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## Prediction of trauma responses following myocardial infarction

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Prediction of Trauma Responses Following Myocardial Infarction

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Dissertation submitted to the

College of Arts and Sciences

at West Virginia University

in partial fulfillment of the requirements

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Doctor of Philosophy

in

Clinical Psychology

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## ABSTRACT

### Prediction of Trauma Responses Following Myocardial Infarction

Risa Nakase Thompson

For survivors of MI, the most common subsequent psychological complications include anxiety and depression. Recent interest has increased in examining the incidence of anxiety disorders, including Post-Traumatic Stress Disorder (PTSD), among post-MI patients. The purpose of this study was to prospectively evaluate trauma responses among a consecutive sample of post-MI patients. Forty - six post MI patients completed questionnaires and forty completed structured interviews during their initial hospitalization for MI. Six of these individuals reported acute stress disorder symptoms in response to their MI. These six patients scored significantly higher on most measures of PTSD. Thirty -two individuals completed a follow-up assessment of PTSD symptoms. Eight individuals (30%) reported symptoms sufficient for a diagnosis of PTSD; five of whom had subclinical symptoms during Phase One. Younger age, lower levels of perceived social support from family, and less use of avoidant coping style significantly predicted PTSD measures at follow-up. Physician ratings of distress, perceived distress during MI, anticipated disability as a result of MI, and prior exposure to more traumatic events significantly correlated with PTSD measures, but they did not add unique variance in the regression models. Objective measures of the severity of the MI (peak cardiac enzymes, ejection fraction, and length of stay) did not correlate with number or severity of PTSD responses. Finally, prior exposure to traumatic events significantly predicted overall psychological distress. These findings suggest that PTSD is a common reaction to MI and that efforts to assess this treatable anxiety disorder, using multidisciplinary teams including mental health professionals should be encouraged.

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## Prediction of Trauma Responses Following Myocardial Infarction

Coronary heart disease (CHD) is the leading cause of death for men and women in western industrialized nations (Smith & Leon, 1992). CHD is a condition in which the blood flow through the coronary arteries to the heart muscles is reduced resulting in either myocardial ischemia (e.g., angina) or myocardial infarction (MI; heart attack; Roberts, Morris, Pratt, & Alexander, 1994). A MI occurs when a portion of the myocardium is deprived of its' blood supply for a period of time, resulting in the necrosis/death of heart muscle tissue. Approximately 1.5 million individuals experience a MI in the United States each year, and over 500,000 die from this disease annually (American Heart Association, 1989). This translates to 1,500 deaths per day or one fatality per minute. Since the 1960's, CHD has been the leading cause of death in both men and women by the age of 40 and remains the number one killer of Americans throughout the remainder of life (Smith & Leon).

### Clinical Presentation of MI

The typical symptom profile for an individual experiencing an acute MI includes chest discomfort, described as aching, burning, crushing, squeezing, feeling heavy, or swelling up, and discomfort that radiates over the anterior of the chest and into the left or both arms and/or the neck or jaw (Roberts et al., 1994). Other symptoms may include dyspnea (difficult/labored respiration), diaphoresis (perspiration), nausea, vomiting, belching, syncope, acute confusion, agitation, palpitations, urge to defecate, and weakness/fatigue (Roberts et al.; Smith & Leon, 1992). Despite the prevalence of these fairly obvious symptoms, in approximately one-quarter to one-third of all MI cases, symptoms are absent or non-specific symptoms go misinterpreted, and myocardial damage is only revealed on a subsequent electrocardiogram (ECG; Kannal & Abbott,



1984). Thus, a MI can vary across individuals in terms of symptoms experienced and presentation to the medical setting.

### Psychological Complications Associated with MI

For survivors of MI, the most common subsequent psychological complications include anxiety and depression (Roberts et. al., 1994; Wenger, 1994). Estimates have revealed that approximately 40 to 80 percent of MI patients experience some type of emotional disturbance following their heart attacks (Byrne, & Whyte, 1978; Cassem & Hackett, 1971; Hackett & Cassem, 1969; Lloyd & Cawley, 1982; Naismith, Robinson, Shaw, & McIntyre, 1979; Rosen, & Bibring, 1966; Stern, Pascale, & McLoone, 1976; Wiklund, Sanne, Elmfeldt, Vedin, & Wilhelmsson, 1984a; Wiklund, Sanne, Vedin, & Wilhelmsson, 1984b). Specific disturbances cited have included depression, anxiety, irritability, excessive autonomic stimulation, disturbances in memory and concentration, preoccupation with cardiac problems, sleep disturbances, and nightmares (Byrne, & Whyte, 1978; Cassem & Hackett, 1971; Hackett & Cassem, 1969; Lloyd & Cawley, 1982; Naismith, et. al., 1979; Rosen & Bibring, 1966; Stern et al., 1976; Wiklund, et al., 1984a; Wiklund, et al., 1984b). Although some level of emotional distress is considered a normal reaction post-MI, Lloyd and Cawley (1982) report that 20 to 30 percent of MI patients experience severe emotional disturbances. Whereas the symptoms experienced by most patients will dissipate two to three months post-MI, approximately 10 to 20 % continue to experience distress for more extended periods of time (Lloyd & Cawley, 1982; Rosen & Bibrin, 1966; Wiklund et al., 1984). Following MI, anxiety and depression are believed to contribute to poor prognosis in cardiac rehabilitation, unsatisfactory life adjustment, failure to return to work, less interest in sexual activity, and reduced engagement in social activities subsequent to

