being punished (by self or others) for not doing what one ought to do.

Higgins (1987) administered a list of traits or attributes, such as "honest," "hot-tempered," "friendly," "easy-going," "sincere," etc. to university undergraduates and then one month later also administered assessments of depression and anxiety. As predicted, actual/ideal discrepancies predicted depression, but not anxiety; whereas, actual/ought discrepancies predicted anxiety, but not depression. Students who felt they were not living to their ideal selves reported high levels of sadness and depression, whereas those who felt they were not living up to their ought selves reported high level of fear and anxiety.

Unfortunately, self-denigration, disruptions to the self-concept, negative affect, and stress-related physical illnesses seem to have many sources. Ogilvie (1987) examined still a different kind of disturbance to the self-concept. Whereas Higgins (1987) focused on the extent to which the perceived actual self differs from other positive selves (ideal or ought), Ogilvie
(1987) examined the extent to which the actual self is similar to an undesired self. The undesired self contains attributes that the person fears, dreads, hates and actively seeks to exclude from one's experience. Ogilvie suggests that we may be in closer touch with our undesired selves because they are rooted in our past experiences, than our ideal/ought selves which are more hypothetical. Ogilvie obtained university undergraduate students' characterizations of their actual, ideal and undesired selves and "measured" the distance between these positions in a hypothetical space. The results indicated that the distance between a person's ideal and actual selves was negatively associated with life satisfaction, while the distance between the undesired and actual selves was positively associated with life satisfaction. The second effect was larger. This is to say that the distance between undesired and actual selves was a much stronger predictor of life satisfaction than was the distance between ideal and actual selves. Ogilvie's findings imply that if we want to be happy, we will do better avoiding self-denigration rather than striving to be the way we want to be.

The physical consequences of this thinking pattern was shown in an important study by Pearlin and Schooler
(1978). They interviewed 2,300 people from urban Chicago and found that three psychological traits (self-esteem, self-denigration and mastery) were crucial in protecting against the effects of psychological stress. Of these, the most significant was self-denigration. The more frequent the individual had negative thoughts about self, the greater the stress. Most significant was the fact that self-denigration was the strongest variable for all four of the major life events assessed in the study (i.e., marital stress, parenting stress, family financial stress, and work stress).

Thus, individuals who experience aversive events strive to maintain a positive self-concept and defend against negative self-perceptions that would disrupt their self-concept and lower their self-esteem. This may cause them to experience the additional stress of inability to predict and control the environment incurring degrees of self-rejection and failure to maintain their self-worth. These self-devaluing responses can facilitate depression and/or anxiety which would have implications for physical health.

**Identity Disruption as a Model**

Thus far, several theorists (Higgins, 1987; Kaplan, 1975; Ogilvie, 1987) have attempted to describe
some of the conditions and responses inherent in changing the self-concept. In essence, when an individual encounters relatively common or major life events, the way a person thinks about the self may change. The impact of the degree of disturbance in the self-concept is predicted by the identity disruption model of stress (Brown, 1987), which holds that the more a life event changes one’s self-concept, the greater the person’s risk for developing illness. A two-step process is proposed: a) life events create alterations in identity and (b) identity disruption has a negative impact on health. So far, there are four ways that life events initiate disturbances in the self-concept. First, they may cause individuals to abandon an existing identity. When people graduate from college, they shed the student identity. Life events may also require individuals to adopt new identities. When individuals marry, they take on the identity of husband or wife. Life events may also disrupt identity by changing the structure of the self-concept. When one leaves home for the first time, the identity of a son or daughter may decline in importance as new identities rise in prominence. Or, life events may cause an individual to re-evaluate pre-existing identities. After losing one’s job, for example, the identity of being successful in
one's career may be called into question (Brown & McGill, 1989).

The functions of self-conceptions suggest two alternatives by which identity disruption may impair health. First, because self-conceptions facilitate personal information processing and provide clear guidelines for present and future behaviors, individuals experiencing identity disruption must devote extra attention to those tasks, thus reducing the amount of energy available for other tasks (Brown & McGill, 1989). This general depletion of resources could then limit a person's ability to withstand illness (Selye, 1956).

Secondly, identity disruption may also negatively affect physical health by undermining one's sense of control over the environment, weakening the identity's usefulness as a conceptual tool because of the perceived inability to predict and control events. Thus, a diminution in perceived control may represent another way identity disruption impairs physical health (Brown & McGill, 1989).

In summary, the identity disruption model of stress (Brown, 1987) states the more a life event changes the way a person thinks about the self, the greater the person's risk for developing illness.
Identity disruption may negatively affect physical health by undermining one's sense of control over the environment. This loss of control may have negative consequences for physical health. Thus, the relationship between self-esteem and physical health can be mediated by identity and control issues.

**Negative Affect: The Outcome of Disturbance to the Self-Concept**

Another observation by Kaplan (1975) is the association between self-devaluing experiences and subjective distress/negative affect (i.e., sadness, anger, bitterness, tenseness, panic, hopelessness, pressure, etc.) when, by definition, individuals display negative affect (NA) in response to negative self-perceptions and self-evaluations. The self-esteem motive is inferred by relating the affective responses to self-devaluing experiences, such as characteristic responses of negative affect to self-devaluing experiences and positive affect to positive self-evaluation experiences.

Watson and Clark (1984) have shown that a number of diverse personality scales (e.g., trait anxiety, ego strength, and neuroticism) are measures of the common stable trait of negative affect. They stated that negative affect is the disposition to experience aver-
sive emotional states, and defined high-NA individuals as those who are "distressed and upset" (p. 465). Although common measures of depression (e.g., Beck Depression Inventory; Beck, 1967) and less severe, more transient negative mood states correlate substantially with negative affect (Watson and Clark, 1984), self esteem is a concomitant of negative affect when NA has been shown to be relatively stable over long period of time (Conley, 1984; Costa & McCrae, 1980; Wells & Stryker, 1988).

But what is the relationship between low or high NA and self-esteem or the self-concept? Is there any response difference between low or high NA individuals when they encounter life events? Research has found a consistent relationship between subjective distress (negative affect) and low self-esteem implying congruence of the self-esteem motive (Rosenberg, 1965). Watson and Clark's (1984) found that low NA individuals are generally better adjusted than high NA individuals, and they agree with Taylor and Brown's (1988) theory that the optimistic beliefs of low NA individuals, even when they are unrealistic, are healthy and adaptive. This association becomes important when potentially threatening life events are encountered, as self-concept uncertainty and negativity are critical to the
disposition to experience aversive emotional states such as depression or anxiety (Campbell & Fehr, 1990). As noted earlier, NA is assessed by many common personality measures, is a measure of maladjustment, low self-esteem, pessimism and ego-strength (reverse-keyed) and generally is a diffuse, nonspecific measure of subjective distress and dissatisfaction that exerts a pervasive influence in self-report personality assessment (Watson & Clark, 1984).

Thus, negative affect can influence an individual's self-concept, contribute to low self-esteem, and affect physical health due to the effects of stress. Research has shown that LSE individuals are more likely to experience negative affect, cognitive and behavioral reactions to failure or negative feedback than HSE individuals (Brockner, Derr & Laing, 1987; Campbell and Fairey, 1985; Moreland and Sweeney, 1984). Brockner (1983) reviewed a substantial body of research indicating LSE subjects are generally more susceptible to the effects of self-relevant cues. Kernis, Brockner and Frankel (1989) found that in response to negative feedback, LSE individuals had a greater tendency to overgeneralize the implications of the negative feedback to other aspects of their identities than HSE individuals. Even repressive copers who by definition
have rigid control over affect and impulses experience poor self-regulation of emotions once the defensive structure is breached. Megargee, Cook and Mendelsohn (1967) found in a series of studies that the majority of individual imprisoned for sudden, extremely violent acts of aggression are repressive rather than undercontrolled. Blackburn (1965) found in another study that psychiatric patients who were repressive were more likely referred for treatment because of temper outbursts or somatic symptoms, such as paralysis or back pain. Therefore, in response to failure or negative feedback, negative affect may contribute to one's low self-esteem, negative self-concept, and have adverse effects on physical and mental health as a result of the stress created by life events.

The relationships between NA, health complaints and actual health are not so simple. Watson and Pennebaker (1989) call into question the use of health scales and other types of physical status measures because these questionnaires rely on subjective self-reports. The questionnaires ask subjects to assess how frequently or intensely they have experienced various physical symptoms or problems, such as headaches, back pain, etc. Although Watson and Pennebaker agree that these self-reports have been extensively validated
against hard evidence of dysfunction (e.g., data from medical records), they suggest that self-report health scales have two distinct components: one is subjective and psychological, and the other that is objective and more clearly health related. In their study, Watson and Pennebaker tested university employees, students, and adults from a rural community not affiliated with the university. They found that the association between NA and health complaints is quite general and that NA is related to a broad range of self-reported physical problems.

Watson and Pennebaker (1989) found little support for the NA-actual health complaint relationship. They found that NA individuals complain about their health, but showed no hard evidence for poorer health or increased mortality.

Further, Watson and Pennebaker (1989) found that NA was not consistently associated with major or chronic health problems, at least not in the populations they studied. However, the correlation between NA and reported somatic problems remained strong in these samples. So major health problems were not a significant cause of high NA in normal subject and such problems could not offer an acceptable explanation for the NA-health complaint correlations found in their sample.
Watson and Pennebaker's findings also agreed with McCrae, Bartone and Costa (1976) and Tessler and Mechanic (1978) who found that NA correlated significantly with self-rated health, self-rated health has significantly associated with physicians' ratings, but NA was unrelated to physicians' ratings. They noted that the relation between NA scores and somatic complaining was strongly linear and continuous. Despite their myriad of complaints, high NA individuals showed no increased frequency of physician or health center visits. In order to explain these results, Watson and Pennebaker present recent theory and research that high NA subjects are hypervigilant and scan the world for impending trouble (Tellegen, 1985). The hypervigilance of NA subjects may help explain their increased somatic complaining in two ways. First, high NAs may be more apt to notice or attend to normal body sensations and minor aches and pains. Secondly, because their persistent scanning is anxiety-based, high NAs may interpret normal symptoms as painful or pathological. Several studies have indicated that high NA subjects interpret ambiguous stimuli in a negative or threatening manner (Goodstein, 1954; Haney, 1973; and Watson & Clark, 1984).

