THE RELATIONSHIP BETWEEN HOSTILITY AND SOCIAL SUPPORT
WITH CHRONIC PAIN AND HEALTH INDICATORS

DISSERTATION

Presented to the Graduate Council of the
University of North Texas in Partial
Fulfillment of the Requirements

For the Degree of

DOCTOR OF PHILOSOPHY

By

Kevin J. Witham, B.A., M.S.
Denton, Texas
December, 1997
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The purposes of the study were to examine the psychosocial variables of hostility and social support, and their independent relationships with resting physiological levels and chronic pain symptoms, and to examine the independent relationships of chronic pain chronicity and social support with hostility.

Twenty-three chronic pain patients completed assessment of hostility, two measures of social support, measurement of resting physiological levels (systolic blood pressure, diastolic blood pressure, heart rate, and respiratory rate) and chronic pain symptomology (difficulty breathing, perceived physical conditioning level, fatigue, depression, general limitations, pain, and stress).

Results indicated that hostility was positively associated with systolic blood pressure and respiratory rate. Social support was not independently related to resting physiological measures. Hostility was also positively associated with the self-reported chronic pain symptoms of difficulty breathing, depression, fatigue, and stress. Social support was not independently related to self-reported chronic pain symptoms. Duration of pain was positively associated with hostility, but social support was not associated hostility. Findings were discussed in terms of the possible importance of hostility in aggravating chronic pain symptoms, and that duration of pain may influence hostility. Methodological limitations were discussed which may have reduced the impact of hostility and social support in the study.
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CHAPTER I

INTRODUCTION

Chronic pain has been a major health problem which has been responsible for enormous annual costs from lost productivity and health care costs (Bonica, 1986). Chronic pain has been defined as continuous or intermittent pain which has lasted for six months or longer. Acute pain, pain which has lasted less than six months, is presumed to serve a warning and protection function in the body. Chronic pain serves no apparent useful purpose in the body (Tollison, 1987). Chronic pain is a complex phenomenon involving physical, psychological, cognitive, and behavioral processes, which pain have contributed to development, adaptation, and prognosis of the illness. Physical pathology has not been sufficient to explain most cases of chronic pain reports (Turk, 1996).

The gate-control theory of pain (Melzack & Wall, 1965) has been looked upon as the most influential model which has detailed the physical, psychological, cognitive, and behavioral processes found to be involved in chronic pain (Turk, Meichenbaum, & Genest, 1983). According to that model, injury, damage, or disease has caused pain signals to be sent from some part of the body along pathways of nerve fibers to the brain. At that point the pain signal is interpreted, and the individual experiences pain. As the pain signal traveled along the nerve pathway, cells in the central nervous system influenced the pain signal by regulating the rate and intensity of the pain signal that traveled to the brain. When the pain signal traveled to the brain, those central nervous system cells either intensified the pain signal, or minimized the signal according to a variety of physical, psychological, cognitive, and behavioral factors. Some of the factors which have been found to increase pain signals have been: extent of physical damage,
chronic inactivity, depression, worrying, anxiety, anger, muscle tension, boredom, minimal involvement in daily activities, and focusing attention on pain. Some of the factors which have been found to minimize pain signals are: medication, counterstimulation, appropriate activity levels, relaxation, happiness, optimism, rest, distraction achieved through intensely focusing attention, and increased involvement in daily activities (Tollison, 1987; Turk, et al., 1983).

Despite the theoretical involvement of several negative emotional states in chronic pain, research has focused predominately upon the role of depression in the chronic pain experience, and the role of anger and hostility has often been neglected. For example, Atkinson, Slater, Grant, Patterson, and Garfin (1988) studied thirty-two male patients with chronic low back pain to examine the relationship between pain, stress, and depression. They found that stressful, pain-related life events contributed to development of depressive reactions as measured by the Beck Depression Inventory, the Hamilton Rating Scale, and the Diagnostic Interview Schedule.

Stenger (1992) studied characteristics which influenced treatment outcome for chronic pain patients. Self-report of poor treatment efficacy was found to be related to severe depression, poor self-esteem, high levels of stress, emotional lability, and secondary gain. Dozois, Dobson, Wong, Hughes, and Long (1995) studied 117 men participating in an outpatient work hardening program. They examined the relationship between physical and psychological factors and employment status nine months after treatment. They found that the psychological factors of depression and general psychological distress were more important determinants of employment status than physical factors. Linton, et al. (1994) studied 1,140 Swedish women and examined variables associated with pain and work status. They found that both women who worked with pain, and women who were unable to work because of pain reported higher
levels of depression and anxiety as measured by the Duke Health Profile as compared to healthy controls. Those results indicated that at least some emotional concomitants of pain have been found to be relevant regardless of work status and vocational distress.

Krause, Wiener, and Tait (1994) studied thirty-seven patients with chronic pain who were treated in an inpatient chronic pain program. They examined the relationship between depression and pain behaviors as measured by nurse and patient rated pain behaviors of patients with depression, and those without depression. Results indicated that depressed patients rated their pain behaviors as higher than non-depressed pain patients, and those ratings were higher than the nurse ratings of both patient groups. The authors interpreted those results to indicate that depressed chronic pain patients cognitively distort their problems and disability.

Goldberg, Kerns, and Rosenberg’s (1993) study of 105 married men who suffered with chronic pain examined the relationship between social support, social activity, and depression in chronic pain patients. Participants were categorized into low or high spousal social support, and also into low or high social activity levels. They found that men who participated in low levels of activity, and had low levels of social support had higher levels of self-reported depression. The authors interpreted those results to indicate that social support buffered chronic pain patients from becoming depressed.

Swimmer, Robinson, and Geisser (1992) studied MMPI cluster types. They used hierarchical cluster analysis in 159 chronic pain patients who underwent treatment in an outpatient multidisciplinary pain management program. Four cluster types were derived: depression/pathological (very high scale 2 scores and elevated 1, 3, 4, 7, 8 scale scores), marginal depression (lesser elevations on the same scales which were high in the depressed pathological cluster), V-type (elevated scores only on scales 1 and 3), and marginal V-type (lesser elevations on scales 1 and 3 than was evident in the V-type
cluster). Patients in the depression/pathological cluster were described as people whose maladaptive coping responses to the stress of the chronic pain experience resulted in development of depression. The authors classified seventy chronic pain patients into one of those four clusters and examined treatment outcomes. They found that patients who experienced both depression and a personality disorder had worse treatment outcomes for medical and psychological treatments than any of the other cluster types.

Young (1992) reviewed the literature on psychological factors associated with rheumatoid arthritis. Conclusions derived from this review were that depression and anxiety contributed to pain complaints in that medical population.

Carey (1994) reviewed the literature regarding chronic back pain. It was concluded that depression is involved in pain development and exacerbation. Unfortunately, the role of anger and hostility was not considered in this review.

In the studies reviewed above, hostility and anger were generally overlooked, despite readily available data in some of those studies. For example, studies which utilized the MMPI often did not consider that anger, aggression, and hostility items were scattered throughout several scales, and together they may have represented an important factor to consider when the psychological processes involved in chronic pain were studied (Deardorff, Chino, & Scott, 1993; Fordyce, Bigos, Batti’e, & Fisher, 1992; Swimmer, et al., 1992). Instead those researchers and reviewers focused primarily upon the role of depression in development and exacerbation of chronic pain, while other theoretically important variables, such as hostility, were neglected. That neglect has been even more puzzling considering the wealth of research which has demonstrated the importance of those psychological processes in overall mortality, CHD, cancer mortality, and unhealthy lifestyle behaviors (Barefoot, Dodge, Peterson, Dahlstrom, & Williams, 1989; Costa, Zonderman, McCrae, & Williams, 1986; Helmers, et al., 1993; Houston &
Hostility and Chronic Pain

Anger and hostility have been mentioned as theoretically important in the chronic pain experience (Melzack & Wall, 1965; Turk, et al., 1983). However, very little research has actually examined the role of anger and hostility in relation to chronic pain.

For a patient suffering with chronic pain, anger and hostility often started as a reaction to an injury or accident. The injured person often becomes angry at those deemed responsible for the injury, and sometimes their anger has been directed inward. In many cases, if the injury occurred at work, communication between the person who suffered with pain and the employer broke down once the individual made a legal claim for compensation (Carey, 1994). As the individual dealt with financial and legal issues involving compensation and liability, anger may have become exacerbated.

People who experienced chronic pain, whether by injury or as a result of an illness such as osteoarthritis, have often experienced increasing frustration with treatment professionals who were unable to effectively treat their pain. These people underwent various diagnostic examinations, and often found no identifiable source sufficient that explained their pain. When they experienced continued lack of long-term progress frustration, anger, and cynicism may have mounted (Carey, 1994; Reid, Ewan, & Lowy, 1991). For many chronic pain patients the anger and hostility may have continued to escalate because; 1) the medical field was unable to diagnose and treat their pain problem, 2) their inability to become well despite treatment, and 3) the pressures they faced from doctors, attorneys, and people in the social network to resume pre-morbid activity levels.
Reid, et al. (1991) interviewed women suffering from pain due to repetition strain injury. The authors found that women in their survey felt their credibility was questioned. The women felt that many doctors believed their problems were psychological, an attitude which made these women distressed and angry. Because they had no observable signs of the pain, these women were worried that people would not believe their pain problem. These women felt a need to re-establish their credibility and integrity, a context which reinforced pain behaviors and disability. Their cynical and hostile outlook extended to the legal profession, treatment professionals, and co-workers, and colored their interpretations of events in their environment. Perceived skepticism from others was humiliating and socially alienating for these women, and this experience contributed to those women developing increased anger, irritability, and cynicism the longer they endured the experience of chronic pain.

In sum, chronic pain patients were susceptible to develop higher levels of interpersonal hostility because of several reasons. Those reasons included: 1) real or perceived mistrust from other people, 2) real or perceived mistreatment from attorneys, insurance providers, work, and treatment professionals, and 3) failure of the patient and treatment professionals to cure the pain problem. According to the gate control theory of pain (Melzack & Wall, 1965), the increasing hostility of pain patients may have aggravated the pain problem, turning into a vicious cycle in which hostility and pain continually exacerbated one another.

The literature that has examined hostility and anger in the experience of chronic pain has been sparse. The existing literature has indicated that hostility and anger are important processes in the development and adaptation to chronic pain. For example, clinical observations has indicated that patients with chronic pain often had a family history of aggressive behavior, cold and distant parental behavior, and hostile behavior
A family history of these same interpersonal styles has been found to contribute to development of hostility (Houston & Vavak, 1991; Matthews, Woodall, Kenyon, & Jacob, 1996; Woodall & Matthews, 1989). Chronic pain patients who responded to the MMPI-2 often endorsed high levels of anger, aggression, cynicism, conflict, irritability, and hostility (Deardorff, et al., 1993; Fordyce, et al., 1992).

Bates, Edwards, and Anderson (1993) examined cultural variations in the experience of chronic pain. Participants were 372 patients from six ethnic groups. Results indicated that of all the ethnic groups studied, Hispanics had higher levels of negative emotions associated with their pain, including helplessness, worrying, tension, and anger. The authors also found evidence which indicated that multiple emotional factors were involved in pain perception. Specifically, higher levels of anger, tension, worries, and depression were associated with higher levels of reported pain. The outward expression of hostility and anger was interpreted by Payne and Norfleet (1986) to represent a manner in which chronic pain patients used pain to manipulate others.

Hostility and anger in chronic pain patients may have had important interpersonal consequences, and these interpersonal consequences may have exacerbated the ongoing pain problem because it increased social isolation. Support for this interpretation was provided in a study by Schwartz, Slater, Birchler, and Atkinson (1991) which was one of the few studies which explicitly examined hostility in addition to depression. They studied twenty-nine married men suffering with chronic back pain and examined the impact chronic pain had on the patient's spouses. Their results indicated that high levels of hostility and anger in patients with chronic pain, as measured by the profile of moods scale, were independently related to depressed mood in their spouses. Schwartz and Slater (1991) claimed that patients with chronic pain experienced high levels of anger,
and their anger placed their spouses in a approach-avoidance conflict. The spouses felt compelled to approach so they could help alleviate the patients suffering, but they were repelled by the patients angry and hostile behavior. Eventually the spouses minimized interaction with the patient to avoid hostile interactions, and this avoidance increased the patients hostility, isolation, and pain complaints.

Some studies specifically addressed the role of hostility and anger in coping with the chronic pain experience, and those studies indicated that hostility and anger was in some way involved with the chronic pain experience. Spinhoven, Jochmes, Linssen, and Bogards (1991) studied 111 chronic headache sufferers. They examined the relationship between personality and pain coping strategies. The researchers measured personality with a Dutch variation of the California Personality Inventory. They found that patients who scored high on hostility or neuroticism reported increased use of “helpless” coping strategies, such as catastrophizing, praying, and hoping. Pain coping strategies were not related to any other personality characteristic measured in this study, which included social inadequacy, rigidity, dominance, self-esteem, and self-sufficiency.

Burns, Johnson, Mahoney, Devine, and Pawl (1996) studied 127 married patients with chronic pain participating in a multidisciplinary pain management program and examined the relationship between anger, hostility, and chronic pain adjustment. Results indicated that “low hostile women” who expressed their anger reported the lowest pain levels. They also found that highly hostile men who did not express their anger reported the highest levels of pain.