hospitalization (Brown & Munford, 1984; Cay, Vetter, Philip, & Dugard, 1973; Garrity, 1973; Hacket & Cassem, 1982; Mayou, 1984; Naismith et al., 1979; Trelawny-Ross & Russell, 1987; Wenger, 1994). In addition, recent studies have shown that individuals experiencing post-MI psychological complications have increased rates of morbidity and mortality in comparison to patients without psychological complications (Allison et al., 1995; Frasure-Smith, 1991; Frasure-Smith, Lesperance, & Talajic, 1993, 1995; Moser & Dracup, 1996; Vogt, Pope, Mullooly, & Holis, 1994).

Interestingly, the level of emotional distress following MI seems unrelated to the severity of the heart attack; rather, the perception of the MI and its perceived impact upon future functioning better predicts who exhibits emotional distress following a heart attack (Lloyd & Cawley, 1982; Sanne, 1986; Schleifer, Macari-Hinson, & Coyle, 1989; Thompson, Webster, Cordle, & Sutton, 1987).

#### Myocardial Infarction and Trauma-Related Anxiety

Although anxiety symptoms have been regularly reported in studies on post-MI patients, few studies have examined specific anxiety disorders that may develop as a consequence of MI. In particular, only a few studies exist that have examined the incidence of post-traumatic stress disorder in post-MI patients (Doerfler, Pbert, & DeCosimo, 1994; Kutz, Shabtai, Solomon, Neumann, & David, 1994; Neumann, 1991; van Driel & Op den Velde, 1995). Post traumatic stress disorder (PTSD) is defined as a behavioral, cognitive, and physiological disturbance that follows a traumatic event causing significant impairment or distress. According to diagnostic criteria, the disturbance must last one month in duration; however, if the disturbance is less than

one month in duration, a diagnosis of acute stress disorder (ASD) can be assigned (APA, Diagnostic and Statistical Manual IV, 1994).

Other studies have examined the incidence of PTSD following various medical illnesses, including cancer and severe burns (Alter, Pelcovitz, Axelrod, Goldenberg, Harris, Meyers, Grobois, Mandel, & Kaplan, 1996; Shalev, Peri, Canetti, & Schreiber, 1996). The medical course for each of these individual types of trauma is different from myocardial infarction; thus there may be a difference between them regarding incidence. For example, an individual with cancer may describe his or her trauma as a verbal exchange between the patient and physician when initial diagnosis was made. This appears to be qualitatively different from an individual experiencing classic symptoms of MI such that they have sudden onset of various physical symptoms followed by the possibility of emergent treatments that are distressing and unexpected. In contrast, cancer patients may experience few and relatively benign symptoms at disease onset and have a more programmatic treatment course involving scheduled radiation therapy or chemotherapy courses. Fewer studies exist for individuals with burns. This type of medical problem is unique in that the physical signs of the illness are easily seen by the patient and may serve a qualitatively different cue for the individual traumatized by the burn experience. No studies to date have directly compared trauma experiences between these medical populations; however, the reported incidence of PTSD among them are comparable to those reported for MI (Kutz et al., 1994, van Driel & Op den Velde, 1995).

Community-based studies have indicated a lifetime prevalence for PTSD related to all types of trauma ranges from 1 to 14% (variability due to methods of ascertainment and population sampled; Breslau, Davis, Andreski, & Peterson, 1991; Helzer, Robins, & McEvoy, 1987;

Kilpatrick & Resnick, 1992; Kulka et al., 1988). PTSD reactions have been observed in individuals exposed to various stressors, such as military combat, violent personal assault (e.g., sexual assault, physical attack, robbery, mugging), being kidnapped, being taken hostage, terrorist attack, torture, incarceration as a prisoner of war or in a concentration camp, natural or man-made disasters, severe automobile accidents, or being diagnosed with a life-threatening illness (Burgess & Holmstrom, 1974; Grene, Grace, Lindy, Gleser, Leonard, & Kramer, 1990; Kilpatrick, Saunders, Veronen, Best & Von, 1987; Smith, North, McCool, & Shea, 1990; Winfield, George, Swartz, & Blazer, 1990).

Not everyone exposed to these various types of events subsequently develops PTSD or ASD (Fairbank, Schlenger, Caddell, & Woods, 1993). Prediction of the development of PTSD in response to stressors has been examined in many types of trauma survivors; however, predictors have been most scrutinized among Vietnam veterans (Fairbank et al., 1993; Ridley, 1991). Predictor variables of PTSD have included pre-trauma factors, trauma-related factors, and post-trauma factors (Fairbank et al., 1993). Pre-trauma factors include variables that were present prior to the traumatic event(s), such as age of entry into the military and drug or alcohol problems that may have existed for veterans prior to combat exposure (Fairbank et al., 1993). Trauma-related factors are variables concerning the traumatic event(s). For example, a study of PTSD among individuals exposed to the Mt. St. Helens eruption found a dose-response relation among PTSD symptoms and proximity to the mountain (Shore, Tatum, & Vollmer, 1986). Post-trauma factors are considered variables that occur some time after the traumatic event. For example, studies of rape victims have demonstrated a positive relation between post-trauma social support and subsequent psychological adjustment (Atkeson, Calhoun, Resick, & Ellis, 1982; Wirtz & Harrell,

1987). Research suggests that there is a role for each of these three categories of variables for understanding the development of PTSD (Fairbank et al., 1993; Scotti, Beach, Northrop, Rode, & Forsythe, 1995).