The review of extensive evidence demonstrating
that NA is associated with a broad range of subjective complaints and that NA highly correlates with self-reports of physical symptoms suggests an expansion of the conception of NA. Rather than just a disposition of negative emotion, NA is more a general trait of somatopsychic distress (Watson and Pennebaker, 1989) which is self-reported distress that represents a single pervasive trait that is expressed through a broad range of negative affect states and somatic complaints.

Thus, it is possible that self-esteem may be related to measures of somatic complaints, but whether it is related to actual and objective measures of physical health is unknown. Therefore, individuals' self-deceptive traits must be considered in any self-reported measure used in order to obtain a reliable uncontaminated estimate of any personality measure including self-esteem.

**The Role of Defensiveness in the Self-Concept**

Dimensions discussed by Turner (1976) regarding authentic or inauthentic regions of the self are important to this discussion. Certain aspects of ourselves do not reflect what we feel we really are. Some parts of the self are experiences of "the real self" or "true me," whereas others are viewed as more "superficial,"
"artificial," or "alien". The behavior we exhibit in a social setting may not be a true representation of what we really feel about ourselves. We build up concepts of what we are like and experience qualities or actions contrary to these as "inauthentic" or "unreal".

Turner (1976) presents a question of which parts of the self are experienced as more real, genuine or authentic than others. He suggests that this may be dependent on historical circumstances. At an earlier time, people felt that the real self was expressed in fulfilling one's self social roles, accepting responsibility for one's decisions, setting high standards of behavior and living with ethical principles. Today, on the other hand, the real self tends to be recognized as an impulse; that is spontaneous, unreflective, emotional and free of facade. According to Turner, this historical change should not be perceived as people being closer to their real self in different terms. They just construct it differently.

Berger, Levin, Jacobson and Millham (1977), however, discuss the highly ritualized nature of social behavior and notes that individuals manage impressions with each performance they enact. They state that even the most "spontaneous" situations are mere role-play designed to manage the impressions of others. However,
there are conceptions of individuals who often do not recognize their own affective reactions.

This viewpoint only becomes tenable within certain perspectives on the nature of emotion. Gazzaniga (1985), among others, has noted that much of 2,000 years of Western thought has urged us to view the brain as creating a unified cognitive process. Emotions were formulated as the "interactions between the arousal system and the cognitive-interpretive system" (Mandler, 1975, p. 65), where the cognitive system both incites the affective arousal and determines its meaning. This model leaves little room for self-deception about one's emotional states (Sarbin, 1981; Szabados, 1985). If the affect system is thought incapable of independent assessment of sensory information, one's emotional state becomes whatever the "cognitive-interpretive system" decides it is (Schachter & Singer, 1962).

However, recent work on the complex nature of human information processing and brain subsystems (Fodor, 1983; Gazzaniga, 1985; Hilgard, 1986; McClelland & Rumelhart, 1986) provides a very different understanding of human nature. A psychobiological perspective suggests that affects emanate, at least in part, from sub-cortical centers that are semi-autonomous from verbal information processing (MacLean, 1975;
Panksepp, 1982). MacLean (1975) states that our "paleomammalian brain" including the limbic system has its "own special kind of intelligence" and can function somewhat independently from more recently developed neocortical centers and notes that this phenomena "may partly account for conflicts between what we affectively 'feel' and what we 'know'" (p. 81).

Affective specialization within the neocortex has also been demonstrated. The frontal region of the right cerebral hemisphere, which is connected to the limbic system, seems to be particularly activated during the generation and processing of many negative affects (Davidson, 1984).

Nonetheless, there is growing evidence that the emotion system interacting with other subsystems is capable of conducting its own assessments of sensory information (Izard, 1984; Leventhal, 1984). LeDoux (1986) has recently reviewed neurological findings that sensory messages are transmitted directly to regions of the limbic system without initially being relayed through the neocortex which is in accord with MacLean's (1975) findings. It is well-known that the emotion system, in part, specializes in anticipating whether situations may require significant psychophysiological preparation, such as for flight/fear response, physical
combat or loss of deprivation/sadness (Schwartz, Weinberger & Singer, 1981).

How do we as individuals know which emotion is appropriate to the situation? Recent research (Roseman, 1984; Smith & Ellsworth, 1985) has begun to model types of schematic processing (Leventhal, 1984) that the emotion system employs in determining what specific patterns of emotion seem warranted. For example, sadness seems to reflect an assessment that an unpleasant situation is controlled by interpersonal circumstances where the individual can do nothing to change it. There is no direct introspective access to how the emotion system constructs these appraisals; instead, we rely on subjective experiences of resulting emotions (Schwartz & Weinberger, 1980) and on inferences based on implicit theories about what it must be doing (Nisbett & Wilson, 1977). From observations of split-brain patients, Gazzaniga (1985) actually claims to have identified an interpretive system with the left hemisphere that specializes in constructing explanations for behaviors and emotional responses generated by other modules within the brain.

Although we have a preliminary understanding of the complimentary dynamics of the cognitive-interpretive and affect systems, we do know that they can
respond very differently to the same situation. An example is how they react to inputs from another brain subsystem, i.e., the one that produces visual imagery (Kosslyn, 1987). Having individuals image a threatening scene of a disturbing motion picture reliably incites specific patterns of emotion including differentiated autonomic changes and facial expressions, even though the person "knows" that the images pose no real threat (Lang, 1979; Schwartz, Weinberger & Singer, 1981). Wolpe (1978) also noticed from a behavioral perspective that neurotic patients are often afraid in situations they acknowledge not to be objectively dangerous imagery. This information is consistent with data suggesting that conditioning of affective responses can occur without involvement of the higher cortex (LeDoux, 1986). Thus, emotional responses to some degree have their own integrity, even when the cognitive-interpretive system considers them irrational or inappropriate (Ellis, 1987).

Current psychobiological research suggest that our cognitive-interpretive and emotion systems can generate quite discrepant assessments of the same stimuli. Commonplace self-perceptions such as "I am really feeling anxious even though I know there is no reason to be" may be a valid reflection of the modular nature
of human information processing. Psychologists readily admit that not all individuals readily tolerate these types of discrepancies suggesting that some invoke defenses under these circumstances and self-deceptively reach false conclusions such as "I am not feeling anxious because there is no reason to be."

Generally, Dennett (1969) outlined two essential types of awareness necessary to self-deception. First, individuals are aware of a proposition if they can talk about it. Secondly, the individual is aware of a proposition if they cannot talk about it, but an observer could claim with justification that they are considering that belief or proposition in their behavior. In psychoanalytic terms, the proposition is either conscious or unconscious. Unconscious awareness, according to Dennett, is defined as the second condition, but not the first because the individual cannot sincerely recognize their behavior, but an observer can reliably infer it.

Two additional criteria are necessary to conclude that information is excluded from consciousness because of a defensive process. First, the information must be potentially available. Second, there must be clear motivation for keeping it out of one's awareness (Weinberger, 1990). Some aspects of the first crite-
rion may be difficult to determine due to the accessibility of mental contents, such as specific memories or interpretations of particular behaviors (Nisbett & Ross, 1980). Freud’s (1915/1957) definition of repression that it required an effort not to know seems particularly apt in this case. Emotions are, by definition, psychophysiological responses that are difficult to ignore. Very young children, who have not yet developed inhibitory controls, have no trouble expressing the fact that they are upset despite difficulties articulating why. Therefore, if an affective state is unconscious, it is reasonable to conclude that it is not because we lack the capacity to know what we are feeling.

With regard to the second criterion, psychoanalytic theory states that information is not repressed solely because it is unpleasant. Reality testing remains intact when an individual remembers they have experienced a death of a family member, been divorced or had an illness. Within Gur and Sackeim’s (1979) framework, unconscious defenses entail active self-deception in that one is motivated to keep something out of the awareness because it is incompatible with a conscious belief. Freud (1915/1957) felt that a person represses an idea when it is incompatible with her/his
ego. This formulation suggests that internal or external percepts become a target of defenses when they directly or indirectly contradict strongly-held beliefs about the self. Experiences of discrepancies between these ideals and perceptions of our actual behavior are themselves major sources of negative affects (Higgins, Klein & Strauman, 1985). One strategy for reducing this discomfort is to fail to recognize the discrepancies. For example, if one's self-concept (i.e., the "self-respect of the ego") incorporates an idealized image the one is not prone to certain affects and impulses, defensive maneuvers may be undertaken to exclude them from awareness (A. Freud, 1966).

In order to distinguish the effects of true high self-esteem from defensive high self-esteem in any pen-and-pencil measure of self-esteem or self-concept, a reliable and valid procedure is necessary to identify individuals prone to defensiveness. This entails use of an individual difference strategy because psychologists have noted some individuals are very repressive and others are not. Since self-esteem assessments are self-reports and subject to social desirability effects, a serious confound occurs especially with subjects reporting high SE. For example, for those who report low levels of negative affect, the SE scales have not
distinguished between repressors (who maladaptively self-deceive themselves avoiding perceptions or negative affects) and truly low anxious individuals who are well-adjusted and maintain non-defensive higher levels of SE (Weinberger, 1990). Thus, the relationship between self-esteem and physical health should be controlled for defensiveness partly because highly defensive individuals who test high in self-esteem may be unhealthy and have reported higher levels of physical stress responses than low defensive individuals who test high in self-esteem.