Wade, Dougherty, Hart, and Cook (1992) studied the personality structure of fifty-nine chronic pain patients who were treated at a multi-disciplinary pain clinic. Patients were first classified into four categories based upon MMPI profiles. The categories were conversion (scale 1 and 3 above a score of 70, with a 10-point valley
between scales 1-3 and scale 2), hypochondriasis (scales 1, 2, and 3 all above a score of 70), denier/coper (a profile within the normal range), and emotionally overwhelmed (scales 1, 2, and 3 above a score of 70, and elevations on at least three of scales 4, 6, 7, 8, and 9). The personality structure of people falling within those four categories was then assessed by the NEO Personality Inventory. Results indicated that conversion, hypochondriasis, and denier/coper profile groups demonstrated normal personality structure, but the emotionally overwhelmed group had higher levels of neuroticism as measured by the NEO Personality Inventory. These results suggested that emotionally overwhelmed chronic pain patients had an abnormal underlying personality structure, a structure which contributed to exacerbated experiences of hostility, anxiety, and depression. Other types of typically encountered MMPI pain profiles (conversion, hypochondriasis, and denier/coper) reflect a normal underlying personality structure, a structure which did not aggravate hostility and depression.

Wade, Price, Hamer, Schwartz, and Hart (1990) investigated the importance of emotional factors in the chronic pain experience of 143 chronic pain patients. They used seven visual analog scales which measured anger, anxiety, frustration, fear, depression, degree of emotional unpleasantness, and pain intensity. They found that anger, frustration, and anxiety were associated with emotional unpleasantness, and that anger was specifically related to depression for these patients. The authors suggested that although psychological/psychiatric treatment approaches have typically emphasized depression and anxiety, utilization of interventions targeting anger and frustration were important when attempting to improve long-term adjustment.

Finally, Fernandez and Milburn (1994) studied forty chronic pain patients. They examined the impact of emotional and sensory processes on ratings of pain. They found that both emotional and sensory aspects uniquely contributed to overall pain intensity.
The authors also found that the emotional component which contributed to pain intensity consisted of anger, fear, and sadness. Those results provided further evidence that anger, hostility, and anxiety, in addition to depression, were important contributors to the chronic pain experience. Those results have further supported the notion that treatment interventions should have targeted the full range of psychological processes involved in chronic pain.

Psychological factors in chronic pain patients have also been associated with unhealthy lifestyle behaviors. Chronic pain has been found to be associated with weight gain, poor nutrition, lack of exercise, smoking, and increased narcotic use and addiction (Jamison, Stetson, & Parris, 1991; Tollison, 1987). Burns, et al. (1996), in the study cited above, found that women who scored low on hostility and who expressed their anger, reported the highest level of physical activity. They also found that men who scored high on hostility and who did not express their anger, reported the highest level of interference with daily activities.

Voulgari, et al. (1991) studied 162 postoperative patients and the relationship between postoperative pain, narcotic consumption, and psychological factors. The researchers used a variety of psychological tests and evaluated depression, hostility, personality, and anxiety. Their results indicated that pain levels were positively associated with hostility levels, and higher pain levels increased narcotic use. They also found that depression and anxiety were not related to postoperative pain levels. Those researchers speculated that hostile patients used pain complaints when they wished to express hostility to treatment professionals. If those results were extended to chronic pain patients, it would be argued that hostile chronic pain patients have used narcotics more often for pain relief, and that they were at increased risk of addiction as a result of their drug exposure.
Jamison, et al. (1991) studied 209 chronic pain patients and studied the relationship between cigarette smoking and pain. Results indicated that the majority of patients who smoked reported feeling they needed to smoke in order to cope with their pain, although most of those patients believed that smoking did not reduce their pain. They also found that chronic pain patients who smoked reported more emotional distress, lower activity levels, and increased use of narcotic pain medication. The finding of increased narcotic pain medication use among patients with chronic pain who smoked was supported by Barton, Kofoed, and Doleys (1989) who suggested that nicotine sensitizes pain receptors which increased the need for pain medication. Taken together this literature indicates that hostility in patients with chronic pain was associated with unhealthy lifestyles which aggravated the chronic pain experience and hindered long-term adjustment.

The literature on chronic pain has suggested that based upon the dominant theoretical conceptualizations of chronic pain, such as the gate-control theory of pain, more attention has been needed to be focused upon the processes of hostility and social support in chronic pain patients. The research which has examined hostility in the process of chronic pain has been sparse, and no literature was found which examined hostility and social support processes jointly in the experience of chronic pain.

**Chronic Pain and Social Support**

Social support has been implicated as important in the development and exacerbation of many chronic illnesses. Psychological theories concerned with the development and exacerbation of chronic pain have implicated social support and the social environment as having been important in the experience of chronic pain. For example, psychodynamic perspectives have suggested that chronic pain patients tended to have backgrounds of hostile, unsupportive, and aggressive familial relationships, and
that they have tended to convert their emotional pain and isolation into physical symptoms (Engel, 1959; Turk, et al., 1987). This model has suggested that low levels of social support have contributed to development and exacerbation of chronic pain. On the other hand, behavioral approaches have suggested that high levels of social support may have contributed to development and exacerbation of chronic pain. According to that theoretical perspective (Turk, et al., 1987), high levels of social support for pain and illness related behaviors have reinforced their expression, and increased the likelihood of future pain and illness behavior. Evidence has been found to support both perspectives, but recently the preponderance of support has indicated that higher quality of social support was related to reduction of chronic pain symptomology.

Isacsson, Hanson, Ranstam, Ranstam, and Isacsson (1995) studied 500 Swedish men. They examined the relationship between social support and neck and back pain after retirement. Results of the study indicated that higher levels of social support were associated with lower incidence of neck and back pain after retirement independent of lifestyle behaviors. Ahlberg-Hulten, Theorell, and Sigala (1995) studied ninety Swedish nurses and nurse’s aides and examined the relationship between social support and pain reports. Results of the study indicated that lower levels of social support were related to more severe symptoms of neck, shoulder, and back pain.

Radojevic, Nicassio, and Weisman (1992) studied fifty-nine people who underwent treatment for rheumatoid arthritis. Their results indicated that participants who received familial support for pain coping behaviors had less severe joint swelling after completion of the treatment program when compared to participants who did not have familial pain coping support.

Fishman, Turkheimer, and DeGood (1995) studied sixty college students and examined the relationship of physical contact and pain. Participants were assigned to
either pulse palpation, cold pressor test, or pulse palpation during cold pressor test conditions. Results indicated that cardiovascular responses and subjective ratings of pain in response to the cold pressor test were lower in the group who were touched (by pulse palpation) during the test conditions.

And finally, the Goldberg, et al. (1993) study, discussed above, which demonstrated that low levels of marital support were associated with higher levels of depression, as measured by scores on the Beck Depression Inventory, in chronic pain patients, but only for those patients who had low levels of self-reported social activity. Those associations remained even after pain severity variation was controlled.

Hostility

There have been several definitions of hostility in the literature. Those definitions have not been mutually exclusive, and indicated processes which interacted and contributed to one another in a positive feedback loop which lead to development or exacerbation of hostility. Those definitions included: 1) hostility as a tendency to want to harm others; 2) hostility as a tendency to feel anger towards other people (Chaplin, 1985); 3) hostility as a coping effort in which individuals tried to force others/the environment to confirm the individual's invalid predictions based upon constructs in need of modification (Kelly, 1955); and 4) hostility as a negative cognitive set of learned attitudes, beliefs, and appraisals about others (Smith, 1992).

The CHD-hostility literature most often conceived of hostility as a combination of the first, second, and fourth of these definitions. This definition indicated that hostility involved distinct, but interrelated processes of cynicism, anger, and aggression. Specifically, it has been conceptualized that: hostile individuals devalued others and viewed the motives and actions of other people with cynical mistrust, hostile people were likely to have perceived that other people were involved in transgressions, hostile people
had a tendency to be angry at perceived transgressions by others, and hostile people had a tendency to respond with verbal or physical aggression to interpersonal problems with the intention to harm or the intention to intimidate others (Smith, 1992).

The Minnesota Multiphasic Personality Inventory (MMPI) derived Cook-Medley hostility scale (Ho) has been the most commonly utilized method for evaluating the health consequences of hostility. The scale was originally constructed to identify teachers who had problems associating with students (Cook & Medley, 1954).

Hostility and Health

Research investigated the possibility that certain behavioral styles and personality traits were involved in the development and aggravation of disease. The Type A behavior pattern, which involved characteristics of increased time urgency, hostility, and competitiveness, was believed to have increased CHD risk because of increased psychophysiological reactivity to frequent stress (Krantz, Contrada, Hill, & Friedler, 1988; Krantz & Manuck, 1984; McCann & Matthews, 1988; Sundin, Ohman, Palm, & Strom, 1995). Early evidence indicated that Type A was a good independent predictor of CHD (Brand, Rosenman, Sholtz, & Friedman, 1976; Rosenman, et al., 1970; Rosenman, et al., 1975; Rosenman, Brand, Sholtz, & Friedman, 1976). However, subsequent results and several literature reviews indicated that the only Type A component which was a risk factor for CHD development was hostility, and that measures of hostility were better predictors of CHD morbidity and mortality than measures of Type A behavior (Baker, Dearborn, Hastings, & Hamberger, 1984; Dembroski & Costa, 1987; Diamond, 1982; Hecker, Chesney, Black, & Frautschi, 1988; Krantz, et al., 1988; Matthews, 1988; Matthews, Glass, Rosenman, & Bortner, 1977; McCann & Matthews, 1988; Siegman & Dembroski, 1989, chap. 2, 4; Williams, 1994; Williams, et al., 1988; Williams, Barefoot, & Shekelle, 1985; Williams, et al., 1980; Williams & Williams, 1993).
Prospective studies indicated that a high level of hostility was a risk factor for illness related morbidity and mortality. An important early study which concerned the health consequences of hostility was conducted by Williams, et al., (1980). They compared the CHD predictive abilities of the Type A behavior pattern using the Structured Interview, and hostility using the Cook-Medley Ho scale in 424 coronary arteriography patients at the Duke University medical center. They found that hostility was a significantly better predictor of CHD severity for both men and women than was the Type A behavior pattern. Results from the Multiple Risk Factor Intervention Trial, a prospective randomized CHD prevention trial, supported findings that interpersonal hostility, not the global Type A behavior pattern, was a CHD risk factor (Dembroski, Macdougall, Costa, & Grandits, 1989).

Several other prospective studies have not only supported the relationship between high hostility levels and CHD development, but have also indicated that hostility is predictive of mortality from all causes (Miller, et al., 1996). Barefoot, Dahlstrom, and Williams (1983) used archival data of 255 University of North Carolina medical students and studied the relationship between Ho scores and health twenty-five years later. Results indicated that hostility scores were related to CHD incidence and all-cause mortality independent of traditional risk factors, with high Ho scores associated with six times the likelihood of CHD incidence.

Barefoot, et al. (1989) divided the Ho scale into six subscales based on face validity and theories of aggression, attitudes, and information processing. These subscales were then submitted to a group of psychologists for validation and scale modification. Their aim was to improve the predictive ability of the MMPI Ho scale by eliminating CHD irrelevant items. They used those subscales to study archival data of law students who attended the University of North Carolina and examined the
relationship between the Ho subscales and CHD incidence twenty-nine years later. Results indicated that only the Cynicism, Hostile Affect, and Aggressive Responding subscales were related to CHD incidence. High scores on the sum of these three subscales, called the composite hostility score (Chost), was associated with a 5.54 increase in CHD incidence when compared to those with low scores. Their results also indicated that the CHD relevant, Ho subscales were better predictors of CHD when compared to the full Ho scale and when compared to factor analytically derived Ho subscales of cynical mistrust and paranoid alienation derived by Costa, et al. (1986).

Shekelle, et al. (1983) studied 1,877 men to examine the relationship between Ho measured hostility scores and CHD incidence twenty years later. They used data from the Western Electric Study, a prospective CHD study conducted in Chicago. The results indicated that hostility was associated with CHD incidence, CHD mortality, and all-cause mortality independent of other risk factors. Koskenvuo, et al., (1988) examined data from a prospective, twin population study in Finland. They found a strong relationship between hostility and CHD development twenty-three years later, and that hostility predicted CHD even after adjustment for other risk factors. Barefoot, Larsen, von der Lieth, and Schroll (1995) prospectively studied 730 men and women in Denmark over twenty-seven years. Results demonstrated a relationship between Ho scores and myocardial infarction, and that there was a relationship between Ho hostility scores and mortality from all causes after traditional risk factors were controlled. Those results indicated that the relationship between hostility and mortality was not restricted to the American culture.

Several mechanisms have been proposed to account for the link between hostility and health. Exaggerated cardiovascular reactivity in response to interpersonal stress for people with high hostility levels have been suggested as one of those mechanisms (Hardy
& Smith, 1988; Smith, 1992; Suarez, Williams, Kuhn, Zimmerman, & Schanberg, 1991; Williams, 1994). According to that model, hostile people are hypervigilant to interpersonal stress, experienced stress more frequently, and exhibited larger increases of catecholamine response to interpersonal stress. This catecholamine response resulted in larger increases in blood pressure, heart rate, and blood cholesterol for hostile people and presumably contributed to development of hypertension, atherosclerosis, instability of blood insulin levels, ischemia, and perfusion defects. Hostility was also believed to contribute to poor health by way of increased unhealthy lifestyle behaviors and less social support. (Helmers, et al., 1993; Helmers, et al., 1995; Williams, et al., 1985; Williams & Williams, 1993).