Intensity and severity of the trauma have been consistent predictors across types of traumatic events (Ridley, 1991). For example, frequency and intensity of combat exposure (participation in atrocities, exposure to abusive violence) was a strong predictor of PTSD in combat veterans (Foy, Resnick, Sippelle, & Carroll, 1987). For adult rape survivors, intensity of initial distress, perceived life threat, and presence of physical injury were predictors of PTSD, and severity of abuse was an important factor affecting development of PTSD in child-incest victims (Kilpatrick, Veronen, & Best, 1985; Kilpatrick et al., 1989; McCahill et al., 1979; Wolfe, Gentile, & Wolfe, 1989). Although intensity and severity of trauma has been consistently linked to PTSD, it is uncertain whether this trauma-related factor serves as either a mediator or moderator of the relation between experience of trauma and PTSD onset. It's relation to predict PTSD may also differ depending upon the nature of the traumatic event and the time elapsed since the onset of the trauma (Feinstein & Dolan, 1991; Perry et al., 1992; Ullman & Siegel, 1994; Harvey & Bryant, 1997).

Social support has also been shown to be a key variable in predicting PTSD across many types of trauma. Social support at home (particularly from ones' family) was important for post combat adjustment of veterans, and social support for rape survivors has been shown to have a significant impact on post-rape adjustment (Foy et al, 1987; Steketee & Foa, 1987). Finally, unsupportive families has a negative impact on subsequent functioning for sexually abused children (Browne & Finkelhor, 1986). Studies examining social support in PTSD populations

purport that it serves as a buffer to the effects of stress including trauma-related stressors (Golding et al., 1989; Joseph et al., 1992; Kaniasty & Norris, 1992). To what extent social support serves to mediate or moderate the relation between experience of a traumatic event and PTSD onset is unknown. The identification of these common "risk factors" highlights that exposure to trauma alone is a necessary but not sufficient condition to predict subsequent development of a trauma reaction and that various factors serve as important predictors of who develops PTSD.

#### Controversy of PTSD in Post-MI Patients

The diagnosis of PTSD or ASD in post-MI patients is a controversial issue. Previous Diagnostic and Statistical Manuals (DSMs) did not permit classification of anxiety responses following MI, including PTSD, because MI was not considered an uncommon traumatic event (APA, Diagnostic and Statistical Manual III, 1980; APA, Diagnostic and Statistical Manual III-R, 1987; DSM-IV, 1994). As previously indicated, MI is very common and because past criteria required that a traumatic event be "out of the normal range of human experiences" or "so stressful that almost everyone exposed to it becomes distressed," trauma responses could not "technically" be diagnosed following MI until the DSM IV (1994). Significant changes in diagnostic criteria in the DSM-IV have refined the definition of PTSD and ASD to include traumatic events in which individuals respond with fear, helplessness, or horror. Further, individuals can experience, witness, or confront events that involve physical threat to others or self. As individuals suffering a MI may often exhibit fear or helplessness (van Driel & Op den Velde, 1995), many of the descriptions of emotional upset in post-MI patients overlap with the diagnostic criteria for PTSD (e.g., anxiety, irritability, excessive autonomic stimulation, disturbances in memory, sleep disturbances, and

nightmares (Byrne & Whyte, 1978; Cassem & Hackett, 1971; Hackett & Cassem, 1969; Lloyd & Cawley, 1982; Naismith et al., 1979; Rosen & Bibring, 1966; Stern et al., 1976; Wiklund et al., 1984a; Wiklund, et. al., 1984b). Finally, because some individuals who suffer a heart attack do die, MI could easily be classified as a traumatic event according to the current criterion A in the DSM-IV (1994). Because of this recent change in the diagnostic system allowing MI or other life-threatening medical illnesses to serve as a traumatic event, the literature on PTSD in cardiac patients is virtually non-existent in comparison to increasingly more studies examining the incidence of PTSD in cancer patients and caregivers of cancer patients (Andrykowski et al, 1998; Cordova, Studts, & Andrykowski, 1998; DuHamel et al., 1998; Manne et al., 1998).

#### Review of Studies Assessing PTSD in Post-MI Patients

Only four published studies have examined PTSD in post-MI patients.

The first study is by Neumann (1991) who compared PTSD symptoms between post-MI survivors and colonoscopy patients. During subsequent hospitalizations, 21 post-MI survivors and 20 colonoscopy patients completed a packet of questionnaires which included the Impact of Events Scale (IES), a checklist of diagnostic criteria for PTSD, and a Likert scale assessing subjective distress associated with MI or colonoscopy. Patients were a minimum of six months post-event (M=98 months for MI patients; M=29.9 months for colonoscopy patients). Neumann reported that the post-MI group reported significantly more PTSD symptoms and obtained significantly higher scores on the IES than the post-colonoscopy group.