Summary

To investigate the relationship between global self-esteem and physical health, the relationships between an individual’s affect, coping style or disposition, and their physical health must be considered. The dynamics of the relationship may be complex in terms of describing the behavior of individuals with varying levels of self-esteem. For example, the individual with valid HSE has less frequent negative self-descriptions, uses less self-devaluation, experiences less negative affect, has a more authentic self, and expresses less defensiveness than either a person with defensive high self-esteem or one with low self-esteem. This translates into a more congruent self with a less
disrupted identity in the face of stressful life events because it allows the individual to feel that they can deal more efficiently with, and better predict and control, their social world. Thus, an individual who feels more positive about themselves and their ability to predict and control their environment may experience less stress and negative affect when they encounter life events, and consequently, better physical health in terms of normal levels of such physiological indicators as systolic and diastolic blood pressure, cholesterol, thyroxine and leukocytes.

**Physiological Measures**

**Blood Pressure.**

Recent psychosomatic theories of coronary heart disease (CHD) and essential hypertension (EH) have described the role of cardiovascular reactivity. Cardiovascular reactivity refers to changes in a variety of physiological parameters, including systolic blood pressure (SBP) and diastolic blood pressure (DBP) in response to discrete environmental stimuli. These physiological responses are hypothesized to contribute to the development of CHD (Clarkson, Manuck & Kaplan, 1986) and EH (Obrist, 1981). Generally, these models suggest that individuals with abnormal, frequent or enduring cardiovascular responses to stressors are at
greater risk for development of CHD or EH.

One important determinant of the degree of cardiovascular reactivity elicited by stressors concerns the coping requirements of the situation. Historically, it has been assumed that control over events reduces physiological arousal, but this is most likely true only when the exertion of control is very easy (Solomon, Holmes & McCaul, 1980). Similar differences are observed when active versus passive coping is manipulated in the same task. Whether performing reaction-time tasks (Light & Obrist, 1983) or solving cognitive problems (Smith, Houston & Stucky, 1983) in an attempt to avoid electric shock, or in attempting to influence other people (Smith, Allred, Morrison & Carlson, 1989), greater levels of SBP, heart rate, and sometimes DBP occur than by passively coping with the stimuli. Additionally, increased cardiovascular arousal has been observed when subjects are anticipating exerting effort in an active coping situation (Contra-da, Wright & Glass, 1984). Easy coping tasks produce lower levels of reactivity than do difficult tasks (Solomon, Holmes, & McCaul, 1980).

Siltanen (1984) attempted to address these concerns with a 10-year longitudinal study regarding psychosomatic factors in CHD. Subjects were medically
and psychologically examined in 1966, 1971 and 1976. Subjects were initially divided into three groups: a) completely healthy, b) ECG signs, but no CHD signs, and 3) symptomatic CHD patients. Subjects were age-matched with no significant differences in occupation or standard somatic risk factors. The findings were in large agreement with results of earlier studies (Zyzanski, Jenkins, Ryan, Flessas and Everist, 1976) that obtained a positive correlation between angiographically documented coronary artery sclerosis and anxiety and depression measured independently from clinical manifestations of CHD.

One study (Karteroliotis and Gill, 1987) tested undergraduate males for cognitive worry, somatic anxiety, self-confidence, heart rate and blood pressure. Their results supported the relationship between increased anxiety and cognitive worry and increased levels of heart rate and blood pressure.

Since HSE individuals are less vulnerable to stress and less subject to the effects of negative affect, depression and anxiety, it was expected that HSE subjects would test lower in SBP and DBP than subjects who have LSE. These findings were expected to be moderated by defensiveness and were expected for HSE subjects who are not highly defensive.
**Cholesterol.**

Although it has a negative connotation, cholesterol is indispensable for body maintenance. Its main function is to contribute to the build-up of cell membranes, but it is also a basic substance for the production of bile acids in the liver and gonadal hormones. The body produces 80 to 90 percent of the body's cholesterol. The rest comes from ingested foods. There are two kinds of cholesterol known as lipoproteins. High-density lipoprotein (HDL) is beneficial serving to keep arteries clean and elastic. Low-density lipoprotein (LDL) is associated with coronary heart attacks because it embeds itself in the arterial walls, beginning to narrow and harden the artery so that blood can only pass through with great effort for the heart and much higher pressure in the arteries (Rice, 1987). For the purposes of this paper, the term cholesterol is meant to describe the harmful LDL cholesterol.

The contribution of diet to cholesterol was investigated by Connor and Conner (1977). After a period of a cholesterol-free diet, 25 subjects were given twice the average daily amount of cholesterol (1000 mg.). Still, the increase of cholesterol was relatively small (from 210 to 245 mg. percent (mg100
ml), normal values ranging from 150 to 270 mg%). A feedback system in the body inhibits the endogenous cholesterol production when nutrition uptake is increased. Hence, nutrition can, indeed, increase cholesterol level, but its effects should not be overestimated (Rice, 1987).

Independent of any controversy concerning the nutritional contributions of cholesterol, the status of cholesterol as a risk factor is beyond dispute. In the study by Kannel, Castelli, Gordon and McNamara (1971), its relation to CHD applied to both sexes and was strongest in the 30-49 year age group. The relation between one’s cholesterol level and risk seems to be continuous since there is no "critical level" found to discriminate between risk and no-risk individuals. The CHD risk of subjects in the upper 20 percent of the distribution of cholesterol values was 2.4 times that of subjects in the lowest 20 percent.

Increases in cholesterol levels have been found with changes in mood. Psychological stress originates from a subjective appraisal of the total situation and can lead to emotions such as fear and depression. Different studies have evaluated the relationship between changes in mood, psychological stress and its effect on cholesterol levels.
In one study involving frogmen, Rahe, et al. (1968) found a rise in cholesterol during periods when anxiety and discomfort were reported. Subjects' moods and cholesterol levels were tested periodically over a two-month period. Results indicated positive correlations of cholesterol with depression, fear and anger, and negative correlations with motivation, happiness and arousal. The strongest correlation was between depression and cholesterol in five of the 16 sessions tested (Rahe, et al., 1971). In another study, unemployed men were evaluated by nurses for anxiety, sadness and self-esteem. Those subjects judged depressed invariably manifested elevated cholesterol levels (Kasl, Cobb & Brooks, 1968).

Segers and Mertens (1976) explored the cholesterol-psychological relationship in two age groups (above and below 45 years of age) which were further subgrouped according to weight (underweight, normal, obese). Significant findings occurred between both depression and anxiety and cholesterol in the young obese group because of the influence of mood on eating behaviors. The observation was made that under stressful conditions, individuals with generally high cholesterol levels reacted by increasing food consumption, whereas those with normal cholesterol levels tended to
respond with a decrease in appetite.

In a study by Jenkins, James and Zyzanski (1969) exploring the relationship between cholesterol and 18 scales of the California Personality Inventory, two main dimensions were associated with high cholesterol: overactivity (competition, aggression and impatience) and overcontrol (responsibility, conformism, and low self-esteem). van Doornen and Orlebeke (1982) investigated relationships between personality variables, general cholesterol levels, and cholesterol response to stressors. Personality variables measured were depression, neuroticism, debilitating anxiety and achievement motivation. In contrast to other findings, the only significant correlations occurred with achievement motivation and a stress-induced cholesterol rise and this was predominately attributed to male subjects.

Since HSE individuals are less vulnerable to stress, and less subject to the effects of negative affect and depression, it was expected that HSE subjects have lower cholesterol levels than than subjects who have LSE. These findings were expected to be moderated by defensiveness and were expected for HSE subjects who are not highly defensive.
Thyroxine.

Zack and Ackerman (1988) offered three models of thyroid function, metabolic regulation and depression: a) Model 1: Depressive symptoms are primary, changes in thyroid function and metabolic rate are secondary, b) Model 2: Change in metabolic rate is primary, changes in thyroid function and depressive symptoms are secondary, and c) Model 3: Thyroid changes are primary, changes in energy balance and depressive symptoms are secondary because there has been no theory to explain why weight loss occurs in some depressions and weight gain in others. These models are said to represent different pathophysiologic states which are equally likely to occur, and Zack and Ackerman suggested further research to test these models.

The hypothalamic-pituitary-thyroid axis effect on mood has been a subject of research since both increases and decreases of thyroid indices have been linked with mood disorders. Depressed patients have been found to have blunted thyroid-stimulating hormone (TSH) responses to thyrotropin-releasing hormone (TRH) in comparison to patients with other psychiatric illnesses and normal controls (Extein, Pottash & Gold, 1981; Kirkegaard, Bjorum, Cogn & Lauridsen, 1978). The proportion of depressed patients with a
blunted TSH response to TRH has been found to vary from 25% to 70% across different studies (Loosen & Prange, 1982). More recently, the TRH-test has been suggested as a diagnostic aid in major depressive disorders (Extein, et al., 1981; Targum, Sullivan, & Byrnes, 1982).

The significance of the blunted TSH response to TRH in depressives is unclear. Hatotani, Nomura, Yamaguchi and Kitayam (1970) suggest that it may be due to reduced thyroid function; whereas, Loosen and Prange (1982) state that during depression there is hypersecretion of TRH with a transient increase in thyroid activity, producing blunting by negative feedback. However, longitudinal studies, and those assessing thyroid function during depressive episodes and again after recovery, suggest that thyroid levels are high during depression and fall on recovery (Board, Wadeson, & Persky, 1957; Kirkegaard & Faber, 1981).