The association between hostility and overall health, and between hostility and CHD has been strengthened by additional research which has demonstrated positive relationships between hostility level and aggravation of various health related events, markers, and symptoms. For example, hostility was associated with cardiac symptoms 6 months after heart surgery (Jenkins, Stanton, & Jono, 1994). Hostility levels, as measured by the Ho scale, the Chost scale (Helmers, et al., 1993), and the Buss-Durkee Hostility Inventory (BDHI), were associated with both severity of CHD and future ischemic episodes in CHD patients (Siegman, et al., 1987).

Haney, et al. (1996) found that in coronary patients, severity of coronary artery disease was associated with higher hostility scores. Hostility levels derived from the Structured Interview were positively correlated with platelet activation (Markowitz, Matthews, Kiss, & Smitherman, 1996), and with thromboxane production, a chemical important in thrombosis and CHD development (Dion, Gerrard, Ready, & Dyck, 1992).

Helmers, et al. (1995) studied hostility and defensiveness using the Chost and social desirability scales. They found that defensive hostile individuals, measured as
high scores on both the Chost and social desirability scales, evidenced greater perfusion
defects during exercise, more frequent ischemic episodes during ambulatory EKG
monitoring, and more severe ischemia during non-interpersonal stress.

Christensen, et al. (1996) studied the association between hostility and immune
system functioning. They found that high Ho measured hostile men had greater increases
in natural killer cell activity as compared to low hostile men during self-disclosure tasks.

Julkunen, Salonen, Kaplan, Chesney, and Salonen (1994) conducted a prospective
study with 128 men living in Finland and examined the relationship between hostility and
carotid atherosclerosis. Results indicated that cynical hostility was prospectively
associated with twice the acceleration of carotid atherosclerosis two years later, even
after other risk factors were controlled.

Joesoef, Wetterhall, DeStefano, Stroup, and Fronek (1989) studied 4,462 male
veterans, and examined the relationship between hostility and peripheral artery disease.
They found that Ho measured hostility was positively associated with peripheral artery
disease.

Christensen, Wiebe, & Lawton (1997) studied the relationship between hostility
levels and treatment compliance in 48 hemodialysis patients. They found that Ho
measured hostility levels were related to physiological measures which indicated poor
treatment compliance with dietary changes and medication.

Further support for a link between interpersonal hostility and both CHD and
overall health came from the study of lifestyle behaviors. Hostility, measured as both
scores on the total Ho scale and scores on the Chost, have been found to correlate with
unhealthy lifestyle behaviors (Barefoot, et al., 1995; Houston & Vavak, 1991;
Koskenvuo, et al., 1988; Leiker & Hailey, 1988; Lipkus, et al., 1994; Miller, Markides,
Chiriboga, & Ray, 1995; Musante, Treiber, Davis, Strong, & Levy, 1992; Shekelle, et al.,
1983). For example, hostility was positively correlated with cigarette smoking (Koskenvuo, et al., 1988; Musante, et al., 1992), sugar intake (Musante, et al., 1992), cholesterol intake (Musante, et al., 1992), animal fat intake (Musante, et al., 1992), drinking and driving (Leiker & Hailey, 1988), heavy alcohol consumption (Koskenvuo, et al., 1988; Leiker & Hailey, 1988; Miller, et al., 1995), and body mass index (Lipkus et al., 1994). In addition, hostility has been negatively correlated with physical fitness (Leiker & Hailey, 1988), calcium intake, dental hygiene (Leiker & Hailey, 1988), fiber intake (Musante, et al., 1992), and self-care (Leiker & Hailey, 1988). Hostility has also been associated with frequency of hassles (Smith, Pope, Sanders, Allred, & O'Keefe, 1988), frequency and severity of stress (Smith, et al., 1988), divorce (Miller, et al., 1995), psychosomatic symptoms (Miller, et al., 1995), depressive symptoms (Miller, et al., 1995), interpersonal conflict (Miller, et al., 1995; Smith, et al., 1988), poor treatment compliance with dietary changes and medication regimens (Christensen, Moran, Lawton, Stallman, & Voigts, 1997), and a lesser likelihood of smoking cessation (Lipkus, et al., 1994).

Williams and Williams (1993) have estimated that 20 percent of the entire population had hostility levels high enough to cause health problems. If accurate, hostility may have been one of the most undiagnosed and untreated health problems, particularly in certain medical contexts which may have aggravated or fostered hostility, such as the experience of patients with chronic pain.

Hostility and Psychophysiological Activity

Several studies have demonstrated that people with high hostility levels had increased cardiovascular reactivity to interpersonal stress (Burns & Katkin, 1993; Christensen & Smith, 1993; Hardy & Smith, 1988; Jamner, Shapiro, Goldstein, & Hug, 1991; Jamner, Shapiro, Hui, Oakley, & Lovett, 1993; Lepore, 1995; Linden, Chambers,
Maurice, & Lenz, 1993; Powch & Houston, 1996; Smith & Allred, 1989; Smith & Brown, 1991; Suarez & Williams, 1989; Suarez, Harlan, Peoples, & Williams, 1993; Suarez & Williams, 1990; Suarez et al., 1991; Weidner, Friend, Ficarrotto, & Mendell, 1989) but results for resting levels and for non-interpersonal stress were inconsistent (Suarez & Williams, 1989; Suls & Wan, 1993). The inconsistent results for non-interpersonal stress have been found on a variety of physiological measures. For example, Pope and Smith (1991) collected urinary cortisol excretion levels during daily activities from thirty-nine undergraduates. They found that high hostile men had twice the daytime cortisol increase of low hostile men, a difference which was not found during sleep. Smith & Houston (1987) studied the association between Ho measured hostility during two non-interpersonal stress tasks, the Stroop Color-Word Interference Test and mental subtraction, and cardiovascular reactivity. They found no association between hostility and cardiovascular reactivity during those types of stress tasks.

Burns, Friedman, and Katkin (1992) examined the effect of mental arithmetic on myocardial contractile force of forty-nine undergraduate men. The myocardial measure utilized in this study was pre-ejection period, a non-invasive measure of sympathetic nervous system activity, which was defined as the interval between ventricular depolarization and the onset of left ventricular ejection. They found that Ho measured hostility interacted with inward expressions of anger to predict cardiac reactivity in a non-interpersonal stress situation.

Jamner et al. (1991) studied ambulatory heart rate and blood pressure in thirty-three paramedics during various levels of daily stress. Paramedics who scored high in Ho measured hostility and had high scores on social desirability, demonstrated increased heart rate and diastolic blood pressure responses during periods of high and
low work stress. Also, high levels of hostility were associated with higher average systolic and diastolic blood levels during both awake and sleep times of the day.

Burns, Hutt, and Weidner (1993) studied the effects of solving Graduate Record Examination tasks on blood pressure and heart rate responses of seventy undergraduate men and women. Results indicated that Ho measured hostility was related to systolic blood pressure changes to the non-interpersonal stress task, but only for men. Spicer and Chamberlain (1996) studied Ho measured hostility scores and Spielberger anger scores, and examined their relationship with resting blood pressure of men and women. They found that only hostility scores were associated with systolic and diastolic blood pressure for women. Carroll, Smith, Sheffield, Shipley, and Marmot (1997) demonstrated a relationship between resting diastolic blood pressure and Ho measured hostility in a population study conducted in England.

The hostility definitions discussed above proposed hostility was an interpersonal construct. If hostility was an interpersonal construct then interpersonal stress situations would be more appropriate to utilize in attempts to elicit the exaggerated psychophysiological reactivity evident in hostile people. A recent meta-analysis of the hostility psychophysiological literature (Suls & Wan, 1993) indicated that hostility predicts blood pressure reactivity to interpersonal stress, but its' ability to predict reactivity to non-interpersonal stress was substantially weaker.

Many studies and experiments have utilized interpersonal stress situations with impressive results. For example, Malarkey, Kiecolt-Glaser, Pearl, and Glaser (1994) and Siegman (1993) have reported increased cardiovascular reactivity and increased pituitary and adrenal hormone levels during expression of hostile interpersonal behavior and emotions on structured behavioral observation tasks.
Hardy and Smith (1988) studied cardiovascular reactivity of sixty-eight participants during varying degrees of role-played interpersonal conflict. They found that highly hostile participants demonstrated greater diastolic blood pressure reactivity to high levels of interpersonal conflict than participants scoring low in hostility. When comparing reactivity of the participants to varying degrees of interpersonal conflict, they found that degree of interpersonal conflict had no effect on low hostile participants, but highly hostile participants had greater diastolic blood pressure reactivity to high levels of interpersonal conflict situations as compared to low conflict situations. Those results provided strong evidence of the interpersonal nature of the hostility construct as measured by the Cook and Medley Ho scale.

Suarez and Williams (1990) further supported the theory that psychophysiological hyperactivity was associated only with interpersonal stress. The cardiovascular reactivity of 53 men was measured while they solved timed anagram tasks. The participants were assigned to either a non-harassment task, where the research technician was friendly, or to a harassment task, where the research technician delivered harassing statements at fixed intervals. Their results indicated that participants who scored highly on hostility responded to the harassment task with greater systolic blood pressure reactivity to stress, poorer systolic blood pressure recovery from stress, and greater changes in forearm blood flow than those people who scored low on hostility. Suarez, et al. (1993) employed a similar methodology using female participants, and similar results were obtained. Women who scored highly on hostility demonstrated higher systolic blood pressure levels during the anagram task and during recovery form the task, but this reactivity was only evident in the harassment condition.

Powch and Houston (1996) measured the cardiovascular reactivity of 109 undergraduate women during interpersonal stress tasks. Participants were assigned to
either a high interpersonal stress task (the viewpoint discussed was considered important to the participants, and they discussed it with a person who was opposed to the viewpoint), or to a low interpersonal stress task (the viewpoint discussed was considered important to the participants, and they discussed it with a person who was supportive of their viewpoint). Results indicated that women who scored highly on Ho measured hostility demonstrated greater systolic blood pressure reactivity, but only in the high interpersonal stress condition. Christensen and Smith (1993) examined the cardiovascular reactivity of sixty undergraduate men who were assigned to either self-disclosure of a personally stressful issue, or to discussion of hypothetical stress experienced by another student. Highly hostile men, as measured by the Ho scale, had higher systolic blood pressure at baseline, and they demonstrated greater systolic and diastolic blood pressure reactivity when compared to low hostile men. The difference was apparent only during the personal stress self-disclosure condition.

Smith and Brown (1991) conducted a study which underscored the interpersonal-social impact of hostility. They studied forty-five married undergraduate couples and measured their cardiovascular reactivity during a discussion task. In one condition there was an incentive for spouses to have influenced one another's decisions on the discussion task, and in the other condition there was no incentive to have influenced each other's decisions. Results indicated that men who had high Ho measured hostility scores had greater heart rate reactivity in both types of discussion conditions than men who scored low on the Ho scale. Results also indicated that hostile men had greater systolic blood pressure reactivity in the condition where they attempted to influence/control the responses of their wives as compared to low hostile men, and that the husband's Ho scores were positively correlated with systolic blood pressure reactivity in their wives.
Although the hostility-health morbidity/mortality, and the hostility-cardiovascular reactivity associations have been generally consistent, a few negative results have been reported (Leon, Murray, Finn, & Bailey, 1988; McCranie, Watkins, Brandsma, & Sisson, 1986; Shekelle, et al., 1983; Smith, & Houston, 1987; Spoth, Dush, & Leonard, 1992). Negative results have been attributed to methodological problems such as restricted range of scores (Pickering, 1985), samples of older participants for whom all risk factors including hostility are less predictive of CHD (Williams & Williams, 1993), demand characteristics (Sallis, Johnson, Treverrow, Kaplan, & Hovell, 1987), low mean hostility scores (Leon, et al., 1988; McCranie, et al., 1986) and use of non-interpersonal stress to elicit cardiovascular reactivity in a trait/construct which claimed to measure interpersonal stress (Carroll, et al., 1997; Durel, et al., 1989; Sallis, et al., 1987; Smith, & Houston, 1987; Suarez, & Williams, 1989; Williams & Williams, 1993).

**Hostility and Social Support**

Social support has been found to have been related to heart disease, and to all-cause morbidity and mortality in several prospective general population studies (Berkman & Syme, 1979; Helgeson, 1991; House, Landis, & Umberson, 1988; Orth-Gomer, Rosengren, & Wilhelmsen, 1993; Orth-Gomer & Unden, 1990; Ruberman, Weinblatt, Goldberg, & Chaudhary, 1984; Seeman & Syme, 1987; Welin, et al., 1985). Lack of social support has even been suggested by these researchers to be an independent CHD and all-cause mortality risk factor. One mechanism by which hostility has been proposed to adversely impact health is by its' negative impact on social support. Williams and Williams (1993) suggested that hostile people had a cynical outlook in regards to other people. Their outlooks made them prone to interact with other people in ways which validated their expectations, namely with cynical remarks, angry reactions, and aggressiveness. Their behavior often solicited a similar response from other people,
which validated the hostile person's beliefs. As a result, the hostile person experienced even more cynical cognitions, angry feelings, and aggressive responses. It has been proposed that in this way hostile people have actively created a hostile environment around themselves, an environment which was stressful was perceived to require constant vigilance.

Research has supported the model of self-fulfilling hostility-social alienation. For example, Allred and Smith (1991) found that people who scored high on Ho measured hostility were more likely to have interpreted their social interactions as having been hostile, indicating the presence of a hostile-other schema which was present in those people. This hostile-other schema promoted processing of negative information about others when activated. Specifically, they recalled more hostile adjectives than people low in hostility following a hostile social interaction, but not during a neutral social interaction.