The use of a standardized PTSD measure is a strength for this study. Comparison to another medical patient group allowed the investigators to control other unpleasant aspects of illness and hospitalization that may influence psychological distress following a medical illness.

However, receiving an unpleasant diagnostic test may not be comparable to receiving an imminent life-threatening diagnosis. Additionally, the retrospective nature of the design does not permit for assessment of acute distress that may be associated with complications during a time interval closer to the event. Post-MI survivors in this sample were an average of 8 years post-event. This sample may not be representative of the individuals who experience distress earlier in the stage of recovery from a traumatic event. Finally, the authors do not provide information regarding the subsequent diagnoses that individuals with higher questionnaire scores may have had. The mean IES scores reported fall below clinically significant levels.

Next, Kutz et al. (1994) assessed for the presence of PTSD in 100 Israeli MI patients selected from cardiology clinic files at a local hospital. Inclusion criteria included presence of (a) at least two out of the three diagnostic criteria for MI (typical clinical symptomatology, ECG evidence of MI, and typical elevated serum levels of myocardial enzymes), and (b) length of time elapsed since last MI ranging from 6 to 18 months ( $M = 14$  months). Participants were assessed using an adaptation of the PTSD Inventory (Solomon, 1989; Solomon, Mikulincer, & Jacob, 1987) that was originally developed for use with combat veterans. Twelve of the original 13 items were used. The items consisted of statements regarding symptoms of PTSD adapted for use with MI patients. Additional information was collected from a semi-structured interview with psychiatrists, chart reviews, and other questionnaires that were not specified in the article.

Kutz et al. (1994) indicated that PTSD was present in 25 percent of the sample which is much higher than general population prevalence rates for PTSD (Helzer, Robins, & McEvoy, 1987; Kilpatrick & Resnick, 1992; Kulka et al., 1988). In their analysis, nine percent were



diagnosed retrospectively as having suffered from acute PTSD that lasted less than six months and was not present at the time of examination. The remaining 16 percent were diagnosed with chronic PTSD. Using chi-square analyses, the authors reported that ethnic origin (Asian and Mediterranean), history of previous MI or previous cardiac hospitalization, and history of PTSD were related to the existence of current PTSD. No relation was found between PTSD and objective measures of the coronary event (e.g., degree of cardiac complications and necessity for cardiopulmonary resuscitation); however, the subjective rating by the patient regarding "anticipated incapacitation due to the MI" was significantly related with the development of PTSD. Specifically, individuals who anticipated more disability were more likely to develop PTSD. Other types of subjective experiences such as intensity of pain, degree of dyspnea, intensity of fear, and loss of consciousness were not significantly related to PTSD. Levels of dysfunction on all measures relating to post-MI work and social activities were strongly related to presence of PTSD in these post-MI patients.

The use of a large sample size is a major strength for this study; however, the assessment measures that were utilized represent a major weakness of this study. The authors used a PTSD measure that was originally developed with combat veterans. Although items were modified, no psychometric properties were reported. In addition, a semi-structured interview was employed; however, the authors did not state whether PTSD was assessed during the interview or what interview format was used. The authors reported that during the structured interview, they collected demographic information, medical history, life history, and subjective experiences of the MI from the patient's chart. The authors also did not report how subjective experiences of the MI were quantified and used in the statistical analyses. Although the findings of this study are

provocative, the reliance upon the exact incidence of PTSD observed (i.e., 25%) should be considered premature due to the numerous methodological limitations of this investigation.

Another study was conducted by van Driel and Op den Velde (1995) who assessed 23 individuals suffering from his or her first MI confirmed through medical tests. Participants were assessed one to two weeks following hospital admission and 22 to 26 months later. Participants with other major medical illnesses including previous MI were excluded. An initial structured interview was conducted by one of three psychiatry residents who used the SCID-R PTSD module (Spitzer & Williams, 1985). Information regarding life history, social situation, prior traumatic experiences, and the subjective experience of the MI were additionally collected during the interview. Results indicated that during the initial interview (at 1-2 weeks), only one individual met criteria for acute stress disorder. Twelve participants had not realized that they were experiencing a heart attack during transportation to the hospital and reported no feelings of perceived life-threat, severe anxiety, or helplessness during this initial assessment. The follow-up assessment conducted approximately two years later was conducted by a psychiatry resident not involved in the initial examinations. The SCID-R PTSD module was again utilized and additional information regarding present condition, treatment, further developments, and subjective experience of the MI was also collected. Subject mortality included five individuals who died between assessments. The 12 individuals that had not realized they were experiencing a heart attack upon initial admission did not report any symptomatic distress at follow-up. Interview data revealed that 8 of 18 participants reported some distress during the first year after their MI, and two individuals sought psychiatric care. All of the distress-related symptoms reported by these individuals dissipated within two years of the MI. Two individuals who underwent cardioversion

(discharge of electrical energy [shock] synchronized with the R-wave of the electrocardiogram) during initial MI were still preoccupied with the possibility of a second MI. According to the SCID-R PTSD module, none of the 18 individuals assessed at follow-up met criteria for PTSD after the two-year interval. The individual with ASD during the admission met criteria for PTSD in the first year after his MI, but did not meet criteria by the two-year interval.