Raised cortisol levels may also cause blunting of the TSH response (Loosen, Prange & Wilson, 1978). A study by Agren and Wide (1982) reported an inverse relationship between TSH response and cortisol levels, but this association was not confirmed by Gold, Pottash, Ryan, Sweeney, Davies and Martin (1980) and Davis, et al. (1981). Calloway, Dolan, Fonagy, De
Souza, and Wakeling (1984) suggest that more than one mechanism may be responsible for the blunted TSH response in depressed patients, such as weight loss, reduced intake, or other metabolic factors.

Munjack and Palmer (1988) tested 52 adult patients diagnosed with generalized anxiety disorder for more than 6 months, 41 adult patients with either panic disorder or panic disorder with agoraphobia, and 14 controls who had been screened for thyroid disease and found no significant differences in thyroid function between groups. However, Argue, Segura and Torrubia (1987) found a positive relationship between depression and anxiety and thyroxine, and a negative relationship between hypomania and thyroxine when comparing 44 psychosomatic and 13 healthy subjects. Brayshaw and Brayshaw (1986) found 51 of 54 women with premenstrual syndrome (PMS) showed evidence of thyroid dysfunction and 34 women found relief when a synthetic thyroxine supplement was administered. As stated earlier, thyroxine levels are affected by mood and stress but studies have indicated bi-directional results.

Since HSE individuals are less vulnerable to stress and less subject to the effects of negative affect, depression and anxiety, it was expected that
HSE subjects have lower thyroxine levels compared to LSE subjects. These findings were expected to be moderated by defensiveness and were expected for HSE subjects who are not highly defensive.

**Leukocytes.**

Stressful events have been known to have adverse effects on health, and the immune system is thought to be an important mediator between aversive events and infectious disease (Ader, 1981; Borysenko, 1984). There is substantial evidence that natural killer (NK) cell activity has an important role in the body's defense against illnesses (Herberman, 1982). Interferon is a major regulator of NK cell activity, because it can affect both the growth and differentiation of NK cells from their progenitor cells.

Glaser, Rice, Speicher, Stout, and Kiecolt-Glaser (1986) addressed the effects of commonplace stress on interferon production and NK cell activity and numbers by testing 40 medical students before and after examinations and found the IFN levels produced by peripheral blood leukocytes were significantly lower after stress, and the NK cell activity was also significantly lower than baseline, having controlled for poor nutrition. Other studies (Glaser, Kiecolt-Glaser, Speicher & Holliday, 1985; Glaser, Kiecolt-Glaser,

Earlier studies with rodents suggested that stress-related changes in IFN production were found in virus-infected mice following application of shock (Chang & Rasmussen, 1965) and restraint (Steplweski & Vogel, 1986). For example, after 11 days of restraint stress, the mice's leukocytes count fell about 50% and after a 12 day recovery period, normal leukocyte was restored (Steplweski & Vogel, 1986).

Since HSE individuals are less vulnerable to stress and less subject to the effects of negative affect, depression and anxiety, it was expected that HSE subjects have higher leukocyte levels than subjects with LSE. These effects were expected to be moderated by defensiveness and were expected for HSE subjects who are not highly defensive.
PILOT STUDY

Introduction

The data for the main study were obtained from medical records provided by the Yale Behavioral Medicine Clinic, an outpatient service that evaluates and treats mostly stress-related disorders. Since no direct measure of self-esteem was included in the test battery used by the Yale Behavioral Medical Clinic, a Self-Esteem Questionnaire was developed using specific items from measures available, such as the Beck Depression Inventory (BDI), Taylor Manifest Anxiety Scale (TMAS), SCL-90-R Questionnaire that on face value measured dimensions of self-esteem. In order to verify that the proposed Self-Esteem Questionnaire was measuring self-esteem, a pilot study was developed to select items from the above cited available measures for the questionnaire.

Method

Subjects

Twenty university college students who were taking psychology classes volunteered for this portion of the research.
**Self-Esteem Questionnaire Development**

From the available personality measures in the above cited test battery (e.g., BDI, TMAS, and SCL-90-R), 38 items were selected on face value that appeared to measure self-esteem (i.e., "I am happy most of the time").

The **Rosenberg Self-Esteem Scale (1965)** was included in the pilot instrument in order select items and to assess the construct validity of the proposed Self-Esteem Questionnaire using item analysis. A copy of the Self-Esteem Questionnaire (Pilot Study) is listed as Appendix A.

Rosenberg's (1962a) Self-Esteem Scale was developed to measure the self-acceptance aspects of self-esteem. The scale was originally designed for use with high school students. Norms were developed by randomly selecting 10 high schools in New York testing 5,024 students. The scale consists of 10-items, and according to Rosenberg (1965) it is valid to score it as a simple additive scale.

The Self-Esteem Scale was designed to be a unidimensional measure specifically with brevity and ease of administration. High self-esteem indicates respect for oneself and a feeling of self-worth, but not feeling superior to others; whereas, low self-esteem indicates
both a lack of self-respect and feelings of inadequacy. Silber and Tippett (1965) found the Guttman scale reproducibility coefficient as .92 with Coopersmith Self-Esteem Inventory a correlation of .59 indicating the items have a high internal and construct reliability. Test-retest correlation over two weeks was .85. Evidence of the construct validity appears in a high correlation between the Self-Esteem Scale and a scale of depressive affect (Rosenberg, 1962a) and a measure of psychophysiological indicators of anxiety (Rosenberg, 1962b).

The scale is criticized by Nunnally (1967) who states that the small number of items and forced rectangular distribution of items in Guttman scales are artificial and likely to produce gross ordinal distributions between people. Notwithstanding this criticism, this scale has become widely used as a quick assessment of self-esteem.

The Symptom Check List-90-Revised (SCL-R-90) is a 90-item, self-report inventory designed to assess psychological symptoms of medical and psychiatric patients. The inventory measures somatization, obsessive-compulsive symptoms, interpersonal sensitivity, depression, anxiety, phobic anxiety, psychoticism, paranoid ideation, hostility and global indices of
psychopathology originally developed by the Clinical Psychometrics Research Unit of Johns Hopkins University. All items have a 5-point response scale (Derogatis & Melisaratos, 1983).

Although this is a very brief scale by comparison with the Minnesota Multiphasic Personality Inventory (MMPI), and some factors are measured by as few as 6 items, its reliability is remarkably high. Measures of factor internal consistency range from .77 (psychoticism) to .90 (depression), and test-retest (1 week apart) correlation coefficients range from .78 (hostility) to .90 (phobic anxiety) in a psychiatric population (Derogatis, Rickels & Rock, 1976).

The most impressive set of research studies is concerned with the use of the SCL-90-R in depression. Several investigators have reported significant correlations between the SCL-90-R symptom subscale scores and measures of analogous constructs and similar dimensions measured by the MMPI (Derogatis, Rickels & Rock, 1976; Dinning & Evans, 1977). Further, Derogatis and Cleary (1977) describe results of a confirmatory factor analysis on data from 1,000 psychiatric outpatients. They interpreted their findings to show a reasonably good match between empirical findings and the hypothesized symptom structure in eight of the nine areas.
measured by the test. Generally positive confirmatory factor analyses have also been reported in studies of neurotic patients (Jerabek, Klimpl & Boleloucky, 1982).

The SCL-90-R is a widely used self-report measure of psychopathology with sound psychometric properties, including high levels of internal consistency and temporal stability. The weaknesses of the SCL-90-R are similar to those of many self-report instruments: 1) there is an assumption that the research subject will accurately describe symptoms and behavior (Derogatis & Melisaratos, 1983; Wilde, 1972), 2) that response bias or social desirability (Crowne & Marlowe, 1960) do not contribute to scores in a systematic fashion, and 3) that there is an equivocal concordance between patient reports and clinical ratings.

For the purpose of this study, fourteen items from the SCL-R-90 were selected which appeared to measure aspects of negative self-concept, depression or anxiety. Examples of some items are "Feeling that people are unfriendly or dislike you," or "Feeling inferior to others." The complete list of items is shown in Appendix A.

The Beck Depression Inventory was developed by Beck (1967, 1970). He was one of the first psychologists to offer a cognitive theory of depression because
he had observed that depressed people had a negative view of themselves, were pessimistic about the future and had a tendency to interpret ongoing events in a negative manner. In 1970, Beck developed the Beck Depression Inventory (BDI) which measures the presence and degree of depression in adolescents and adults and has been widely accepted in psychology as a simple and quick tool in assessing the presence and depth of depression. One study demonstrated a correlation of .77 between the BDI and psychiatric rating using university students as subjects (Bumberry, Oliver, & McClure, 1978). Other measures of validity have been undertaken by comparing the results of the BDI with other measures of depression, such as the Depression Adjective Checklist and the Minnesota Multiphasic Personality Inventory (MMPI) (Reynolds, et al., 1981).

Each item of the BDI corresponds to a specific category of depressive symptom and/or attitude. Each category was designed to describe a specific behavioral manifestation of depression. Of the 21 items, only nine items were hypothesized to measure aspects of self-esteem, for example: sadness (negative affect); pessimism (stability); sense of failure (self-confidence); dissatisfaction (self-image); and self-dislike (self-esteem). Each item consists of a graded series
of four self-evaluative statements that are rank ordered and weighted according to the severity of the symptom from neutral to maximum severity. For example, sense of failure (self-confidence) consists of the following range of severity from "I feel I am a complete failure as a person (parent, husband, wife)" to "I do not feel like a failure." A complete list of the selected BDI items are listed in Appendix A, Self-Esteem Questionnaire - Pilot Study.