Snyder and Swann (1978) studied 108 men, and examined the relationship between social perceptions of hostility and subsequent hostile behavior. Use of a noise weapon to disrupt a competitor during a competition performance task was used to measure hostile behavior. Results indicated that having perceptions of the other person as having been hostile elicited hostile behavior from the individual. Also people who were recipients of hostile behavior from a competitor responded to others with increased hostile behavior during a subsequent competition task with a different person than the original competitor. Pope, Smith, and Rhodewalt (1990) found that high Ho scores were associated with increased disparaging appraisals about a competitor, increased suspicious thoughts and feelings in response to interpersonal conflict, and a tendency to have attributed hostile intent to the negative social behavior of others.
Newton and Kiecolt-Glaser (1995) conducted a longitudinal study of marital quality with fifty-three newlywed couples. After three years, they found that hostility levels for husbands were negatively associated with marital quality.

**Hostility and lifestyle behavior**

It has been proposed that hostility has exerted a negative impact on health by its association with unhealthy lifestyle behaviors. As mentioned above, research has demonstrated that hostility was associated with a number of unhealthy lifestyle behaviors (Barefoot, et al., 1995; Christensen, et al., 1997; Houston & Vavak, 1991; Koskenvuo, et al., 1988; Leiker & Hailey, 1988; Lipkus, et al., 1994; McCormick & Smith, 1995; Miller, et al., 1995; Musante, et al., 1992; Shekelle, et al., 1983). Those results indicated that hostility may have been an independent health risk factor as well as an underlying factor which increased the likelihood of engaging in other unhealthy lifestyle that contributed to cancer, diabetes, CHD, accidental death, complications related to hemodialysis, and other health problems. If hostility has been an important underlying factor in general health and in aggravation of illness, then evaluation and modification of hostility levels should have been important in efforts to treat health problems and promote lifestyle behavior change.

The literature on stress and coping behavior has suggested that people engage in unhealthy lifestyle behaviors as a coping mechanism to manage stress, especially if they are deficient in adaptive coping skills (Musante, et al., 1992). Alexander and Hadaway (1982) proposed an adaptive model of addiction which has been applicable to a discussion of hostility and excessive use of unhealthy lifestyle behaviors, such as cigarette smoking and alcohol consumption. The model suggested that addiction reflects an attempt to adapt to stress which developed into a viscous cycle which increased unhealthy behavior when: 1) a behavior was performed as a way to alleviate stress, 2) the
person believed the behavior was the best way to alleviate their stress, 3) the behavior reduced immediate/short-term distress, and 4) use of the behavior increased the individual’s long-term distress. This viscous cycle was likely to have made individuals prone to perform unhealthy lifestyle behaviors, particularly during periods of high stress, in a habitual, compulsive, or even addictive manner if the adaptive coping responses of the individual were limited (Alexander & Hadaway, 1982; Cummings, Gordon, & Marlatt, 1988; Marlatt, Baer, Donovan, & Kivlahan, 1988; Marlatt & Gordon, 1985; Peele, 1985; Wilson, 1992). Whether or not all of these conditions were necessary for habitual, non-addictive use of unhealthy lifestyle behaviors was not addressed by these authors, but it is a logical extension of their model. Since hostile people have experienced more frequent and intense interpersonal stress and anger, they may have been more susceptible to have excessively engaged in unhealthy lifestyle behaviors and addictions which could have had a variety of adverse health consequences, especially if their coping resources were limited (McCormick & Smith, 1995). The idea that hostile men may have been more susceptible to have “medicated” or engaged in unhealthy lifestyle behaviors to reduce distress was supported in a study by Zeichner, Giancola, and Allen (1995). They found that men who scored high on the Ho scale experienced a larger stress-response-dampening effect after they consumed alcohol as evidenced by lower heart rate and systolic blood pressure reactivity to stress. The implications of that study suggested that alcohol was likely to have been perceived as a way to ameliorate distress, and this may have contributed to hostile people having utilized alcohol to manage their lives.

Models of Hostility

Several models of hostility development have been proposed. These models were often inter-related, and results and theory from one model have had application in the
other hostility models. The models have included a developmental Type A model, an existential Type A model, a Kellian hostility model, a social learning/developmental model, a social isolation model, and a genetic model.

**Developmental Type A model.** Some of the hostility research has considered hostility to be part of the Type A behavior pattern. From this view there were several sub-populations of Type A individuals, including a sub-population of Type A's who were high in hostility and were therefore at increased risk of CHD, and a sub-population of Type A's who were low in hostility and were therefore not at an increased risk of CHD. Type A behavior was proposed to have developed as a result of a child's developmental history (Matthews, 1977; Matthews & Woodall, 1988) in which parental behaviors, such as having given supportive motivational comments and having pushed children to try harder even though they had succeeded, were believed to have taught and reinforced Type A behavior during childhood. Matthews, et al. (1996) conducted a prospective study on childhood development of hostile attitudes. This study assessed the familial environment of fifty-one fathers, mothers, and sons by self-report, interview, and observation data. Results indicated that negative familial environment and behavior, characterized by negative emotion, punitiveness, inconsistency, unnurturant mothers, and low conflict resolution, predicted development of anger and hostile attitudes three years later. The authors suggested that negative familial interactions taught children to be mistrustful of people, and that cynical outlook contributed to development of hostile behavior that resulted in isolation, rejection, and to further development of hostility.

**Existential Type A model.** Another example of a hostility-Type A developmental model was the existential approach of Goggans (1993). In that model of hostility development, Type A behavior and hostility developed because of an ineffective attempts to alleviate anxiety about death. Individuals developed various methods of coping with...
the knowledge that we are mortal and would die; some overcame death anxiety through self-actualization, developed need-free love relationships, immersed the self into the greater whole of existence, and other successful methods. Other people used ineffective methods to overcome death anxiety, and lived life in denial of death. These latter individuals developed destructive behavior patterns. They smoked more often, isolated oneself from others, and compulsively strove for power, prestige, validation, and control. The purpose of their behavior was to elevate low self-esteem which resulted from unacceptance of one's "creatureliness." According to this model, those individuals who were ineffective anxiety copers often developed the Type A characteristics of time urgency, hostility, and competitiveness coping styles when they attempted to elevate their self-esteem and decrease existential anxieties.

**Kellian hostility.** Kelly's (1955) version of hostility differed from most other models of hostility. However, this conceptualization of hostility was also compatible with much of the hostility literature. According to this model, hostility represented a coping effort in which individuals tried to force other people to confirm the individual's invalid predictions of the world. This forced confirmation attempt by the hostile person reduced anxiety about their imperfect constructs about their environment because having been unable to make predictions about the environment created anxiety. Hostile people resist change and cope with this anxiety when they tried to force the environment to meet their expectations of the world. The alternative, more adaptive coping response would have been to modify their construct and accommodate invalidating information. Their intolerance of ambiguity often resulted in behavior which elicited anger and avoidance from other people as the hostile person attempts to force the environment to fit their expectations. The more relevant the construct was to the core self, the stronger the
hostile response. In that way, the behavior of hostile people may have created a stressful
environment around themselves.

Bollinger (1994) suggested that a hostile individual could manifest hostility in
two types of general behavior depending upon psychosocial processes, such as culture,
developmental history, and learned gender roles. The first general hostile behavior was
an active style that was similar to what the literature has defined as hostility, a tendency
to view the motivations and behavior of others with cynical mistrust, frequent
experiences of anger in response to perceived mistreatment from others, and a tendency
to respond aggressively either verbally or physically to others. However, the second
general type of hostile behavior was a passive style quite different from the usual
conceptions of hostility. That type of hostile reaction manifested as depression,
passivity, withdrawal, and self-blame.

Approaching hostility from a Kellian perspective, the hostility-health literature
had concentrated mostly upon the active/aggressive type of hostility, and the
passive/depressive type of hostility, which may also have been important for
biopsychosocial health, was overlooked (Bollinger, 1994). In support of this notion,
Thorogood, (1993) indicated that depression was associated with heart disease
independent of other risk factors. Other reports have indicated that depression can be a
predictor of morbidity and mortality after myocardial infarction. For example,
Frasure-Smith, Lesperance, and Talajic (1993) found that depressed patients were more
likely to die six months after myocardial infarction even though those individuals didn't
have more severe disease than nondepressed individuals. Ladwig, Roll, Breithardt,
Bude, and Borggreve (1994) found that reports of angina were more frequent for those
people who suffered severe forms of depression as compared to people who suffered only
mild depression six months after myocardial infarction.
Research has also indicated that depression correlated with pain behaviors in chronic pain patients (Krause, et al., 1994), and that depression has been prospectively related to disability (Dozois, et al., 1995; Linton, et al., 1994). Fava, Nolan, Kradin, and Rosenbaum (1995) found an association between state and trait hostility scores and depression, and suggested there was biological plausibility of a link between depression and heart disease because the neurochemical and behavioral manifestations of depression were similar to that of the stress response. This indicated that the experience of depression may have lead to health morbidity and mortality for many of the same reasons as stress and hostility (Gold, Goodwin, & Chrousos, 1988). If hostility were viewed from this broad perspective suggests that hostility may not have been a simple construct only reflecting cynicism, anger, and aggression, and that it was not merely a component of the Type A behavior pattern. Instead, that view of hostility suggested that it was an indication of a cognitive structure which had diverse psychological implications and manifestations depending upon psychosocial processes. That cognitive structure model of hostility has implied that traditional measures of hostility which focused on cognitive content (cynicism, anger, and aggression) were correlated with depression and depressive symptoms.

Social learning/developmental model. Much of the literature has treated hostility as a major, independent trait or construct for health risk which has developed as a result of developmental and social learning processes (Barefoot, et al., 1983; Barefoot, et al., 1989; Helmers, et al., 1993; Koskenvuo, et al., 1988; Shekelle, et al., 1983; Smith, 1992; Smith & Frohn, 1985; Smith, McGonigle, Turner, Ford, & Slattery, 1991; Wade, Witham, & Abramowitz, 1994; Witham, 1991, Williams, et al., 1985; Williams & Williams, 1993). According to that view, hostility usually began in childhood, because of parental behavior, and feelings of insecurity and negative feelings towards others. For
example, the social learning/developmental model identified several familial styles which were associated with developing high hostility levels in children, and some of the literature which was applicable to the Type A model also has applied to the social learning model of hostility development. Families characterized by little supportiveness, little interpersonal involvement, a lack of genuine acceptance, frequent rejection and punitiveness, inconsistent disciplinary behavior, more expectations of conformity, more strict control, frequent interference in the desires of the children, and aggressive and competitive socialization pressures typically experienced by boys were associated with development of high levels of hostility (Houston & Vavak, 1991; Matthew, et al., 1996; Wade, et al., 1994; Witham, 1991; Woodall & Matthews, 1989). Frequency of angry and aggressive responses increased if the child or adolescent was reinforced for such behavior and if the child learned to control others through hostile behavior. It was believed that those family interactions and reinforcement patterns taught children that people were to be viewed with cynical mistrust, feel anger at perceived interpersonal slights and conflicts, and to respond in an aggressive manner to interpersonal stress (Matthews, et al., 1996; Williams & Williams, 1993). It has been proposed that life experiences lead to development of a hostility trait or construct when observation of familial relationships, and reinforcement patterns in life experiences taught people to view the world from a hostile perspective. This hostile interpersonal perspective contributed to self-confirming behavior, which subsequently confirmed and exacerbated hostility. Cynical mistrust, anger, and aggression were experiences which contributed to feelings of isolation, and which contributed to behavior which elicited like responses from other people. In this way, hostile people actively created a hostile environment around themselves through their thoughts, feelings, and behavior (Allred & Smith, 1991; Pope, et al., 1990; Smith, 1992; Snyder & Swann, 1978).
Social isolation model. Development of hostility has been conceptualized as stemming from social isolation. Ornish’s (1990) model of hostility development has suggested that many people felt socially isolated when they chronically were unable to achieve contentment and life-satisfaction because of intrapersonal and interpersonal obstacles. Continually having been unable, or having been prevented from achieving long term contentment which other people apparently achieved, has contributed to development of a cynically hostile world view. This cynically hostile world view served to increase the individual’s sense of social isolation, which in turn increased interpersonal hostility.

Genetic model. Finally, a genetic model of hostility has also been proposed as accounting for development of hostility. However, the genetic model of hostility (Carmelli, Rosenman, & Swan, 1988; Cates, Houston, Vavak, Crawford, & Uttley, 1993; Pedersen, et al., 1989; Smith, et al., 1991) has yielded unimpressive results, and this research indicated that socialization/social learning history best accounted for hostility development.

Social Support

Social support has been another psychosocial variable implicated as important in health problems. Several prospective studies supported the status of social support as a psychosocial risk factor for morbidity and mortality. For example, Orth-Gomer and Unden (1990) studied 150 Swedish men, and examined the ten-year prospective relationship between psychosocial factors and mortality. They found that low levels of social support predicted all-cause mortality in Type A men, but not Type B men, independent of other risk factors. Farmer, et al. (1996) studied 292 Mexican American cardiac patients. They examined the prospective relationship between social support and CHD mortality 43 months after initial myocardial infarction. They found that low levels
of social support was associated with increased risk of post-infarction mortality. Ruberman, et al. (1984) studied 2,320 men with a history of myocardial infarction, and examined the prospective relationship between psychosocial factors and three-year mortality. They found that men who experienced high levels of stress, and low levels of social support had four times the risk of all-cause mortality and of mortality from sudden cardiac death. Welin, et al. (1985) studied the psychosocial factors prospectively associated with nine-year mortality in 989 Swedish men. They found that low levels of social activity was associated with all-cause mortality independent of other risk factors, and independent of CHD mortality. In the above population studies, social isolation has been associated with 2-4 times increased CHD incidence, reoccurrence, and mortality, and was found to be as important a risk factor as traditional coronary risk factors.