Although this study employed a prospective design to assess the development of PTSD, considerable time passed between assessment intervals. As indicated above, many individuals retrospectively reported experiencing PTSD symptoms post-MI, yet the symptoms dissipated by the time the second assessment was conducted. In addition, the authors used a structured clinical interview with modest inter-rater reliability during the initial assessment, and the second assessment was conducted by a different psychiatrist with no information regarding his/her reliability with the original assessors. Additionally, no information was reported regarding how subjective information collected during the interview was quantified (i.e., subjective experience of the MI). Moreover, the smaller sample size employed could make it difficult to detect PTSD in this population. Finally, exclusion criteria for this study included other medical illnesses and previous MI. As indicated in the report by Kutz et al. (1994), one variable significantly associated with PTSD in this population was previous MI and cardiac-related hospitalization and testing; therefore, a selection bias could have resulted in the lower incidence of PTSD observed in this sample.

Finally, Doerfler et al. (1994) reported symptoms of PTSD in 50 patients that either were hospitalized for Coronary Artery Bypass Surgery (CABG; N=23) or had previously experienced a MI (time passed ranged 6 to 12 months; N=27). Patients responded to a survey mailed to 115

individuals. The survey package included the Reaction Index (RI; Frederick, 1985; checklist of various DSM-III PTSD symptoms), the Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979; items assess responses to stressful events), the Inventory to Diagnose Depression (IDD; Zimmerman & Coryell, 1987; Zimmerman, Coryell, Corenthal, & Wilson, 1986; items assess DSM-III-R range of depressive symptoms), the Trait Anxiety Inventory (TA; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983; items assess feelings of apprehension, worry, tension, and nervousness), the Trait Anger Scale (TAS; items assess frequency of anger as an emotion and individual differences in anger expression as a personality trait), the Symptom Check List - 90 (SCL-90; Derogatis, Lipman & Covi, 1973; items assess broad range of psychopathology including anxiety, depression, somatization, hostility, interpersonal sensitivity, phobic anxiety, paranoid ideation, obsessive-compulsive symptoms, and psychoticism), and the Social Adjustment Scale (SAS; Weismann & Bothwell, 1976; items assess instrumental or expressive role performance in work, social and leisure activities, relationship with extended family, marital role as spouse, parental role, and membership in family unity).

Doerfler et al. (1994) indicated that overall the distress levels in the group were quite low; however, several individuals reported high levels of PTSD symptoms on the RI and IES. Nine individuals had scores above seven on the RI which the authors suggest may indicate the presence of PTSD. Further, the authors attempted to compute an algorithm using the RI cutoff of seven, and items from the IES, IDD, and TAS to assess if individuals met all criteria for PTSD. Using this method, the authors determined that four individuals (three MI, and one CABG) met criteria for PTSD.

Although Doerfler et al. (1994) utilized many valid self-report measures, the use of these measures to diagnose PTSD is questionable. The RI, in fact, was developed based upon the DSM-III criteria for PTSD, which has been mentioned earlier to rely on criterion different from current diagnostic criteria. Also because the authors reported the results of the study on both MI and CABG patients, it is difficult to ascertain the direct effects of MI on PTSD symptoms.

#### Statement of the Problem

Although studies reviewed have various methodological weaknesses, thus far these studies support the hypothesis that MI may be a type of traumatic stressor that results in trauma responses such as PTSD or ASD. As discussed earlier, anxiety responses following MI have been observed in a large proportion of post-MI individuals and associated symptoms have included responses such as sleep disturbances, nightmares, excessive autonomic stimulation, irritability, disturbances in memory and concentration, and depression (Byrne & Whyte, 1978; Cassem & Hackett, 1971; Hackett & Cassem, 1969; Lloyd & Cawley, 1982; Rosen & Bibring, 1966; Stern, Pascale, & McLoone, 1976; Wiklund et al., 1984a; Wiklund et al., 1984b). All of these symptoms could describe post-trauma adjustment. For example, re-experiencing of a trauma may take the form of nightmares, and persistent arousal may be manifested by sleep disturbances, irritability, and difficulty concentrating.

Recent studies have shown increased risk of mortality and morbidity for individuals with post-MI psychological complications (Frasure-Smith, 1991; Frasure-Smith, Lesperance, & Talajic, 1993; Allison et al., 1995; Frasure-Smith, Lesperance, & Talajic, 1995; Vogt et al., 1994; Moser & Dracup, 1996; Sullivan et al., 1997). Exploring the incidence of anxiety responses such as PTSD in this population could reveal a similar relation between post-MI anxiety responses and

increased risk of morbidity or mortality. Identification and treatment of PTSD in these individuals may improve recovery from MI and lower mortality resulting from cardiac complications.

The literature examining PTSD following MI has been limited in part due to past restrictions in diagnostic criteria. Four group studies have attempted to examine the incidence of trauma responses in the form of symptoms or diagnoses (PTSD or ASD); however, the methodological weaknesses of these studies obscure the estimation of an accurate description of PTSD in post-MI individuals.