**The Taylor Manifest Anxiety Scale** (Taylor, 1951) was developed for use in a study of eyelid conditioning by taking items from the MMPI which allegedly described anxiety reactions. The scale went through several modifications and presently consists of 50 items now known as the Taylor Manifest Anxiety Scale (Taylor, 1953). The test norms were developed with various groups such as university students in Iowa, airmen tested at the beginning of their basic training at an Air Force Base, and university students at Northwestern in a repeated measures design. The test-retest coefficient was found to be .89 after 3 weeks (n=163), .82 over 5 months (n=113), and .81 after 9-17 months (n=50). Additionally no appreciable sex differences, no practice effects, and no differences in scores attributable to variations in filler items were noted.
Fifteen items were taken from the Taylor Manifest Anxiety Scale and used in the Self-Esteem Questionnaire. For example, one item is "I am certainly lacking in self-confidence." A complete list can be reviewed in Appendix A.

**Results**

In order to develop a Self-Esteem scale and estimate the construct validity of the new Self-Esteem Questionnaire, only 15 items that comprised the highest correlation ($r > .43$) with the summated Rosenberg Self-Esteem Scale were used. See Table 1 for the results and final items.
### TABLE 1.

**Inter-Item Correlations between Rosenberg's Self-Esteem Scale and Self-Esteem Items and Alpha Levels.**

<table>
<thead>
<tr>
<th>Self-Esteem Questionnaire Items</th>
<th>Corrected Item - Rosenberg SE Correlation</th>
<th>Alpha If Item Deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td>B7</td>
<td>.486</td>
<td>.895</td>
</tr>
<tr>
<td>T5</td>
<td>.539</td>
<td>.884</td>
</tr>
<tr>
<td>T7</td>
<td>.577</td>
<td>.882</td>
</tr>
<tr>
<td>T12</td>
<td>.574</td>
<td>.883</td>
</tr>
<tr>
<td>T13</td>
<td>.470</td>
<td>.885</td>
</tr>
<tr>
<td>S1</td>
<td>.481</td>
<td>.884</td>
</tr>
<tr>
<td>S2</td>
<td>.629</td>
<td>.878</td>
</tr>
<tr>
<td>S3</td>
<td>.477</td>
<td>.883</td>
</tr>
<tr>
<td>S4</td>
<td>.466</td>
<td>.887</td>
</tr>
<tr>
<td>S5</td>
<td>.707</td>
<td>.873</td>
</tr>
<tr>
<td>S6</td>
<td>.456</td>
<td>.884</td>
</tr>
<tr>
<td>S8</td>
<td>.614</td>
<td>.878</td>
</tr>
<tr>
<td>S12</td>
<td>.804</td>
<td>.868</td>
</tr>
<tr>
<td>S13</td>
<td>.730</td>
<td>.872</td>
</tr>
<tr>
<td>S14</td>
<td>.682</td>
<td>.874</td>
</tr>
</tbody>
</table>

**Note.** N = 20; B = Beck Depression Inventory; T = Taylor Manifest Anxiety Scale; S = Symptom Check List-90-Revised.

The final version of the Self-Esteem Questionnaire had an overall alpha of .8997. Split-half reliability was .7821 for the first eight items, and .8612 for the last seven items.

Of the original 15 SCL-R-90 items selected, only 10 had significant correlations with Rosenberg's Self-Esteem Scale. An example of a significant SCL-R-90 item is "Feeling inferior to others." Of the original nine BDI items tested, only one had a significant
correlation with Rosenberg's Self Esteem Scale. That item was "sense of failure (self-confidence). From the 15 TMAS items chosen, only four had significant correlations with Rosenberg's Self-Esteem Scale. An example of such an item is "I feel I am no good at all." In order to differentiate high and low self esteem scores, the median split of 9.0 was used. See Table 2 for the final version of the Self-Esteem Questionnaire.

TABLE 2.
Self-Esteem Questionnaire - Final Version.

Choice of one or more items.

1. (Beck-Social Withdrawal)
   a. I have lost all of my interest in other people and don't care about them at all.
   b. I have lost more of my interest in other people and have little feeling for them.
   c. I am less interested in other people than I used to be.
   d. I have not lost interest in other people.

True/False Choice.

2. Life is a strain for me much of the time. (Taylor)

3. I sometimes feel that I am about to go to pieces. (Taylor)

4. I am certainly lacking in self-confidence. (Taylor)

5. I am happy most of the time. (Taylor)
Choose Descriptors:  A. Not at all  
B. A little bit  
C. Moderately  
D. Quite a bit  
E. Extremely

6. Feeling that others do not understand you or are unsympathetic. (SCL-R-90)

7. Feeling that people are unfriendly or dislike you. (SCL-R-90)

8. Feeling inferior to others. (SCL-R-90)

9. Feeling uneasy when people are watching or talking about you. (SCL-R-90)

10. Feeling very self-conscious with others. (SCL-R-90)

11. Feeling uncomfortable about eating or drinking in public. (SCL-R-90)

12. Difficulty making decisions. (SCL-R-90)

13. Blaming yourself for things. (SCL-R-90)

14. Feeling hopeless about the future. (SCL-R-90)

15. Feeling of worthlessness. (SCL-R-90)
PHYSIOLOGICAL STUDY

Method

Subjects

The medical records of 183 patients (76 males/107 females) on whom complete computer data was available were selected for the main study. These subjects had presented themselves during the period of 1981 to 1983 to the Yale Behavioral Medicine Clinic.

Sample means and standard deviations for the subjects' age and weight are presented by gender in Table 3.

TABLE 3.
Means and Standard Deviations of Subjects' Age and Weight by Gender.

<table>
<thead>
<tr>
<th>GENDER</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable       n</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Age (Years)    76</td>
<td>38.19</td>
<td>14.30</td>
</tr>
<tr>
<td>Weight (lbs.)  76</td>
<td>180.97</td>
<td>38.86</td>
</tr>
</tbody>
</table>

The effects of gender were examined using multiple regression. Age was not significant, but weight was found to be significant $F(2) = 24.302, p < .00$. Addition-
ally, when smoking habits was examined by gender, 48 (63.16%) of the men smoked, while 28 (36.84%) did not. Of the 107 women, 70 (65.42%) smoked and 37 (34.58%) did not.

**Medical Tests**

All patients who participated in this study at the clinic received an initial psychological assessment and routine blood and urine tests prior to being examined by a physician. The single blood sample was drawn between 2:00 and 4:30 p.m. on the day of the psychological assessment and was analyzed by the Yale - New Haven Hospital, Clinical Hematology Laboratory for the cholesterol, white blood count (leukocyte), and thyroxine evaluation. CBC differentials were derived using manual inspection and counting techniques by trained laboratory personnel. Blood pressure was measured by the examining physician using a sphygmomanometer, an instrument consisting of an inflatable cuff placed around the upper left arm, and a stethoscope. Medical histories, including self-reports of current medications and smoking habits, were also obtained from all patients.

**Psychological Tests**

Behavioral Medicine Clinic psychological staff administered a battery of psychological tests imme-
ately following the medical testing. The psychological tests that pertain to this study included the Beck Depression Inventory (BDI), Taylor Manifest Anxiety Scale (TMAS), SCL-90-R Questionnaire, and Marlowe-Crowne Social Desirability Scale (MCSDS).

Defensiveness was controlled by the use of the Marlowe-Crowne Social Desirability Scale. In 1960, Crowne and Marlowe developed the MCSDS to discriminate defensive versus non-defensive individuals reporting low distress. By 1964, Crowne and Marlowe realized that their scale was primarily measuring a substantive individual difference dimension rather than response bias which has been confirmed by a formidable body of research (Arkin & Lake, 1983; Nordholm, 1974; McCrae & Costa, 1983; Wiesenthal, 1974).

Current evidence is most consistent with the interpretation that high scorers on the MCSDS generally believe what they are reporting and attempt to behave accordingly. Close friends of high scores confirmed that these subjects actually try to conform to the rigid standards of self-control outlined in the test (Strahan & Strahan, 1972).

For low-scorers on the Marlowe-Crowne (1960, 1964), "socially desirable" responses may be agreeing that certain perceived universals about human nature
also apply to them. However, they simply consider it untenable to deny statements such as "I sometimes feel resentful when I don't get my way." It is common knowledge that individuals who make implausible claims are often suspected of lying, and blatant lying is not considered "socially desirable." Whereas, high scorers must believe they are at least capable of extraordinary self-control reflected in those items. Otherwise, they too would consider it untenable to make such claims (Kraut, 1978).

Since Crowne and Marlowe (1960) used the normed mean score of 13.72 and standard deviation of 5.78 to differentiate low and high defensiveness groups, this same mean and standard deviation was used to divide our subjects into similar groups. Sample means and standard deviations for the subjects' defensiveness are presented by gender in Table 4.
TABLE 4.
Means and Standard Deviations of Subjects' Defensiveness by Gender.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Men</th>
<th>Mean</th>
<th>SD</th>
<th>Women</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defensiveness</td>
<td>76</td>
<td>15.76</td>
<td>6.03</td>
<td>107</td>
<td>16.88</td>
<td>6.38</td>
</tr>
</tbody>
</table>

Note. According to Crowne & Marlowe (1960), the normed mean for the Marlowe-Crowne Social Desirability Scale is 13.72 with a standard deviation of 5.78.

Defensiveness was not found significant when examining the effects of gender in a multiple regression equation.

An example of an MCSDS item is "I never hesitate to go out of my way to help someone in trouble." A complete version of the MCSDS scale is shown in Appendix B.

Results

Self-esteem and defensiveness served as independent variables, while the physiological measures (blood pressure, cholesterol, thyroxine and leukocytes) were dependant variables. Sex, age, weight and smoking habits were used as control variables.