The social support-mortality relationship has also been demonstrated in cancer patients. For example, Spiegel (1993) reported on research which compared five-year survival rates of cancer patients who received group support, and cancer patients who did not receive group support. Results indicated that cancer patients who participated in weekly group support meetings had twice the survival rate of those who did not participate in group support meetings. Goodwin, Hunt, Key, and Samet (1987) found that unmarried cancer patients had higher mortality rates then married cancer patients.

House, et al. (1988) concluded that the protective functions of social support on overall health were attributed to its ability to buffer the individual from increased psychophysiological reactivity to social stress, and its tendency to promote healthy lifestyle related behaviors such as adherence to medical treatment, adherence to lifestyle modification, seeking appropriate medical care, exercise, and proper sleep. Studies investigating the social support-health model have indicated a relationship between poor
social support and unhealthy lifestyle behaviors, psychophysiological reactivity, and psychological morbidity (Orth-Gomer, et al., 1993).

Anderson, Deshaies, and Jobin (1996) reviewed the social support-CHD rehabilitation literature, and concluded that high levels of social support were associated with improved adaptation to CHD. These authors also suggested that the health benefit of social support can be extended to adaptation to other chronic illnesses, and that social support can be an important factor associated with patients’ compliance with their rehabilitation programs.

Murray, Johnston, Dolce, Lee, and O’Hara (1995) studied 3923 men and women diagnosed with mild to moderate pulmonary obstruction who were attempting to abstain from smoking. Their results indicated that spousal social support was related to smoking abstinence one year later, but the relationship was evident only for the men. They also found that participants who were supported in the cessation program by an ex-smoker had high rates of abstinence after one year, and participants who were supported by a current smoker had a much lower abstinence rate.

A study by Goldberg, Kerns, and Rosenberg (1993) studied 105 married men who had chronic pain. They found that poor marital support was associated with increased levels of depression in these.

Wills and Cleary (1996) studied 1,702 adolescents and investigated the relationship between familial social support and substance use. Their results indicated that high levels of parental social support were associated with low levels of tobacco, alcohol, and marijuana use.

Steptoe, Wardle, Pollard, Canaan, and Davies (1996) studied 180 university students, and examined the relationship between social support, exam stress, and lifestyle behavior. They tested students prior to exam stress, and at a later point in the semester as
examination stress increased. They found that as examination stress increased, smoking increased dramatically in women who experienced both exam stress and low levels of social support. They also found that participants who had low levels of social support increased alcohol consumption between testing sessions, and that participants who had high levels of social support decreased alcohol consumption.

Research on social support has suggested that social support is related to several health-related mechanisms. For example, research on the social support-health connection indicated that individuals who did not have a person providing social support had greater cardiovascular reactivity to interpersonal and non-interpersonal laboratory stress when compared to individuals who had a social support person (Gerin, Pieper, Levy, & Pickering, 1992; Kamarack, Manuck, & Jennings, 1990; Lepore, Mata Allen, & Evans, 1993; Uchino, Cacciopo, & Kiecolt-Glaser, 1996). Lepore (1995) provided evidence of the importance of consideration of both social support and hostility in relation to health. Participants were randomly assigned to a supportive or unsupportive confederate condition. Participants then completed a cynical hostility measure during a speech task, and their cardiovascular reactivity was measured. Results indicated that there was no difference between groups except that individuals who scored low on the Cohn cynicism subscale and who were assigned to the social support condition had lower systolic and diastolic blood pressure increases to the stress task.

A recent review of the social support literature by Uchino, et al. (1996) concluded that low levels of social support can have adverse consequences on physiological processes as evidenced by activity of the cardiovascular, endocrine, and immune systems. They found that the association of social support to healthier physiological processes was at least partially due to a stress-buffering effect, and that the association of social support to healthier physiological processes was independent of lifestyle behavior. The authors
concluded that although social support was related to health-lifestyle behaviors and depression, these were not major pathways by which social support was associated with physiological processes. Together, these data indicated that high levels of hostility were related to low levels of social support, and that lower social support impacted psychophysiological reactivity, lifestyle behavior, and possibly health. Overall these results indicated that social support can be related to morbidity and mortality from a variety of health problems, psychophysiological reactivity, lifestyle behaviors, and poor adherence to lifestyle changes.

Evidence has also indicated that immunological function can be impaired in people with low social support. Caregivers who lived with chronically ill spouses, spouses who reported poor marital quality, and people who had recently lost a spouse had compromised cellular immune function, especially natural killer cell activity (Kiecolt-Glaser, et al., 1987; Kiecolt-Glaser & Glaser, 1995; Glaser, Kiecolt-Glaser, Speicher, & Holliday, 1985; Uchino, et al., 1996).

Several studies and laboratory experiments in humans and animals reviewed indicated that low levels of social support had adverse effects on cellular immunity, and on the cardiovascular system as mediated by the neuroendocrine system. As indicated in a recent literature review which examined the importance of social support in health (Berkman, 1995), social support can be an important risk factor to consider in the development of a variety illnesses, and social support can be important in aggravation/progression of the illness after initial onset. These associations were particularly strong for CHD, but have also been found for cerebrovascular disease, cancer, respiratory disease, and gastrointestinal disease.

Research has indicated that hostility and social support were correlated, such that people who had high hostility levels have reported fewer social supports than people who
had low hostility levels (Smith & Frohm, 1985; Smith, et al., 1988). Uchino, et al. (1996) suggested that it would have been beneficial to study both hostility and social support more often in health-related studies because they are both interpersonal constructs.

Lepore (1995) provided evidence which indicated that although hostility and social support were correlated, consideration of both social support and hostility were important if psychophysiological reactivity was to be observed. They examined the cardiovascular reactivity during a speech task of men and women who completed the Chost. Participants were randomly assigned to a supportive or unsupportive confederate condition. Results indicated that there was no difference between groups except that individuals who scored low on the Chost cynicism subscale, and who were assigned to the social support condition had lower systolic and diastolic blood pressure increases to the stress task. Although social support was independently associated with these adverse changes, the negative health impact may have been accentuated when the individual experienced chronic and/or acute stress, as has been proposed to be common in hostile people.

Not all types of social support appeared to be health promoting. Berkman (1995) suggested that social support can be beneficial to health when it provided a sense of competence and self-efficacy, as well as a sense of belonging and intimacy, but it can impair health if it fosters dependency and helplessness as has been suggested by behavioral approaches to chronic pain.

Ornish (1990) conceptualized social isolation as a risk factor which was a factor underlying illness, hostility, and unhealthy lifestyle behaviors. Adaptation of his basic conceptualizations can be applicable to diverse physical and mental health conditions. According to this view, social isolation developed as people experienced chronic
frustration and disappointment when they were not able to attain things which they believed would make them happy and content, or when obtaining these things only brought short-term happiness and contentment. Obstacles to goal attainment were then attributed to interpersonal and/or intrapersonal processes. Failure to obtain the same happiness and contentment which they believed other people had obtained left these people feeling separated, different, and apart from others. These people developed a cynically hostile world view as their happiness and contentment continued to be fleeting or was prevented. These hostile, socially isolated people often engaged in unhealthy lifestyle behavior for two general reasons. Some felt driven to engage in compulsive behavior, such as smoking and working, as they struggled to achieve distinction and contentment. Others engaged in unhealthy lifestyle behaviors as a way of coping with the chronic interpersonal life stress they experienced. In either case, what resulted was unhealthy lifestyle behavior, compulsive behavior, and chronic stress which eventually impacted health.

Hostility, Social Support, and Chronic Pain

Research has demonstrated relationships between hostility and health, between hostility and cardiovascular reactivity, between social support and health, between social support and cardiovascular reactivity, and between hostility and social support. In addition, social support has been associated with chronic pain symptomology, and, although under-studied, hostility has also been implicated in chronic pain symptomology. Discussion of various models of hostility and social support indicated: 1) hostility and social support were positively correlated, 2) hostility and social support influenced health by shared pathways (i.e. stress and lifestyle behaviors), and 3) hostility and social support also contributed to variance in health outcomes independently of each other.
The current research was conducted to: 1) examine the possibility that hostility and social support were independently related to resting physiological levels in a sample of chronic pain patients, 2) examine the possibility that hostility and social support were independently related to chronic pain symptomology, and 3) to examine the possibility that duration of living with chronic pain and social support were related to hostility.

No research was found which examined these issues in chronic patients, primarily because of under-utilization of hostility as a research variable, despite its previously proposed theoretical importance. Based on previous research which examined the relationship between the psychosocial variables of hostility and social support, and how those related to physiological measures and illness symptomology the following predictions were made.

Hypothoses

1) It was hypothesized that hostility and social support were independently associated with resting physiological levels. Specifically, high levels of hostility and low levels of social support were expected to have been associated with higher systolic blood pressure, diastolic blood pressure, heart rate, and respiratory rate.

2) It was hypothesized that hostility and social support were independently associated with chronic pain symptomology. Specifically, high levels of hostility and low levels of social support were expected to have been associated with more difficulty breathing, more fatigue, more depressed mood, more limitations to daily activities, more pain, more stress, and lower perceived conditioning level.

3) It was hypothesized that duration of chronic pain and social support were independently associated with hostility. Specifically, longer duration of chronic pain and low levels of social support were expected to have been associated with higher levels of hostility.
CHAPTER II

METHOD

Participants

Participants were 47 chronic pain patients who began treatment at a pain management clinic in Florida, and who volunteered to participate in the study. The outpatient treatment facility provided services including anesthesiology, psychological assessment, psychotherapy, biofeedback, and physical therapy modalities for treatment of chronic pain. The participant sample consisted of 41 White, 5 Native American, and 1 Black participants. Participants were 25 males and 22 were females. Ages ranged from 29 years to 74 years old, with a mean age of 53.89. Duration of participants' pain ranged from 6 months to 240 months, with a mean duration of 63.57. No discrimination for pain location was made for inclusion in the study. Twenty of the participants were receiving workman's compensation, social security disability, or had a case pending.

Procedure

New patients to the treatment facility were approached for participation in the current research project while they were in the waiting room. Patients were asked by nursing staff to participate in a research project which examined the importance of stress in chronic pain. To participate it was explained that they had to answer four questionnaires, and had to allow access to their medical records to obtain blood pressure, heart rate, and respiratory rate data which was also collected during their first visit. Participants were told that total participation time was approximately 15-20 minutes. Study participants were patients who volunteered to complete the questionnaires and allowed access to their medical records. Following their medical appointment on their
initial visit, participants were escorted to a private testing room where they completed the four questionnaires under the supervision of the researcher who also answered participant questions.

Participants were escorted to treatment rooms where their blood pressure, heart rate, and respiratory rate were taken by a certified nursing assistant as a required part of their medical visit. The same nurse obtained the physiological data from all participants. Next, participants were seen for their medical appointment. At the end of their appointment, participants were escorted to private rooms to complete the four self-report, paper and pencil questionnaires. They read and signed an informed consent form which included a brief overview of the study (see Appendix A). Next they completed the Hostility Questionnaire (HQ), two abbreviated social support scales derived from the Interview Schedule for Social Interaction (ISSI), the Symptoms Rating Scales, and a self-report questionnaire which asked questions concerning pain duration, compensation/disability status, cigarette consumption, alcohol consumption, exercise frequency, exercise duration, and perceived level of physical conditioning. After completion of the self-report instruments, participants were thanked for their participation and informed that a summary of the results would be available after the project was completed.

Instruments

Demographics and pain duration. Participants filled out a questionnaire concerning demographics, age, sex, duration of pain, race, and compensation/disability status (see Appendix B). Participants also answered four items on the questionnaire concerning lifestyle behaviors: the number of cigarettes smoked each day, the number of alcoholic beverages consumed each week, the number of exercise sessions performed each week, and the average duration of their exercise sessions.
Symptoms rating scales. Eleven types of self-report, bipolar chronic pain symptom-relevant experiences made up the paper and pencil questionnaire called the Symptoms Rating Scale (see Appendix C). The bipolar dimensions consisted of Difficulty breathing-Relaxed breathing, Rested-Fatigued, Depressed-Happy, Light headed-Steady, Sense of belonging-Lonely, Tightness-Comfort, Gentle-Angry, Limited-Active, Pain-Relief, Pressured-Calm, and Subdued-Pounding. The six bipolar scales which had the least apparent overlap with other measures used in the study, were included in the data analysis. The six bipolar dimensions included were: Difficulty breathing-Relaxed breathing, Rested-Fatigued, Depressed-Happy, Limited-Active, Pain-Relief, and Pressured-Calm. These scales were named Difficulty Breathing, Fatigue, Depression, Limitations, Pain, and Stress respectively for purposes of analysis and discussion of this study. Twelve-point scales were used to rate degree of these experiences at the time of the testing procedure. All of the bipolar scales were reversed scored for ease of data interpretation, except for the dimension of Rested-Fatigued. Perceived level of physical conditioning was rated on a nine-point Likert scale. That score was obtained from the Participant Survey questionnaire.

Physiological measures. Four physiological health measures were collected at the start of treatment at the pain management facility. A certified nursing assistant trained in collection of blood pressure, heart rate, and respiratory rate, collected these measures from each participant as a routine part of medical appointments for all patients. The four physiological measures used as dependent variables were heart rate, systolic blood pressure, diastolic blood pressure, and respiratory rate. Blood pressure was measured by a sphygmomanometer blood pressure cuff. Heart rate was measured by wrist palpation.