This current study was designed to overcome some of the methodological limitations associated with previous studies. Individuals in this study were assessed during the acute recovery phase and three to four months immediately post-MI in order to prospectively collect data regarding trauma responses. Valid diagnostic instruments were used to assess the incidence of PTSD/ASD in a consecutive sample of participants with a recent history of MI. The measures of PTSD/ASD included the Post-traumatic Stress Disorder Scale (PDS), a standardized self-report instrument that was developed for use with various types of traumatic events. The scale allowed for assessment of specific diagnostic criteria and provided a checklist of previous traumatic events that an individual may have experienced. A standardized clinical interview for PTSD was used to ascribe a diagnosis of ASD or PTSD during the assessment intervals. Additionally, the Impact of Events Scale was selected because it has been used in previous studies examining responses to stressful events in this population. These instruments were selected for their utility in assessing incidence of PTSD/ASD prospectively or traumatic responses to stressful events among individuals during the acute hospitalization and approximately 3-4 months post-MI. Also included

was the SCL-90-R, a broad measure of psychopathology that has been used in other studies with this population (Doerfler et al., 1994).

Secondly, variables that have been shown to predict trauma responses across types of trauma (i.e., rape, combat, & incest as mentioned earlier) were assessed during Phase One (initial hospitalization following MI) and used in combination with other predictors of PTSD responses and post-MI maladjustment to predict trauma responses as measured by PTSD questionnaires and structured interview during Phase Two of the study.

Perceived social support and perceived distress associated with MI were among the potential predictor variables chosen for this study. Social support was selected because it has consistently been shown to have a significant inverse relation with distress associated with traumatic events including myocardial infarction (Brezinka & Kittel, 1998; Foy et al, 1987; Schaefer, Coyne, & Lazarus, 1981; Solomon, Mikulincer, & Avitzur, 1986; Steketee & Foa, 1987.). Additionally, perceived life threat and distress has been positively correlated with development of PTSD symptomatology (Foy et al., 1987; Kilpatrick et al., 1985; Kilpatrick et al., 1989). Additionally, Kutz et al. (1994) reported a significant positive relation between perceived distress and disability associated with MI and subsequent development of PTSD symptoms; however, the authors did not report how they measured this variable. Thus, visual analogue scales, frequently used to quantify subjective ratings, were utilized to assess perceived distress and disability associated with MI.

Coping styles and severity of traumatic events have less consistently served as reliable predictors of psychological distress associated with PTSD and distress associated with MI. However, coping styles have repeatedly been investigated in studies examining psychological

distress associated with MI and were assessed for the purposes of this study using similar measurement instruments of coping styles (Alonzo & Reynolds, 1998). Further, severity of MI has not been specifically investigated in PTSD and MI studies but was included in this study to assess its viability as a potential predictor for this unique type of trauma (i.e., medical illness). Finally, additional variables such as socioeconomic data, history of previous traumatic events, psychiatric problems, family instability, and substance abuse were assessed to determine their relation with psychological distress in post-MI patients.

It was hypothesized that (1) some MI patients will report trauma responses across the various measures of ASD/PTSD at both initial data collection and follow up, and (2) variables that were predictive of PTSD symptoms with other types of traumatic events will serve a similar function for the prediction of PTSD symptoms in post-MI patients. For example, it was hypothesized that low levels of perceived social support would be predictive of distress post-MI. Further, higher levels of perceived distress associated with MI would be predictive of subsequent PTSD/ASD symptoms.

## Method

### Participants

Eighty-six individuals with a history of recent myocardial infarction who were treated at Ruby Memorial Hospital in Morgantown, WV were approached to consent to participate in the study. All patients on the Cardiology Service who were at least 18 years of age and had a recent history (< 2 weeks) of MI were approached. Eight individuals were excluded from the study because they had a diagnosis of possible cognitive disorder (N=6), or were the recipient of an implantable cardioverter defibrillator (N=2). Eight participants declined to participate. Of the 70



participants initially consenting to participate, 46 completed the questionnaire component of Phase One and 40 completed the questionnaires and the diagnostic interview. Table 1 depicts information obtained from a demographic questionnaire and chart reviews for individuals completing Phase One. Information obtained included transfer status, age, ethnicity, gender, marital status, current employment, income level, history of psychological problems for individual or family members, and responses to general questions regarding alcohol and illicit substance abuse.

Information regarding the MI experience such as date, duration in hospital, associated complications, treatments received, and knowledge of experiencing a MI during the episode was also recorded. Information regarding the severity of the MI was collected from the participant's chart during or following their hospitalization. Some participants in the study did not have this information available in the medical record at the participating hospital or did not receive a test to determine severity variables such as ejection fraction (17 missing), degree of heart damage as estimated by peak cardiac enzyme level (CPK, 10 missing), and previous medical history (i.e., prior MI; 1 missing). Individuals who completed Phase One did not differ from the non-completers on the basis of age, years of education, or variables assessing severity of MI. However, participants who were approached earlier in their hospital stay were less likely to complete Phase One than those who were approached later (see Table 1). Of the 46 participants who completed Phase One, 14 did not complete either the follow-up questionnaires or telephone interview (Phase Two). A total of 32 individuals completed the interview (N=26), the questionnaires (N=32) or both (N=24) during Phase Two.

Table 1. Demographic Comparison for Individuals Completing and Not Completing Phase One.