Prior to analysis, self-esteem, defensiveness,
sex, age, weight, smoke, cholesterol, thyroxine, lymphocytes, systolic and diastolic blood pressure were examined through Systat programs for accuracy of data entry, missing values, and fit between their distributions and the assumptions of multivariate analysis. Cases with missing values in self-esteem, defensiveness, sex, age, weight and smoke were deleted, leaving 183 cases for analysis.

**Self-Esteem**

The means and standard deviations of self-esteem and defensiveness for high and low self-esteem and defensiveness groups by gender are presented in Table 5. in order to determine if the distributions of defensiveness and self-esteem were similar for men and women.
TABLE 5.
Means and Standard Deviations of Self-Esteem and Defensiveness by High and Low Self-Esteem\(^a\) and Defensiveness\(^b\) Groups by Gender.

<table>
<thead>
<tr>
<th>GROUPS</th>
<th>HSE/LDef</th>
<th>HSE/HDef</th>
<th>LSE/LDef</th>
<th>LSE/HDef</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males (n=76)</td>
<td>15</td>
<td>19</td>
<td>17</td>
<td>25</td>
</tr>
<tr>
<td>n</td>
<td>Mean SE</td>
<td>4.13</td>
<td>3.84</td>
<td>22.94</td>
</tr>
<tr>
<td>SD</td>
<td>3.16</td>
<td>2.73</td>
<td>6.66</td>
<td>9.71</td>
</tr>
<tr>
<td>Mean Def</td>
<td>10.33</td>
<td>20.21</td>
<td>9.64</td>
<td>19.84</td>
</tr>
<tr>
<td>SD</td>
<td>3.50</td>
<td>3.47</td>
<td>3.16</td>
<td>3.61</td>
</tr>
<tr>
<td>Females (n=107)</td>
<td>28</td>
<td>25</td>
<td>13</td>
<td>41</td>
</tr>
<tr>
<td>n</td>
<td>Mean SE</td>
<td>3.21</td>
<td>4.40</td>
<td>23.54</td>
</tr>
<tr>
<td>SD</td>
<td>2.88</td>
<td>3.76</td>
<td>7.53</td>
<td>8.06</td>
</tr>
<tr>
<td>Mean Def</td>
<td>10.54</td>
<td>20.16</td>
<td>10.92</td>
<td>21.10</td>
</tr>
<tr>
<td>SD</td>
<td>3.05</td>
<td>4.19</td>
<td>3.57</td>
<td>4.74</td>
</tr>
</tbody>
</table>

Note. \(^a\)Self-esteem groups were split using the median score of 9.00. \(^b\)Defensiveness groups were split according to Crowne and Marlowe’s (1960) normed mean of 13.72.

Further, the correlations between self-esteem and defensiveness for men \(r=-0.060\) and women \(r=0.191\) indicated no relationship between the two variables.

These tables indicate that the method used to split the groups resulted in clear demarcations.

**Systolic Blood Pressure.**

The means for systolic blood pressure for self-esteem and defensiveness are depicted on Table 6.
TABLE 6.

Mean Systolic Blood Pressure Levels by Self-Esteem and Defensiveness.

<table>
<thead>
<tr>
<th>SELF-ESTEEM</th>
<th>DEFENSIVENESS</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>32</td>
<td>132.81</td>
<td>16.80</td>
<td>18</td>
<td>143.72</td>
<td>17.68</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>20</td>
<td>135.00</td>
<td>18.03</td>
<td>40</td>
<td>139.20</td>
<td>23.82</td>
</tr>
</tbody>
</table>

Note. n=110. Overall mean was 135.84, SD 19.90.

The above table of means without controls suggests that self-esteem controlled by defensiveness did influence systolic blood pressure. However, using multiple regression, neither self-esteem, defensiveness or the interaction between self-esteem and defensiveness was found significant. When the control variables (sex, age, weight and smoke) were added to the multiple regression, the effects of self-esteem, defensiveness and the interaction still were not significant, although both age and weight were individually significant, Multiple r=.625, F(7)=9.318, p<.00.

Diastolic Blood Pressure.

As a test for multicollinearity of the data, a pairwise correlation matrix was examined. See Table 7 for the results.
TABLE 7.

Pearson Pairwise Correlation Matrix for Diastolic Blood Pressure.

<table>
<thead>
<tr>
<th></th>
<th>Dias. BP</th>
<th>Self-Esteem</th>
<th>Defensiveness</th>
<th>Age</th>
<th>Weight</th>
<th>Smoke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diastolic Blood Pressure</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Esteem</td>
<td>0.039</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defensiveness</td>
<td>0.146</td>
<td>0.087</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.301</td>
<td>0.159</td>
<td>0.158</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>0.415</td>
<td>-0.030</td>
<td>0.044</td>
<td>0.148</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Smoke</td>
<td>-0.169</td>
<td>0.148</td>
<td>0.027</td>
<td>0.033</td>
<td>-0.102</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Note. n=110. All other variables had n=183.

Examination of the pairwise correlations did not indicate multicollinearity of the data.

The means of diastolic blood pressures for self-esteem and defensiveness are depicted in Table 8.
### TABLE 8.

**Mean Diastolic Blood Pressure Levels by Self-Esteem and Defensiveness.**

<table>
<thead>
<tr>
<th>DEFENSIVENESS</th>
<th>Self-Esteem</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>n</td>
<td>Mean</td>
<td>SD</td>
<td>Low</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td>32</td>
<td>86.28</td>
<td>10.73</td>
<td>18</td>
</tr>
<tr>
<td>High</td>
<td></td>
<td>20</td>
<td>87.55</td>
<td>12.24</td>
<td>40</td>
</tr>
</tbody>
</table>

*Note:* n=110. Overall mean was 87.14, SD 12.26.

Inspection of the table of means without use of controls suggests that the effects of defensiveness appear to depend on self-esteem rather than the reverse. Among the LSE subjects, a greater difference in diastolic blood pressure as a function of defensiveness was found than with high self-esteem groups.

Using multiple regression, when self-esteem, defensiveness and their interaction was tested, the interaction between self-esteem and defensiveness indicated a trend, $t(3)=1.88$, $p<.063$, Multiple $r=.230$, $r^2=.053$. When the control variables, weight and sex, were added to the regression, the interaction of self-esteem and defensiveness was significant, $t(5)=2.04$, $p<.04$, Multiple $r=.468$, $R^2=.219$. However, the highest predictability ($R^2=.280$, $r=.529$) for diastolic blood pressure occurred when self-esteem, defensiveness,
their interaction, and the control variables of weight, age and smoke were combined. In this equation, only weight and age were significant $p < .01$.

In an attempt to further analyze the significant effects of interaction between self-esteem and defensiveness on diastolic blood pressure, this same group of variables was analyzed using stepwise regression with and without the inclusion of the interaction between self-esteem and defensiveness. The interaction did not contribute to the equation.

Since Systat did not have a hierarchical regression model, a regression analysis of diastolic blood pressure with and without the interaction of self-esteem and defensiveness was performed including various combinations of the control variables of weight, age, and smoke in order to interpret the results of the interaction. Table 9 presents the results.
TABLE 9.

Summary of Hierarchical Analysis for Interaction between Self-Esteem and Defensiveness for Diastolic Blood Pressure.

<table>
<thead>
<tr>
<th></th>
<th>No Interaction</th>
<th>Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control P</td>
<td>Residual $R^2$</td>
</tr>
<tr>
<td>Weight</td>
<td>.000</td>
<td>13570.11 .172</td>
</tr>
<tr>
<td>Weight</td>
<td>.000</td>
<td>12421.35 .242</td>
</tr>
<tr>
<td>Age</td>
<td>.002</td>
<td>12421.35 .242</td>
</tr>
<tr>
<td>Weight</td>
<td>.000</td>
<td>13343.88 .186</td>
</tr>
<tr>
<td>Smoke</td>
<td>.181</td>
<td>13343.88 .186</td>
</tr>
<tr>
<td>Age</td>
<td>.001</td>
<td>14907.87 .091</td>
</tr>
<tr>
<td>Age</td>
<td>.001</td>
<td>14371.32 .123</td>
</tr>
<tr>
<td>Smoke</td>
<td>.048</td>
<td>15925.50 .029</td>
</tr>
<tr>
<td>Age</td>
<td>.004</td>
<td>12052.73 .265</td>
</tr>
<tr>
<td>Weight</td>
<td>.000</td>
<td>12052.73 .265</td>
</tr>
<tr>
<td>Smoke</td>
<td>.094</td>
<td>11812.69 .280</td>
</tr>
</tbody>
</table>

Note. n = 110, 73 cases deleted due to missing data.

With every combination of the independent variables, note the change in $R^2$ with and without the interaction. In each case, the inclusion of the interaction
between self-esteem and defensiveness slightly reduced the residual term and increased the squared multiple R, thereby minimally increasing the predictability of the effects on diastolic blood pressure. Therefore, the interaction of self-esteem and defensiveness contributed minimally or not at all depending on the regression method used.

**Cholesterol.**

The means of cholesterol for self-esteem and defensiveness is depicted on Table 10.

**TABLE 10.**

**Mean Cholesterol Levels by Self-Esteem and Defensiveness.**

<table>
<thead>
<tr>
<th>DEFENSIVENESS</th>
<th>SELF-ESTEEM</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>34</td>
<td>201.73</td>
<td>41.19</td>
<td>24</td>
<td>200.42</td>
</tr>
<tr>
<td>High</td>
<td>37</td>
<td>209.54</td>
<td>33.29</td>
<td>57</td>
<td>216.77</td>
</tr>
</tbody>
</table>

*Note. n=152. Overall mean was 209.07, SD 44.70.*

Using multiple regression, there was no significant effect of either self-esteem or defensiveness on cholesterol with or without the interaction of self-esteem and defensiveness. When the control variables (sex, age, etc.) were added to the multiple regression,
neither self-esteem, defensiveness or their interaction were significant, although both age and weight were significant with and without the interaction, \( p < .00 \) and \( p < .05 \), respectively.