Hostility questionnaire. Participants completed the HQ, which was sometimes also administered at the treatment facility for assessment and treatment purposes (see
Appendix D). To minimize response bias, the HQ was renamed the Stress Survey for purposes of data collection. The HQ was loosely based upon content from the composite Ho scale (Chost) which evaluates the cynicism, anger, and aggression aspects of hostility. The HQ was created as a clinically useful version which reflected thinking, feeling, and action aspects of hostile behavior. These three Chost subscales, especially hostile affect and aggressive responding, contained a limited number of items. Williams & Williams (1993) added 19 items from other hostility measures to the 27 items in the three health risk subscales of the Chost scale, reworded the original items in an attempt to improve its predictive ability and readability, and changed the response format from true-false to a forced choice between two differing responses. This new questionnaire was named the Hostility Questionnaire (HQ), and the three CHD predictive subscales were renamed cynicism, anger, and aggression. High scores were proposed to indicate pathological levels of hostility which were related to CHD. Total scores of 11 or higher suggested that the individual had an increased health risk. The Total HQ score was selected for use in this study instead of the HQ subscales because previous research suggested the subscales had questionable content validity (Witham, 1995).

Witham (1994) administered the HQ to cardiac rehabilitation patients along with the Hutchins Behavior Inventory (HBI) in order to provide construct validation that cynicism, anger, and aggression subscales measured cognitive, emotive, and behavioral aspects of hostility. Results indicated that the HQ measured cognitive and behavioral aspects of hostility better than emotional aspects as indicated by the patterns of correlations with cognitive, emotive, and behavioral HBI scales. Results also indicated that there was substantial subscale overlap on the HQ, and this overlap was consistent with previous research regarding Cook Medley Ho subscales (Barefoot, et al., 1989). Conclusions from the Witham study were that clinical and research use of the HQ should
have focused on the overall HQ score, with usefulness of the three subscales as yet to be
determined. The total HQ mean for the cardiac sample was 13.90 with a range of 3 to 25. For purposes of the current study and to provide further psychometric data for the HQ, 10 day test-retest data was collected. A non-medical, non-psychiatric sample was collected. The participants were 25 healthy, adult volunteers working at four businesses in three different states who were administered the HQ. Ten days later they were retested by filling out the HQ for a second time. The 10 day test-retest correlation for the Total HQ was .79. Correlations for the subscales were: Cynicism, .80, Anger, .80, and Aggression, .60.

**Social support scales.** A 12 item, abbreviated version of the Interview Schedule for Social Interaction (ISSI) was utilized and provided scores for the two dependent measures of social support (see Appendix E). The two scales were named Social Integration, a scale which measured the quantity of people in the social network, and Social Attachment, a scale which measured the quality of social support derived from the people in the individual’s social network (Orth-Gomer, Rosengren, & Wilhelmsen, 1993). The Social Integration (SI) scale consisted of six items which measured size and function of the peripheral social network (range of total social integration scores was 0-26). Four items on the Social Integration scale were scored on a scale ranging from 0-6, and two questions were scored as either 0 or 1. The Social Attachment (SA) scale consisted of six items which measured availability of social support (range of total social attachment scores was 0-6). All items on the Social Attachment scale were scored as either 0 or 1. The items on the SI and SA scales were included after the HQ questions in the packet labeled Stress Survey. Both abbreviated scales have demonstrated adequate internal consistency and split-half reliability. Specifically, correlations for internal consistency ranged from .63 to .76. Correlations for split-half reliability ranged from .59
to.84 (Unden & Orth-Gomer, 1989). Research has demonstrated that the SI and SA scales are moderately, positively associated (Unden & Gomer, 1989). Both the SI and the SA social support scales have been found to prospectively predict CHD morbidity and mortality in the general population independently of other traditional risk factors (Orth-Gomer, et al., 1993). These scales have also been associated with less social and physical activity, less trust, increased smoking, complaints of poor health, and higher levels of depression in general population studies (Unden & Orth-Gomer, 1989).
CHAPTER III

RESULTS

Descriptive statistics for scores on the Hostility Questionnaire (HQ), Social Integration (SI), Social Attachment (SA), physiological measures, and the Symptom Rating Scales are shown in Table 1. SA scores severely violated the multivariate assumption of homoscedacity. Contrary to expectations, the data collected on the SA variable indicated that all participants reported having high quality of social support regardless of the number of people in their social support network. The distribution of SA scores indicated that the data sample may not have been representative of typical patients with chronic pain. The distribution of SA scores made the variable unusable for data analysis in the present study, and it was not included in the multiple correlations.

For purposes of providing psychometric data for the HQ, ten-day test-retest reliability of the HQ and the three HQ subscales were evaluated in a non-medical, non-psychiatric, adult sample of office workers, and the results are shown in Table 2. Reliability of Total HQ and the three HQ subscales was adequate, ranging from .60 to .80. Correlations between the HQ subscales at the first administration of the test-retest data is shown in Table 3. Correlations between the HQ subscales in the chronic pain sample is shown in Table 4.

Hypothesis 1

The first hypothesis predicted that Total HQ scores and SI scores were independently associated with resting physiological measures. Four standard multiple regressions were performed, one for each of the resting physiological measures: systolic blood pressure (SBP), diastolic blood pressure (DBP), heart rate (HR), and respiratory
Table 1

Descriptive Statistics (N=47)

<table>
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<tr>
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<th>Mean</th>
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<th>Min.</th>
<th>Max</th>
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<td>29</td>
<td>74</td>
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<tr>
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<td>SA</td>
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<td>HR</td>
<td>78.68</td>
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</table>

NOTE. Total HQ=Hostility Questionnaire; SI=Social Integration; SA=Social Attachment; Breath=Difficulty Breathing; Conditioning=Perceived Physical Conditioning Level; Depression=Depressed Mood; Limitations=General Limitations to Activities; SBP=Systolic Blood Pressure; DBP=Diastolic Blood Pressure; HR=Heart Rate.

rate (RR). The two independent variables were Total HQ and SI scores. The results are shown in Table 5. Of the four standard multiple regressions performed, the multiple regressions for SBP (R = .39, p = .03) and RR (R = .50, p = .01) were significant. As shown in Table 5, examination of the beta weights indicated that HQ scores contributed
Table 2

Ten-Day Test-Retest Correlations for the HQ and HQ Subscales (N=25)

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<th>Max</th>
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<td>Ang</td>
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<tr>
<td>Agg</td>
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<td>4.60</td>
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</table>

**NOTE.** Total HQ=Total Hostility Questionnaire; Cyn=Cynicism; Ang=Anger; Agg=Aggression.

Table 3

HQ Subscale Intercorrelations in a Non-Medical, Non-Psychiatric Sample (N=25)

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<th>Ang</th>
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<th>Agg</th>
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<td>Ang</td>
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</table>

**NOTE.** Cyn=Cynicism; Ang=Anger; Agg=Aggression.

Table 4

HQ Subscale Intercorrelations in a Chronic Pain Sample (N=47)

<table>
<thead>
<tr>
<th>Variable</th>
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<td>Agg</td>
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</tbody>
</table>

**NOTE.** Cyn=Cynicism; Ang=Anger; Agg=Aggression.
Hypothesis 1

The first hypothesis tested the prediction that hostility and social isolation were independently associated with increased chronic pain symptomology. Seven standard multiple regressions were performed, one for each of the seven dependent variables: Difficulty Breathing, Conditioning Level, Depression, Fatigue, Limitations, Pain, and Stress. As shown in Table 6, of the seven multiple regressions performed, Difficulty Breathing ($R = .48, p = .01$), Depression ($R = .41, p = .02$), Fatigue ($R = .45, p = .05$), and SI scores did not contribute significant independent associations with any of the four resting physiological measures. These results partially supported the hypothesis, and indicated that when independent associations of Total HQ scores and SI scores are examined, higher Total HQ scores were associated with increased resting RR and increased resting SBP. SI scores were not independently associated the four resting physiological measures.

Hypothesis 2

The second hypothesis tested the prediction that hostility and social isolation were independently associated with increased chronic pain symptomology. Seven standard multiple regressions were performed, one for each of the seven dependent variables: Difficulty Breathing, Conditioning Level, Depression, Fatigue, Limitations, Pain, and Stress. As shown in Table 6, of the seven multiple regressions performed, Difficulty Breathing ($R = .48, p = .01$), Depression ($R = .41, p = .02$), Fatigue ($R = .45, p = .05$, and Pain ($R = .43, p = .03$) showed significant, positive, independent associations with SBP and RR. SI scores did not contribute significant independent associations with any of the four resting physiological measures. These results partially supported the hypothesis, and indicated that when independent associations of Total HQ scores and SI scores are examined, higher Total HQ scores were associated with increased resting RR and increased resting SBP. SI scores were not independently associated the four resting physiological measures.

Table 5

<table>
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<tr>
<th>Variables</th>
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</table>

Note: Total HQ=Total Hostility Questionnaire; SI=Social Integration; SBP=Systolic Blood Pressure; DBP=Diastolic Blood Pressure; HR=Heart Rate.

* $p < .05$
Table 6

Multiple Regressions for Total HQ and SI Scores on Chronic Pain Symptoms (N=47)

<table>
<thead>
<tr>
<th>Variables</th>
<th>R</th>
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<th>Beta</th>
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</table>

Note: Total HQ = Total Hostility Questionnaire; SI = Social Integration; Breathing = Difficulty Breathing; Conditioning = Perceived Level of Physical Conditioning; Depression = Depressed Mood; Limitations = General Limitations to Activities
* p < .05

.01), and Stress (R = .40, p = .02) were significant. As shown in Table 6, examination of
the beta weights indicates that HQ scores contributed significant independent
associations with Difficulty Breathing, Depression, Fatigue, and Stress. SI scores did not
contribute significant independent associations any of the seven chronic pain symptom
measures. These results partially supported the hypothesis, and indicated that when
independent associations of Total HQ scores and SI scores were examined
simultaneously, Total HQ scores were independently associated with perceptions of increased difficulty breathing, increased depressed mood, increased fatigue, and increased stress in this sample of chronic pain patients. SI scores were not independently associated with chronic pain symptoms.

**Hypothesis 3**

The third hypothesis tested the prediction that duration of chronic pain and social isolation was independently associated with hostility levels. A standard multiple regression was performed. The two independent variables were duration of pain and SI scores, and the dependent variable was HQ scores. As shown in Table 7, the multiple regression was significant ($R = .39, p = .03$). As shown in Table 7, examination of the beta weights indicated that pain duration was independently associated HQ scores. SI scores was not significantly associated with HQ scores. The results partially supported the hypothesis, and indicated that when independent associations of duration of pain and SI scores were examined simultaneously, duration of pain was independently positively associated with hostility in this sample of chronic pain patients. SI scores were not independently associated with hostility.

**Table 7**

**Multiple Regression for Pain Duration and SI Scores on HQ Scores (N=47)**

<table>
<thead>
<tr>
<th>Variables</th>
<th>R</th>
<th>B</th>
<th>SE B</th>
<th>Beta</th>
<th>T</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total HQ</td>
<td>.39*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain Duration</td>
<td></td>
<td>.05</td>
<td>.02</td>
<td>.38</td>
<td>2.80</td>
<td>.01</td>
</tr>
<tr>
<td>SI</td>
<td></td>
<td>-.10</td>
<td>.21</td>
<td>-.06</td>
<td>-.45</td>
<td>.65</td>
</tr>
</tbody>
</table>

*Note: Total HQ=Total Hostility Questionnaire; SI=Social Integration.
* p < .05
CHAPTER IV

DISCUSSION

the study were: 1) that hostility and social support were independently associated with resting physiological levels in chronic pain patients, 2) that hostility and social support were independently associated with self-reported chronic pain symptoms, and 3) that duration of experiencing chronic pain and social support were independently associated with hostility levels.

The results obtained provided partial support for all three hypotheses. Overall, hostility was independently associated with resting two of the four measured physiological levels, hostility was also independently associated with four of the seven chronic pain symptoms, and duration of chronic pain was independently associated with hostility levels. Contrary to expectations the measures of social support examined in the current study, social integration (SI) and social attachment (SA) scores were not independently related to resting physiological levels, chronic pain symptoms, or duration of pain.

Results indicated that hostility levels were positively associated with resting systolic blood pressure and respiratory rate in this sample of chronic pain patients. Previous research had demonstrated that hostility is related to physiological reactivity to interpersonal stress (Suls & Wan, 1993; Williams & Williams, 1993), but results for non-interpersonal stress and resting physiological levels had been inconsistent (Smith & Houston, 1987; Suarez & Williams, 1989; Suls & Wan, 1993). Based on this, the current results might suggest that the context in which the data were collected (being a new patient receiving a medical evaluation for chronic pain) was threatening enough to activate interpersonal trait hostility in hostile individuals (Reid, et al., 1991), and activation of hostility may have resulted in the observed elevations systolic blood pressure and respiratory rate.
Results also indicated that hostility was positively associated with self-reported chronic pain symptoms. The current results suggest that hostility levels were positively associated with perceived difficulty breathing, depressed mood, fatigue, and stress. The nature of this relationship can not be determined due to the correlational nature of the current research design. Possible explanations for this relationship are; 1) that high hostility levels facilitate physiological processes which aggravate chronic pain symptoms, 2) that highly hostile chronic pain patients are hypersensitive to some aspects of their symptoms, and/or 3) experiencing more severe chronic pain symptoms facilitates development of hostility.