<u>Demographics</u>	<u>Phase One</u> <u>Completers</u> N=46	<u>Phase One</u> <u>Non-Completers</u> N=24	t	p
Mean Age <sup>1</sup>	59.3 (15.6)	63.3 (14.1)	.45	.50
Mean Years of Education <sup>2</sup>	11.46 (3.5)	11.3 (2.8)	.18	.67
CK (CPK; peak creatine kinase) <sup>3</sup>	1603 (1917)	1354 (1146)	.30	.12
Length of Stay (LOS; days) <sup>4</sup>	7.7 (4.3)	6.5 (3.3)	.52	.47
Ejection Fraction <sup>5</sup>	44.1 (14.9)	47.1 (11.6)	.49	.47
Time Since MI (days) <sup>6</sup>	5.7 (6.1)	2.7 (2.1)	6.1	.01*
Gender (Male)	65.2%	58%	-	-
Mean Income (N=23)	22,729 (22,063)	-		
Marital Status	32 Married 8 Widowed 6 Div/Sep/Single	-		
Occupational Status	13 Employed 7 Unemployed 24 Retired 2 Disability/Other	-		
H/O ETOH (N=45)	13%	-		
H/O Illicit Drug Use (N=44)	6.5%	-		
H/O Psychiatric/Self (N=44)	13%	-		
H/O Psychiatric/Family (N=43)	8.7%	-		
Was Pt Transferred	45.7%	-		

Note. <sup>1</sup> N<sub>PINC</sub>= 23; <sup>2</sup> N<sub>PINC</sub>=16; <sup>3</sup> N<sub>PIC</sub>=36, N<sub>PINC</sub>=21; <sup>4</sup> N<sub>PINC</sub>=21; <sup>5</sup> N<sup>PIC</sup>=29, N<sub>PINC</sub>=12; <sup>6</sup> N<sub>PINC</sub>=21; “-“ indicates data was not collected for this subgroup or that an analyses was not computed.

## Measures

Impact of Events Scale. The Impact of Events Scale (IES; Horowitz, Wilner, & Alvarez, 1979) is a 15-item scale on which participants rate the impact of a traumatic or stressful event. The IES has two subscales which assess the intrusive domain (IES-Intrusive Subscale; e.g., recurring thoughts) and the avoidance domain (IES-Avoidance Subscale; e.g., avoid stimuli associated with traumatic event) associated with PTSD, thus yielding two subscale scores for the questionnaire. The IES has overall acceptable test-retest reliability (.87) and internal consistency (e.g., Cronbach's alpha, .78 for the intrusion score and .82 for the avoidance items, with an overall split-half reliability correlation of .86 (Horowitz et. al., 1979), and has been used in many previous studies examining PTSD (Kulka et al., 1988; Schwarzwald, Solomon, Weisenber, & Milulincer, 1987).

Posttraumatic Stress Diagnostic Scale. The Posttraumatic Stress Diagnostic Scale (PSD) is a 49-item self-report instrument designed to aid in the diagnosis of posttraumatic stress disorder (Foa, 1995). The PSD is designed to yield a PTSD diagnosis if a respondent endorses all DSM-IV criteria assessed in the questionnaire, and specifiers regarding acute, chronic, or delayed onset of PTSD; however, if responses are not sufficient to meet criteria for PTSD, the diagnosis score is rated as "Not Enough Information" instead of "No PTSD." Additionally overall number and severity of symptoms is yielded along with number and severity of symptoms associated with the diagnostic categories for (a) avoidance, (b) intrusive thoughts, (c) hyperarousal, and (d) functional impairment (Foa, 1995). Finally, the PSD contains a checklist of previous traumatic events that assesses exposure to previous trauma and the individual's perceived worst traumatic event for which he/she refers to when responding for the duration of the questionnaire. For this reason, the

PSD was modified during Phase Two so that the individual responding reported symptoms associated with their MI as a traumatic event and not other possible traumatic events they may have experienced. The PSD has been shown to have overall good test-retest properties (.83), and good internal consistency for the symptom severity subscale (alpha of .92). The PSD obtained a 79.4% agreement with clinical interviews obtaining diagnoses of PTSD (using SCID), and the symptom severity score was also found to have good convergent validity with measures of depression (coefficient=.79), anxiety (.73 - .74), and intrusive thoughts (.80; Foa, 1995).

Anxiety Disorders Interview Schedule for DSM-IV, PTSD Module. The Anxiety Disorders Interview Schedule (ADIS), PTSD Module has received some empirical support in the area of PTSD diagnosis (DiNardo, O'Brien, Barlow, Waddell, & Blanchard, 1983). The ADIS-IV is a structured clinical interview developed to assess PTSD using DSM-IV criteria (Brown, DiNardo, & Barlow, 1994). After its completion, diagnoses such as PTSD and ASD are determined by a clinician and not by an algorithm of symptoms. Due to its recent emergence, there are no studies published regarding reliability; however, previous versions have been reported to have good psychometric properties (Bouman & de Ruiter, 1991; Di Nardo et al., 1993).