**Thyroxine.**

The means of thyroxine for self-esteem and defensiveness is depicted on Table 11.

**TABLE 11.**

Mean Thyroxine Levels by Self-Esteem and Defensiveness.

<table>
<thead>
<tr>
<th>SELF-ESTEEM</th>
<th>DEFENSIVENESS</th>
<th>n</th>
<th>High Mean</th>
<th>SD</th>
<th>Low Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>36</td>
<td>7.01</td>
<td>1.54</td>
<td>26</td>
<td>7.13</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>38</td>
<td>7.51</td>
<td>1.95</td>
<td>58</td>
<td>7.83</td>
</tr>
</tbody>
</table>

Note. \( n = 158 \). Overall mean was 7.45, SD 1.87.

There was no significant effect of self-esteem on thyroxine with or with the interaction of self-esteem and defensiveness.

Defensiveness was found to have an overall significant effect on thyroxine only when no interaction of self-esteem and defensiveness was included in the equation. Defensiveness remained a significant effect when the controls were added individually or in combination. High defensive subjects had significantly
higher levels of thyroxine than low defensive subjects. When the interaction for self-esteem and defensiveness was included in the multiple regression, the effects of defensiveness were no longer significant with or without the controls.

**Leukocytes.**

The means of leukocyte levels for self-esteem and defensiveness is depicted on Table 12.

**TABLE 12.**

Mean Leukocyte Levels By Self-Esteem and Defensiveness.

<table>
<thead>
<tr>
<th>DEFENSIVENESS</th>
<th>n</th>
<th>High Mean</th>
<th>SD</th>
<th>n</th>
<th>Low Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>35</td>
<td>28.12</td>
<td>7.71</td>
<td>24</td>
<td>25.90</td>
<td>8.64</td>
</tr>
<tr>
<td>High</td>
<td>35</td>
<td>26.98</td>
<td>9.25</td>
<td>53</td>
<td>28.21</td>
<td>9.49</td>
</tr>
</tbody>
</table>

*Note. n=147. Overall mean was 27.52, SD 8.85.*

Review of the above means indicate that neither self-esteem or defensiveness without the control variables had an effect on leukocyte scores. Using multiple regression, there was no significant effect of either self-esteem, defensiveness or their interaction on leukocyte levels.
DISCUSSION

Of all the physiological measures used in this study, only diastolic blood pressure produced significant results involving self-esteem and that was in the interaction between self-esteem and defensiveness. The minimal effect of the interaction on diastolic blood pressure occurred when the control variables were included individually or in combination. The effect of the interaction between self-esteem and defensiveness on diastolic blood pressure with the control variables was not present in all combinations. When this interaction effect occurred, it appeared in unexpected places.

Examination of the interaction of self-esteem and defensiveness using different regression methods suggest that its effect is minimal, at best. As might be expected, weight and age were the significant independent predictors of diastolic blood pressure.

Since blood pressure was assessed only once at the beginning of the study, this method may be flawed. Seer (1979) pointed out that BP changes considerably, both with time of day (Agras, et al., 1980) and in response to various environmental and behavioral factors (Harshfield, Pickering, Kleiner, Blank & Laragh, 1982). Thus, health-care professionals have been con-
cerned about the representativeness of BP readings and the adequacy of decisions based on those measures.

Since the subjects were attending the Yale Behavioral Medicine Clinic for stress-related disorders, it seems reasonable to assume that these subjects were experiencing stress in their lives. Could it be that these results were obtained because the subjects were tested during an identity disruption crisis brought on by their stress, mood state or coping style before they had had an opportunity to readjust their self-esteem or change their coping style? Hence, blood pressure or other physiological measures may have been atypical at the time. That may account for the lack of main effects for self-esteem and defensiveness for the physiological health measures, and the reason age, weight and smoking habits were more predictive since each of the control variables may be more sensitive to changes in stress than personality measures.

Regarding thyroxine, self-esteem was not significant in any condition. Defensiveness taken from the MCSDS was the best predictive variable followed by sex, but only when the interaction between self-esteem and defensiveness was omitted. These results are difficult to interpret because thyroxine levels are known to be affected by mood and stress, and studies have indicated
bi-directional results. If future research is planned, the effects of sex may further differentiate the effects of defensiveness and perhaps self-esteem on thyroxine levels, as well as other physiological measures.

Age and weight were significant predictors of both systolic blood pressure and cholesterol levels, while self-esteem or defensiveness were not. However, neither self-esteem, defensiveness, their interaction or the control variables were predictive measures of leukocyte levels.

The source for the Self-Esteem Questionnaire in this study were items taken from the Taylor Manifest Anxiety Scale, Beck Depression Scale and SCL-R-90 that were assumed to measure self-esteem. In many cases, the items addressed issues of negative self-esteem (e.g. "I am certainly lacking in self-confidence") and perhaps subsequent negative affect since only one of the items was positively worded. The resulting data may have been tainted by the subjects’ mood state when the self-report was taken, thereby confounding the results.

Since negative self-esteem and affect have been shown to affect physical health by mediating the effects of stress, one would have expected significant
relationships between the physical health measures and self-esteem. However, the negative affect itself may have biased the self-esteem measure.

The results of this research seem consistent with studies by McCrae, et al. (1976) and Tessler and Mechanic (1978) who found an intriguing pattern. Negative affect correlated significantly with self-rated physical health, self-rated physical health was significantly related to physicians rating, but negative affect was not related to objectively obtained measures, such as blood pressure scores and cholesterol levels. Watson and Pennebaker (1989) noted a linear and continuous relationship between NA scores and somatic complaining. At any level of NA, the higher the NA score, the more increasing the symptoms (Costa & McCrae, 1985). Watson and Pennebaker (1989) found that despite their myriad of physical complaint, high NA individuals showed no increased frequency of physician or health-center visits.

Watson and Pennebaker (1989) offered the following explanations for their results: High NA individuals are more sensitive to pain and/or are hypervigilant and scan their environment for impending trouble. In assessing sensitivity to pain, these authors found the literature inconsistent and difficult to interpret.
Although negative affect has been found related to an individual’s report of pain, other investigators have reported that negative affect is generally unrelated to pain threshold and tolerance measures. Because the literature in this area is inconsistent, interpretation of these results based on the subjects’ negative affect filtered through self-reports would be foolhardy since additional factors must be involved as well.

Watson and Pennebaker (1989) felt that hypervigilance increased somatic complaining in two ways: First, high NA’s may be more likely to notice or attend to normal body sensation or minor aches and pains. Second, because their scanning is highly related with anxiety and uncertainty, high NA individuals may interpret normal symptoms as painful or pathological. Indeed, Watson and Pennebaker note several studies have shown that high NA subject interpret ambiguous stimuli in a negative or threatening manner (Goodstein, 1954; Watson & Clark, 1984) suggesting that high NA subjects report more physical problems simply because they are more internally focused. Pennebaker and Lightner (1980) support the idea that internal orientation increases physical symptom reporting.

In their 1989 study, Watson and Pennebaker concluded that although NA is associated with a number of
subjective complaints and is highly correlated with physical symptom measures, NA is more a general trait of somatopsychic distress which is self-reported distress that is expressed through a broad range of negative affective states and somatic complaints. As such, NA acts as a nuisance factor in health research because it may tap as psychologically important, but organically it remains a spurious variance in physical symptom measures. Because self-reported measures of stress and health both contain a significant NA component, the relationship between such measures is likely to be overstated or hide the true associations between stress and health and self-esteem and health.

If this research were to be replicated, another selection of subjects must be considered, such as university students. The subjects of this study were not randomly selected, but rather self-selected as they were patients at a clinic treating stress-related disorders. Further, the psychological test battery should include at least one self-esteem measure, (i.e., Rosenberg's Self-Esteem Inventory (Rosenberg, 1965), Tennessee Self-Concept Scale (Roid & Fitts, 1988), or Coopersmith Self-Esteem Inventory (Coopersmith, 1967), a trait measure for negative affect (i.e., Eysenck Personality Inventory Neuroticism Scale (Eysenck &
Eysenck, 1968), Taylor Manifest Anxiety Scale (Taylor, 1951) or Tellegen's Multidimensional Personality Questionnaire (Tellegen, 1982), and a positive affect trait measure (i.e., Positive Emotionality Scale from Tellegen's Multidimensional Personality Questionnaire).

Since all currently accepted self-esteem measures are self-reported, the MCSDS (Crowne & Marlowe, 1964) should be used as a control for defensiveness. The physical health measures would remain the same. Evaluation of the results should not only be examined globally, but also for sex differences.

This study reflects the difficulty of collecting arousal data for comparison with social or personality variables. The use of self-reported measures is a widely accepted form of research due to its inexpensive cost and ease of administration. The results, however, are filtered through the subject's moods states and self-perceptions. Since both types of data (self-reports and some physiological data, i.e., cholesterol and leukocyte tests) cannot be collected simultaneously, changes in mood and arousal can easily occur even when the two types of data are collected concurrently.

Aversive emotional states such as negative affect are affective responses to self-devaluing experiences and subjective distress (Kaplan, 1975; Watson & Clark,
1984) and low self-esteem (Rosenberg, 1965). Although negative affect is considered a diffuse, nonspecific measure of subjective distress and dissatisfaction, it is considered a common measure of low self-esteem (Watson & Clark, 1984).

This data supports Watson and Pennebaker (1989) that negative affect and thereby, low self-esteem, is more a general trait of somatopsychic distress expressed over a broad range of affective states. Somatopsychic complaints act as a nuisance in health research, clouding the true associations between self-esteem and physical health.