Finally, results indicated that duration of pain was positively associated with hostility levels. That finding was interpreted as an indication that the longer an individual lived with the symptoms and/or the stressful environmental context of chronic pain, the more likely the individual was to develop higher levels of the trait characteristic of hostility. However, that result may also have been interpreted as indicating that hostile chronic pain patients "held on" to their chronic pain experience due to secondary gain issues. These secondary gain issues may have occurred, if chronic pain patients used pain as a way of manipulating others, if they resisted return to prior life roles and responsibilities, if they obtained compensation, if they received desired medication, and if they received attention and social contact.

The finding that hostility was associated with depression was consistent with the research of Wade et al. (1990) which demonstrated an association between anger and depression in chronic pain patients. Results of the current study regarding social support were contradictory to previous research which had demonstrated associations of social support with health morbidity and mortality (House, et al., 1988; Uchino, et al. 1996) and cardiovascular activity (Gerin, et al., 1992; Kamarack, et al., 1990; Lepore, et al., 1993).
Although theory and research indicated that hostility and social support are strongly related processes (Allred & Smith, 1991; Newton & Kiecolt-Glaser, 1995; Ornish, 1990; Pope, et al., 1990; Smith, 1992; Snyder & Swann, 1978; Williams & Williams, 1993), a surprising result of the present study was that these variables, as measured by the HQ, SI, and SA demonstrated little relationship with each other.

Overall, the results indicated that interpersonal hostility was associated with chronic pain symptomology and resting physiological activity. These results indicated that hostility was an important factor to consider in evaluation, treatment, and research of chronic pain patients. Social support, as measured by the SI and SA, did not appear to be important in regards to chronic pain symptoms and resting physiological activity in the sample of chronic pain patients who participated in the study. This was contradictory to previous research which indicated an importance of social support in the experience of chronic pain (Fishman, et al., 1995; Goldberg, et al., 1993; Isacsson, et al., 1995).

Causal interpretive statements regarding the impact of hostility on the chronic pain experience can not be made based upon the correlational nature of the current study. Chronic pain was an experience which has been associated with many stresses. These stresses included the pain itself, real or perceived mistrust from other people, real or perceived mistreatment from attorneys, insurance providers, work, and treatment professionals, failure of the patient and treatment professionals to cure the pain problem, multiple types of treatment, financial burdens, changes in life roles and relationships, strained social relationships, and existential concerns of meaningfulness and purpose (Carey, 1994; Reid, et al., 1991). The perceived stress of the chronic pain context may be more severe for the hostile person. High levels of interpersonal trait hostility may have made the person more likely to perceive their chronic pain symptoms as having been more severe because of their frequent hostile perceptions and interactions with their
environment elevated the stress response. The stress enhancing preconception of an already stressful experience may have worn the hostile chronic pain patient down, and contributed to feelings of depression, fatigue, chronic stress, and difficulty breathing, as well as to higher respiratory rate and systolic blood pressure. Another interpretive possibility is that the hypervigilance which has been proposed to exist in hostile individuals (Hardy & Smith, 1988; Smith, 1992; Suarez, et al., 1991; Williams, 1994) may have made them more aware and hypersensitive to the symptoms associated with chronic pain.

Another possible interpretation of these results is that people who experienced more severe stress-related symptoms became more hostile and angry as they attempted to cope with the multiple, chronic stresses of chronic pain. They may have developed higher levels of hostility the longer they interacted with skeptical people, experienced ineffective treatments, and had conflictual interactions with the legal system, work, and their social network (Carey, 1994; Reid, et al., 1991; Tarasuk & Eakin, 1994). The development of hostility may have increased over time and resulted in development, or exacerbation of, hostility levels.

Finally, these results may have reflected a tendency for hostile patients with chronic pain to have interacted or manipulated their environment to help them in order to have improved their chances of acquiring desired treatment, to have demonstrated ineffectiveness of treatment, or to have improved their chances of obtaining sizable compensation (Payne & Norfleet, 1986; Voulgari, et al., 1991). Whatever the nature of the relationship, the association between hostility, anger, and chronic pain-related symptoms was consistent with theory and research on the chronic pain experience (Bates, et al., 1993; Engel, 1959; Melzack & Wall, 1965; Payne & Norfleet, 1986; Turk, et al.,
which suggested that hostility and anger were important processes in health, and symptom perceptions of chronic pain patients.

Methodological limitations of the current study may have led to underestimation of the importance of hostility and social support in the chronic pain experience. The method of participant selection may have reduced associations. Participants were volunteers who began treatment at the facility on the same day as they participated in the study. Participant self-selection bias may have occurred, possibly in such a way that those with high hostility levels refused participation because of their cynical mistrust of the environment. If this selection bias occurred, a disproportionate percentage of the tested sample would have consisted of chronic pain patients who scored in the low to average range of hostility, with under-representation of those who had high levels of hostility. Since high hostility levels have been those associated with elevated physiological activity and unhealthy lifestyle behaviors, the hostility-physiological activity and hostility-lifestyle behaviors relationships may have been reduced by this possible selection bias. This possibility is strengthened when the demographic data are examined. The data indicate that older, non-compensation chronic pain patients may have been over-represented in this sample. Therefore, results based on this sample may not generalize to other groups of chronic pain patients, particularly inpatient and chemically dependent patent populations.

This possibility was further supported by comparing HQ means of the chronic pain sample and the normal sample used for test-retest data. Although hostility scores were theoretically expected to be higher in chronic pain patients than in a non-medical, non-psychiatric sample (Carey, 1994; Reid, et al., 1991; Tarasuk & Eakin, 1994), the non-medical, non-psychiatric sample actually had a mean HQ score 2.6 (16.48 vs. 13.87) points higher at testing, and 0.9 (14.72 vs. 13.87) points higher than the chronic pain
patients at their two testing sessions. This further indicated that the chronic pain sample may not have been representative of chronic pain patients in general, and this may have reduced the association of hostility and social support on chronic pain symptoms and resting physiological activity and chronic pain symptoms. Furthermore, if participants generally lower in hostility were self-selected for participation in the study, this may have explained why SA scores severely violated the homoscedasticity assumption. Since hostility and social support have been suggested as theoretically correlated variables (Allred & Smith, 1991; Newton & Kiecolt-Glaser, 1995; Ornish, 1990; Pope, et al., 1990; Smith, 1992; Snyder & Swann, 1978; Williams, 1993), any selection bias for low hostile people may have also selected for participants who had high levels of social support as measured by the SA score.

Regarding social support, the social support scales utilized have been found to be related to health, physiological activity, and lifestyle behavior in large and small scale general population studies (Orth-Gomer & Unden, 1990; Orth-Gomer, et al., 1993; Unden & Orth-Gomer, 1989). Only the SI scale (a measure of the quantity of people in the social network) was evaluated in statistical analyses in the present study because the distribution of SA scores (a measure of the quality of social support from those in the social network) violated multivariate statistical assumptions (Tabachink & Fidell, 1989). The SI and SA scores have demonstrated good psychometric properties and research utility in previous research (Unden & Orth-Gomer, 1989). Participants in the study were volunteers, and self-selection bias may have occurred such that patients with high quality of social support were over-represented. Therefore the distribution of scores indicated that the sample of patients with chronic pain who participated in the present study were not representative of patients with chronic pain in general.
The measures of social support utilized in the current study also may not have been specific enough to have demonstrated relationships with the chronic pain experience. In a review of the social support and health literature, Uchino, et al., (1996) reported familial support was important to consider in studies which examined physiological levels. The measures in the current study did not specifically examine familial support. Utilization of different social support measures may have been useful for the small sample of chronic pain patients who participated. It may have been the case that measures of social support which would have distinguished between support which reinforced adaptive pain management behavior, and support which reinforced pain behaviors would have been beneficial. Utilization of the Multidimensional Pain Inventory (MPI) would have permitted this type of distinction (Kerns, Turk, & Rudy, 1985; Turk & Rudy, 1990).

There were also limitations regarding the context in which the physiological measures were assessed in the current study. The literature on hostility and social support has demonstrated consistent effects of interpersonal stress on physiological activity in people high in hostility and in people low in social support (Burns & Katkin, 1993; Christensen & Smith, 1993; Gerin, et al., 1992; Hardy & Smith, 1988; Jamner, et al., 1991; Kamarack, et al., 1990; Lepore, et al., 1993; Lepore, 1995; Musante, et al., 1992; Pickering, 1992; Powch & Houston, 1996; Smith & Allred, 1989; Smith & Brown, 1991; Suarez, et al., 1991; Suarez, et al., 1993; Suarez & Williams, 1989; Suarez & Williams, 1990; Uchino, et al., 1996; Weidner, et al., 1989), but there have been inconsistent effects of non-interpersonal stress reactivity and resting physiological activity (Burns, et al., 1992; Burns, et al., 1993; Carroll, et al., 1997; Leon, et al., 1988; Jamner, et al., 1993; Linden, et al., 1993; McCranie, et al., 1986; Pope & Smith, 1991; Shekelle, et al., 1983; Smith, & Houston, 1987; Spicer & Chamberlain, 1996; Spoth, et
al., 1992). Exposure to an interpersonal stressor during measurement of physiological activity would have been theoretically more relevant to examination of relationships for hostility and social support because these variables are interpersonal processes.

Finally, the size of the sample was another limitation of the current study. This small sample size made it more difficult to find significant relationships between highly variable measures, such as blood pressure measures, and may have been responsible for diastolic blood pressure not achieving significance in multivariate analysis. The small sample size, in conjunction with some highly variable measures, also prevented stratification of the sample into groups or categories which may have been relevant to the hostility, social support-chronic pain relationship, such as compensation status, duration of pain, and sex of participant.

Although it has been reported that prospective data are in the process of being collected on the HQ (Williams & Williams, 1993), the HQ had little psychometric data available at the time of this study. The present study addressed this shortcoming of the HQ and it's three subscales. Ten-day test-retest reliability correlations were conducted during the course of this study, and utilized a non-medical, non-psychiatric sample. Results indicated that the HQ and it's three subscales (Cynicism, Anger, and Aggression) demonstrated adequate reliability, with correlations which ranged from .79 to .80 for all scores except the Aggression subscale which had a correlation of .60. When subscale correlations for the different samples (chronic pain, cardiac, and non-medical/non-psychiatric) were examined, it indicated substantial differences. The differing patterns may have indicated that different populations differ in their experience and expression of the cognitive, affective, and behavioral aspects of hostility.

Some of the limitations of the present research could easily be overcome. For example, all of the self-report instruments could be included as part of the intake
information obtained from new patients. This would minimize participant self-selection bias which appears to have occurred in the present research due to the use of volunteers. Increasing the sample size would also be beneficial, and would be achieved by including questionnaires in the intake information for all new patients.

In conclusion, the results of the present study indicated that hostility, as assessed by the HQ, was an important factor in the experience of chronic pain-related symptoms and resting physiological levels. SI and SA measured social support did not appear to be an important process in relation to these measures utilized in this chronic pain sample. In the present study, levels of hostility were positively associated with respiratory rate, systolic blood pressure, fatigue, stress, difficulty breathing, and depressed mood. Duration of pain was also positively associated with hostility. That the association between hostility and both resting physiological levels and chronic pain symptoms was significant study participants reporting high quality of social support and scoring relatively low on hostility, and suggests that the relationship may have been particularly strong. This research supported the notion that hostility was a theoretically important variable in general health and physiological functioning, and extended those findings by demonstrating a relationship between hostility and chronic pain symptoms. Research has consistently substantiated the theory that hostility is a significant psychosocial health risk factor (Baker, et al., 1984; Barefoot, et al., 1989; Bates, et al., 1993; Costa, et al., 1986; Dembroski & Costa, 1987; Diamond, 1982; Hecker, et al., 1988; Helgeson, 1991; Joesoef, et al., 1989; Julkunen, et al., 1994; Krantz, et al., 1988; Matthews, 1988; Matthews, et al., 1977; McCann & Matthews, 1988; Melzack & Wall, 1965; Payne & Norfleet, 1986; Ruberman, et al., 1984; Shekelle, et al., 1983; Turk, et al., 1987; Welin, et al., 1985; Williams, 1994; Williams, et al., 1988, Williams, et al., 1985; Williams, et al., 1980; Williams & Williams, 1993). Yet most of the previous literature focused on
the role of hostility in cardiac disease, despite some research which demonstrated hostility’s associations with other illnesses (Barefoot, et al., 1989; Julkunen, et al., 1994; Joesoef, et al., 1989; Shekelle, et al., 1983). When the wealth of data which indicated that hostility was an important psychosocial health risk factor was considered, the finding that duration of the pain experience was related to hostility levels indicated that duration of chronic pain may have important health consequences which extended beyond pain and pain-related symptoms.

The results of the present study suggested that research should more fully examine hostility’s role in illness other than cardiac disease, and chronic pain should be included in this illness analysis. Previous research on the process of chronic pain had included little formal examination of hostility, and focused instead upon the importance of depression (Atkinson, et al., 1988; Burns, et al., 1996; Deardorff, et al., 1993; Fordyce, et al., 1992; Spinhoven, et al., 1991; Swimmer, et al., 1992). The present results suggested that subsequent chronic pain research should include examination of the construct of hostility, and that evaluation and treatment of interpersonal hostility in chronic pain treatment programs may improve treatment outcomes. Considering the particular symptom complaints of patients with higher levels of hostility who participated in this study (more difficulty breathing, more depression, more fatigue, and more stress), and the findings of higher respiratory rate and systolic blood pressure, chronic pain therapeutic interventions may benefit from inclusion of relaxation training and stress management training in addition to hostility reducing strategies. Williams and Williams (1993) outlined a number of treatment strategies for hostility reduction. These strategies included thought stopping, hostility behavioral mapping, relaxation training, use of laughter and humor, enhancing spirituality, living in the present moment, rational thinking, assertiveness training, community service, and practicing forgiveness and
tolerance. Most of these interventions have previously been found to be effective for reducing feelings of social isolation, and they have already been utilized in treatment programs emphasizing the illness healing aspects of social connectedness (Ornish, 1990). These types of psychotherapeutic interventions may be important adjuncts to chronic pain management, and may be particularly useful for those patients who have high levels of interpersonal hostility.
APPENDIX A

INFORMED CONSENT
Informed Consent

I, ____________________________, agree to participate in a study investigating stress and health. I will answer three brief questionnaires regarding stress and daily experiences. I also agree to allow access to my medical records to obtain information on blood pressure, heart rate, and respiratory rate.

I understand that the test instruments takes about 30 minutes to complete. I also understand that I will complete these instruments only once. I understand that my answers and identity will be kept confidential. Under this condition, I agree that results obtained from this research may be used in any way thought best for publication or education.

I understand that there is no personal risk or discomfort directly involved with this research, and that I am free to withdraw my consent and stop participation in this study at any time. If I have any problems that arise in connection with my participation in this study, I should contact Kevin Witham, the investigator at:
(M, W, F: 407-740-0007)
(T, TH: 904-735-3313).

______________________________  ______________________________
Date                               Signature of Participant

______________________________  ______________________________
Date                               Investigator
APPENDIX B

PARTICIPANT SURVEY
Participant Survey

1) Sex: ___________

2) Age: ___________

3) How long have you been in pain? ___________

4a) Are you receiving Social Security Disability? Yes ___ No ___

4b) Are you receiving workers compensation, or have a case pending? Yes___ No___

5) Race (circle one): Caucasian African American
                        Asian Hispanic Native American

6) How many cigarettes/cigars do you smoke per day? ___________

7) How many alcoholic beverages do you consume in one week? ___________

For the next question exercise is defined as strenuous, continuous activity which you perform for health or pleasure (ie. 20 minutes of walking, 20 minutes of riding a bike, lifting weights)....Work, chores, and activities where you stop frequently (ie. tennis, golf) don’t count as exercise even though you exert yourself during these activities.

Types of exercise: Stretching
                Strengthening (lifting weights)
                Cardiovascular (riding a bike, fast walking, continuous swimming)

8) Number of times per week you exercise (lift weights, stretch, aerobic exercise)? ______

8a) How long are your exercise sessions? ___________

8b) What do you consider to be your current physical conditioning level (circle one):

   1  2  3  4  5  5  7  8  9
   Excellent Very Good Good Fairly Good Average Somewhat Bad Bad Very Bad Terrible
APPENDIX C

SYMPTOM RATING SCALES
<table>
<thead>
<tr>
<th>Difficulty Breathing</th>
<th>-6 -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5 +6</th>
<th>Relaxed Breathing</th>
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</thead>
<tbody>
<tr>
<td>Rested</td>
<td>-6 -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5 +6</td>
<td>Fatigued</td>
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<tr>
<td>Depressed</td>
<td>-6 -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5 +6</td>
<td>Happy</td>
</tr>
<tr>
<td>Shift Position</td>
<td>-6 -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5 +6</td>
<td>Sit Still</td>
</tr>
<tr>
<td>Sense of Belonging</td>
<td>-6 -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5 +6</td>
<td>Lonely</td>
</tr>
<tr>
<td>Muscles Tense</td>
<td>-6 -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5 +6</td>
<td>Muscles Relaxed</td>
</tr>
<tr>
<td>Close with Others</td>
<td>-6 -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5 +6</td>
<td>Angry</td>
</tr>
<tr>
<td>Activities Limited</td>
<td>-6 -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5 +6</td>
<td>Active</td>
</tr>
<tr>
<td>Pain</td>
<td>-6 -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5 +6</td>
<td>Relief</td>
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<tr>
<td>Pressured</td>
<td>-6 -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5 +6</td>
<td>Calm</td>
</tr>
<tr>
<td>Subdued</td>
<td>-6 -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5 +6</td>
<td>Pounding</td>
</tr>
</tbody>
</table>
APPENDIX D

HOSTILITY QUESTIONNAIRE
HQ Scoring

Score one point for each item endorsed which matches the responses below. Sum the totals for the three subscales to obtain the Total HQ score.

Cynicism: 3(B), 4(A), 7(A), 10(A), 14(B), 18(A), 21(A), 22(B), 27(A), 30(A), 34(A), 37(A), 40(B), 43(A), 46(B)

Anger: 1(B), 6(B), 9(B), 13(B), 16(A), 19(A), 23(A), 24(B), 29(A), 32(A), 35(A), 36(B), 39(A), 42(B), 45(A)

Aggression: 2(A), 5(B), 8(A), 11(B), 12(A), 15(A), 17(B), 20(B), 25(B), 26(A), 28(B), 31(B), 33(B), 38(B), 41(A), 44(B)
Instructions: Please read each item carefully and circle the one choice which best applies to you. Please answer all items.

1. A teenager drives by my yard with the car stereo blaring acid rock.
   A. I begin to see why teenagers can't hear.
   B. I can feel my blood pressure starting to rise.

2. The person who cuts my hair trims off more than I wanted.
   A. I tell him or her what a lousy job he or she did.
   B. I figure it'll grow back, and I resolve to give my instructions more forcefully next time.

3. I am in the express checkout line at the supermarket, where a sign reads: "No more than 10 items, please!"
   A. I pick up a magazine to pass the time
   B. I glance ahead to see if anyone has more than ten items.

4. Many large cities have a visible number of homeless people.
   A. I believe that the homeless are down and out because they lack ambition.
   B. The homeless are victims of illness or some other misfortune.

5. There have been times when I was very angry with someone.
   A. I was always able to stop short of hitting them.
   B. I have, on occasion, hit or shoved them.

6. The newspaper contains a prominent news story about drug-related crime.
   A. I wish the government had better educational/drug programs, even for pushers.
   B. I wish we could put every drug pusher away for good.

7. The prevalence of AIDS has reached epidemic proportions.
   A. This is largely the result of irresponsible behavior on the part of a small proportion of the population.
   B. AIDS is a major tragedy

8. I sometimes argue with a friend or relative.
   A. I find profanity an effective tool.
   B. I hardly ever use profanity.

9. I am stuck in a traffic jam.
   A. I usually am not particularly upset.
   B. I quickly start to feel irritated and annoyed.
10. There is a really important job to be done.
   A. I prefer to do it myself
   B. I am apt to call on my friends or co-workers to help.

11. Sometimes I keep my angry feelings to myself.
   A. Doing so can often prevent me from making a mountain out of a molehill.
   B. Doing so is usually a bad idea.

12. Another driver butts ahead of me in traffic.
   A. I usually flash my lights or honk my horn.
   B. I stay farther back behind such a driver.

13. Someone treats me unfairly.
   A. I usually forget it rather quickly.
   B. I am apt to keep thinking about it for hours.

14. The cars ahead of me on an unfamiliar road start to slow and stop as they approach a curve.
   A. I assume there is a construction site ahead.
   B. I assume someone had a fender bender.

15. Someone expresses an ignorant belief.
   A. I try to correct him or her.
   B. I am likely to let it pass.

16. I am caught in a slow-moving bank or supermarket line.
   A. I usually start to fume at people who dawdle ahead of me.
   B. I seldom notice the wait.

17. Someone is being rude or annoying.
   A. I am apt to avoid him or her in the future.
   B. I might have to get rough with him or her.

18. An election year rolls around.
   A. I learn anew that politicians are not to be trusted.
   B. I am caught up in the excitement of pulling for my candidate.

19. An elevator stops too long on a floor above where I am waiting.
   A. I soon start to feel irritated and annoyed.
   B. I start planning the rest of my day.
20. I am around someone I don't like.
   A. I try to end the encounter as soon as possible.
   B. I find it hard not to be rude to him or her.

21. I see a very overweight person walking down the street.
   A. I wonder why this person has such little self-control.
   B. I think that he or she might have a metabolic defect or a psychological problem.

22. I am riding as a passenger in the front seat of a car.
   A. I take the opportunity to enjoy the scenery.
   B. I try to stay alert for obstacles ahead.

23. Someone criticizes something I have done.
   A. I feel annoyed.
   B. I try to decide whether the criticism is justified.

24. I am involved in an argument.
   A. I concentrate hard so that I can get my point across.
   B. I can feel my heart pounding, and I breathe harder.

25. A friend or co-worker disagrees with me.
   A. I try to explain my position more clearly.
   B. I am apt to get into an argument with him or her.

26. Someone is speaking very slowly during a conversation.
   A. I am apt to finish his or her sentences.
   B. I am apt to listen until he or she finishes.

27. If they were put on the honor system, most people wouldn't sneak into a movie theater without paying.
   A. That's because they are afraid of being caught.
   B. It's because it would be wrong.

28. I have strong beliefs about rearing children.
   A. I try to reward mine when they behave well.
   B. I make sure that they know what the rules are.

29. I hear news of another terrorist attack.
   A. I feel like lashing out.
   B. I wonder how people can be so cruel.
30. I am talking with my spouse, boyfriend, or girlfriend.
   A. I often find my thoughts racing ahead to what I plan to say next.
   B. I find it easy to pay close attention to what he or she is saying.

31. There have been times in the past when I was really angry.
   A. I have never thrown things or slammed a door.
   B. At times I have thrown something or slammed a door.

32. Life is full of little annoyances.
   A. They often seem to get under my skin.
   B. They seem to roll off my back unnoticed.

33. I disapprove of something a friend has done.
   A. I usually keep such disapproval to myself.
   B. I usually let him or her know about it.

34. I am requesting a seat assignment for an airline flight.
   A. I usually request a seat in a specific area of the plane.
   B. I generally leave the choice to the agent.

35. I feel a certain way nearly every day of the week.
   A. I feel grouchy some of the time.
   B. I usually stay on an even keel.

36. Someone bumps into me in a store.
   A. I pass it off as an accident.
   B. I feel irritated at the person's clumsiness.

37. My spouse, boyfriend, or girlfriend is preparing a meal.
   A. I keep an eye out to make sure nothing burns or cooks too long.
   B. I either talk about my day or read the paper.

38. A friend calls at the last minute to say that he/she is "too tired to go out tonight," and I'm stuck with a pair of $15 tickets.
   A. I try to find someone else to go with.
   B. I tell my friend how inconsiderate he or she is.

39. I recall something that angered me previously.
   A. I feel angry all over again.
   B. The memory doesn't bother me nearly as much as the actual event did.
40. I see people walking around in shopping malls.
   A. Many of them are either shopping or exercising.
   B. Many are wasting time.

41. Someone is hogging the conversation at a party.
   A. I look for an opportunity to put him or her down.
   B. I soon move to another group.

42. At times, I have to work with incompetent people.
   A. I concentrate on my part of the job.
   B. Having to put up with them ticks me off.

43. My spouse, boyfriend, or girlfriend is going to get me a birthday present.
   A. I prefer to pick it out myself.
   B. I prefer to be surprised.

44. I hold a poor opinion of someone.
   A. I keep it to myself.
   B. I let him or her know about it.

45. In most arguments I have, the roles are consistent.
   A. I am the angrier one.
   B. The other person is angrier than I am.

46. Slow-moving lines can often be found in banks and supermarkets.
   A. They are an unavoidable part of modern life.
   B. They are often due to someone's incompetence.
APPENDIX E

SOCIAL INTEGRATION AND SOCIAL ATTACHMENT SCALES
**SI Scoring**

Points for questions 1-4: \( A=0, \ B=1, \ C=2, \ D=3, \ E=4, \ F=5, \ G=6 \)

Points for questions 5-6: \( A=0, \ B=1 \)

SI Score = Total points for questions 1-6 (range = 0-26)

**SA Scoring**

Points for questions 7-12: \( A=0, \ B=1 \)

SA Score = Total points for questions 7-12 (range = 0-6)
47. Number of people met during an ordinary week.
   A. 0  B. 1-2  C. 3-4  D. 5-6  E. 7-10  F. 10-15  G. More than 15

48. Number of people with whom you share interests.
   A. 0  B. 1-2  C. 3-4  D. 5-6  E. 7-10  F. 10-15  G. More than 15

49. Number of friends who at any time would come and visit your home and wouldn't be embarrassed if it were untidy.
   A. 0  B. 1-2  C. 3-4  D. 5-6  E. 7-10  F. 10-15  G. More than 15

50. Number of friends or family members with whom you can talk frankly.
   A. 0  B. 1-2  C. 3-4  D. 5-6  E. 7-10  F. 10-15  G. More than 15

51. Is there someone whom you can ask small favors?
   A. YES  B. NO

52. Is there someone available - apart from family - to whom you can turn in times of difficulties?
   A. YES  B. NO

53. Do you have someone special, whom you can lean on?
   A. YES  B. NO

54. Do you have someone who feels very close to you?
   A. YES  B. NO

55. Do you have someone to share feelings with?
   A. YES  B. NO

56. Do you have someone to confide in?
   A. YES  B. NO

57. Do you have someone to hold and comfort you?
   A. YES  B. NO

58. Is there someone at home, who really appreciates what you do for him/her?
   A. YES  B. NO
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