It may be that, in fact, self-esteem is related only to self-evaluated assessments of health, and not to actual health. On the other hand, if self-esteem had been measured independently in positive as well as negative terms, it would have provided a better test of the relationship between self-esteem and physical health than what was available. The relationship between self-esteem and physical health requires more valid measures of self-esteem, as well as more research using other than subjective measures of health.
APPENDIX A.

SELF-ESTEEM QUESTIONNAIRE - PILOT STUDY

USE A #2 PENCIL ONLY FOR YOUR ANSWERS. ANY OTHER PENCIL FOR INK MARK WILL NOT BE ACCEPTABLE.

USE ONLY THE SCAN SHEET FOR YOUR ANSWERS. MARKS ON THE PRINTED QUESTIONNAIRE WILL NOT BE USED.

RETURN BOTH THE SCAN SHEET AND QUESTIONNAIRE. THANK YOU.

PART A: On this part of the questionnaire are groups of statements. Please read the entire group of statements of each category. Then pick out the ONE statement in that group which best describes the way you feel today, that is, RIGHT NOW. MARK YOUR ANSWER A, B, C OR D ON THE SCAN SHEET ATTACHED TO THE TEST. If several statements in the group seem to apply equally well, mark each one.

Be sure to read all the statements in each group before making your choice.

1. (Beck-Sadness)*
   a. I am so sad or unhappy that I can't stand it.
   b. I am blue or sad all the time and I can’t snap out of it.
   c. I feel sad or blue.
   d. I do not feel sad.

2. (Beck-Pessimism)
   a. I feel that the future is hopeless and that things cannot improve.
   b. I feel I have nothing to look forward to.
   c. I feel discouraged about the future.
   d. I am not particularly pessimistic or discouraged about the future.

3. (Beck-Sense of Failure)
   a. I feel I am a complete failure as a person (parent, husband, wife).
   b. As I look back on my life, all I can see is a lot of failures.
   c. I feel I have failed more than the average person.
   d. I do not feel like a failure.
4. (Beck-Dissatisfaction)
a. I am dissatisfied with everything.
b. I don't get satisfaction out of anything anymore.
c. I don't enjoy things the way I used to.
d. I am not particularly dissatisfied.

5. (Beck-Self-Dislike)
a. I hate myself.
b. I am disgusted with myself.
c. I am disappointed with myself.
d. I don't feel disappointed with myself.

6. (Beck-Self-Harm)
a. I would kill myself if I had the chance.
b. I have definite plans about committing suicide.
c. I feel I would be better off dead.
d. I don't have any thoughts of harming myself.

7. (Beck-Social Withdrawal)
a. I have lost all of my interest in other people and don't care about them at all.
b. I have lost more of my interest in other people and have little feeling for them.
c. I am less interested in other people than I used to be.
d. I have not lost interest in other people.

8. (Beck-Indecisiveness)
a. I can't make any decisions at all anymore.
b. I have great difficulty in making decisions.
c. I try to put off making decisions.
d. I make decisions about as well as ever.

9. (Beck-Self-Image Change)
a. I feel that I am ugly or repulsive-looking.
b. I feel that there are permanent changes in my appearance and they make me look unattractive.
c. I am worried that I am looking old or unattractive.
d. I don't feel that I look any worse than I used to.
PART B: ANSWER THE FOLLOWING QUESTIONS EITHER TRUE OR FALSE. BE SURE YOU MARK YOUR SCAN SHEET IN THE APPROPRIATE CIRCLE - (T) TRUE OR (F) FALSE.

10. At times I think I am not good at all. (Rosenberg)

11. I am more sensitive than most other people. (Rosenberg)

12. I cannot keep my mind on one thing. (Taylor)

13. All in all I am inclined to feel that I am a failure. (Rosenberg)

14. I cannot keep my mind on one thing. (Taylor)

15. I certainly feel useless at times. (Rosenberg)

16. I have periods of such great restlessness that I cannot sit long in a chair. (Taylor)

17. I feel that I am a person of worth at least on an equal basis with others. (Rosenberg)

18. I am inclined to take things hard. (Taylor)

19. I take a positive attitude toward myself. (Rosenberg)

20. Life is a strain for me much of the time. (Taylor)

21. I certainly feel useless much of the time. (Taylor)

22. I sometimes feel that I am about to go to pieces. (Taylor)

23. I feel that I have a number of good qualities. (Rosenberg)

24. I have sometimes felt that difficulties were piling up so high that I could not overcome them. (Taylor)

25. I feel anxiety about something or someone almost all the time. (Taylor)

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26. On the whole, I am satisfied with myself. (Rosenberg)

27. I frequently find myself worrying about something. (Taylor)

28. I am able to do things as well as most other people. (Rosenberg)

29. I shrink from facing a crisis of difficulty. (Taylor)

30. I am certainly lacking in self-confidence. (Taylor)

31. I wish I could have more respect for myself. (Rosenberg)

32. I am happy most of the time. (Taylor)

33. At times I think I am no good at all. (Taylor)

34. I believe I am no more nervous than most others. (Taylor)

PART C: Below is a list of problems and complaints that people have. Read each one carefully, and select one of the numbered descriptors that best describes HOW MUCH DISCOMFORT THAT PROBLEM HAS CAUSED YOU DURING THE PAST WEEK INCLUDING TODAY. MARK YOUR ANSWER A, B, C, D OR E ON THE SCAN SHEET. BE CAREFUL THAT YOU ARE MARKING YOUR ANSWER ON THE CORRECT LINE. Do not skip any items, and mark your answer clearly. If you change your mind, erase your first answer completely. Read the example below before beginning.

EXAMPLE

HOW MUCH ARE YOU DISTRESS BY:  
Ex. Body aches....... Ex. C

Descriptors:
A Not at all  
B A little bit  
C Moderately  
D Quite a bit  
E Extremely

35. Feeling that others do not understand you or are unsympathetic. (SCL-R-90)
36. Feeling that people are unfriendly or dislike you. (SCL-R-90)

37. Feeling inferior to others. (SCL-R-90)

38. Feeling uneasy when people are watching or talking about you. (SCL-R-90)

39. Feeling very self-conscious with others. (SCL-R-90)

40. Feeling uncomfortable about eating or drinking in public. (SCL-R-90)

41. Repeated unpleasant thoughts that won’t leave your mind. (SCL-R-90)

42. Difficulty making decisions. (SCL-R-90)

43. Thoughts ending your life. (SCL-R-90)

44. Crying easily. (SCL-R-90)

45. Feeling of being trapped or caught. (SCL-R-90)

46. Blaming yourself for things. (SCL-R-90)

47. Feeling hopeless about the future. (SCL-R-90)

48. Feeling of worthlessness. (SCL-R-90)

IF YOU HAVE ANY COMMENTS REGARDING THIS QUESTIONNAIRE, PLEASE FEEL FREE TO LIST THEM BELOW:

Note: Parentheses denote the test source the item was taken from, i.e., Beck (Beck Depression Inventory), Taylor (Taylor Manifest Anxiety Scale), or Rosenberg (Rosenberg Self-Esteem Scale). However, the notation did not appear on the actual test.
APPENDIX B.

MARLOWE-CROWN SOCIAL DESIRABILITY SCALE

Please read each statement and decide whether you feel in general that it is mostly true as applied to you or mostly false. Please circle the appropriate letter (T-true, F-False) directly to the right of each statement. Answer "True" to positively stated questions if they are true as often or more often than stated. For example, answer "True" to "Occasionally, I play poker" if you play occasionally or more often.

1. I am sometimes irritated by people who ask favors of me. 1. T F
2. Before voting, I thoroughly investigate the qualifications of all the candidates. 2. T F
3. I sometime think when people have a misfortune they only got what they deserved. 3. T F
4. I like to gossip at times. 4. T F
5. On occasion I have had doubts about my ability to succeed in life. 5. T F
6. There have been occasions when I took advantage of someone. 6. T F
7. I have never intensely disliked anyone. 7. T F
8. I never make a long trip without checking the safety of my car. 8. T F
9. I am always courteous, even with people who are disagreeable. 9. T F
10. On a few occasions, I have given up doing something because I thought too little of my ability. 10. T F
11. I am always careful about my manner of dress. 11. T F
12. I have never felt that I was punished without a cause. 12. T F
13. When I don’t know something, I don’t mind admitting it.  13. T F
14. I never resent being asked to return a favor.  14. T F
15. I sometimes try to get even, rather than forgive and forget.  15. T F
16. If I could get into a movie without paying and be sure I was not seen, I would probably do it.  16. T F
17. I have never deliberately said something that hurt someone’s feelings.  17. T F
18. I can remember "playing sick" to get out of something.  18. T F
19. I sometimes feel resentful when I don’t get my way.  19. T F
20. No matter who I’m talking to, I’m always a good listener.  20. T F
21. I always try to practice what I preach.  21. T F
22. There have been times when I was quite jealous of the good fortune of others.  22. T F
23. I have never been irked when people express ideas very different from my own.  23. T F
24. My table manners at home are as good as when I eat out in a restaurant.  24. T F
25. There have been occasions when I felt like smashing things.  25. T F
26. I never hesitate to go out of my way to help someone in trouble.  26. T F
27. It is sometimes hard for me to go on with my work if I am not encouraged.  27. T F
28. I’m always willing to admit it when I make a mistake.  28. T F
29. There have been times when I felt like rebelling against people in authority even though I knew they were right.  
   29. T  F

30. I have almost never felt the urge to tell someone off.  
   30. T  F

31. I would never think of letting someone else be punished for my wrong-doings.  
   31. T  F
References