Perceived Social Support. The Perceived Social Support -Friend Scale (PSS-Fr) and Perceived Social Support-Family Scale (PSS-Fa) are two 20-item instruments that assess the degree that one perceives his/her needs for support as fulfilled by one's network of friends as well as family (Procidano & Heller, 1983). Higher scores on each subscale indicate higher levels of perceived support. The PSS has excellent internal consistency (alpha .88 and .90 respectively) for PSS-Fr and PSS-Fa, and overall test-retest reliability coefficients over a one-month time period have been reported at .83 for a preliminary version of the scale which constituted the same items

from both scales. Both scales have good discriminant validity with measures of social assets ( $Fr = .23$  to  $.51$ ;  $Fa = .12$  to  $.35$ ; Procidano & Heller, 1983).

Visual Analogue Scales. Visual Analogue Scales (VAS) are frequently used to assess intensity of variable constructs including pain and anxiety (Arntz, Merckelback, & de Jong, 1993; Feldman, 1986; Holmes, 1989; Thomas, McEwen, & Asbury, 1996). The Kutz et al. (1994) study assessed intensity of perceived distress associated with MI; however, they did not specify how they measured this variable. For the purposes of this study, VASs were selected to assess perceived distress associated with MI. The VAS for this study was constructed using a 10mm line with anchors on each end to facilitate rapid ranking of multiple response questions. Participants used a VAS to (a) rate the amount of distress experienced during their MI (VAS I), (b) rate the amount of perceived life threat (VAS II), and (c) rate the amount of anticipated disability they experienced during the MI episode (VAS III). Higher scores on the VAS indicated higher levels of distress, perceived life threat, or higher anticipation of disability.

Symptom Checklist - 90-R. The Symptom Checklist-90-R (SCL-90-R) is a 90-item self-report symptom inventory designed to reflect the psychological symptom patterns of psychiatric and medical patients (Derogatis, 1977). Each item is rated on a 5-point scale of distress from 0="Not at All" to 4="Extremely." The measure yields nine primary symptom dimensions (somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, & psychoticism) and three global indices of distress (global severity index, positive symptom distress index, & positive symptom total). The SCL-90-R has internal consistency coefficients ranging from  $.77$  to  $.90$  for the subscales, and test-retest properties ranging from  $.78$ - $.90$  for the subscales. Doerfler et al. (1994) used the SCL-90-R as a

distress measure; thus it was utilized for a similar purpose in this current study. However, only the GSI was used as the index of generalized distress due to its stability across factor analytic studies (Derogatis, 1977)

Ways of Coping Checklist - Revised. The Ways of Coping Checklist-Revised (WCCL-R; Vitiliano et. al., 1985) is a 42-item scale with five factor-analytically derived subscales: Problem Focused (actively seeks solutions to problems), Seeks Social Support (actively seeks assistance from others), Blamed Self (frequent negative cognitions blaming self for problem; emotion focused), Wishful Thinking (frequent cognitions for how a problem may be resolved; emotion focused), and Avoidance (behavior and cognitions indicating avoidance of a problem). The WCCL-R has internal consistency coefficients ranging from .74 to .88 for subscales (Vitiliano et al., 1985). Increased use of a particular coping strategy is indicated by a higher score on any particular subscale.

SUDS. A small sample of physicians (residents) were queried regarding patients level of distress using a SUDS (subjective units of distress) rating (1-100) to quantify the perception of distress each participant was experiencing during his or her initial hospitalization. Higher ratings indicate higher levels of distress. Only 32 of the 46 individuals completing Phase One received a SUDS rating by their physician. Consequently, this variable was excluded from some analyses and served primarily a descriptive purpose.

### Procedure

All prospective cardiology patients admitted between February 1997 to June 1997 who met at least two out of the three diagnostic criteria for MI (typical clinical symptomatology, ECG evidence of MI, and typical elevated serum levels of myocardial enzymes) were approached by the

primary investigator to obtain consent for participation. After informed consent was obtained, the participant was asked to complete an initial package of questionnaires and undergo the structured interview using the ADIS-IV PTSD module. Because the assessment packet was lengthy, individuals were provided a self-addressed stamped envelope to return uncompleted portions by mail. The questionnaire packet for Phase One included Perceived Social Support Scale-Family version, Perceived Social Support Scale-Friend version, Symptom Checklist-90-Revised, Ways of Coping Checklist-Revised, Posttraumatic Stress Disorder Scale, Impact of Events Scale, and Visual Analogue Scales I-III.

Approximately 3.0 to 3.5 months following the subject's date of their MI, an abbreviated version of the questionnaire packet and self-addressed stamped envelope was mailed to all participants to complete and return to the investigators. The questionnaire packet at Phase Two included: Symptom Checklist-90-Revised, Impact of Events Scale, and Posttraumatic Stress Disorder Scale. Approximately 1-2 weeks following mailing of the packet, participants were called by phone to complete the interview portion of the study again. If participants were unavailable at the initial phone interview, attempts were made to continue to make phone contact. If participants did not complete the initial packet within approximately one month following the initial mailing, a second packet was mailed. The average time elapsed for follow-up contact was 24 weeks (SD=6.2; range = 15 to 46).

### Statistical Plan

Simple t-tests and analysis of variance with bonferroni correction were used to compute differences between groups completing the various phases of the study for descriptive purposes. Next, all of the potential predictors (IVs) were correlated with the PTSD measures (DVs) and the

IES subscales (DVs). All potential IVs that were significantly correlated with the various DVs were entered concurrently into a stepwise multiple regression equation to assess which IVs would account for the most variance among the DVs. Finally, all IVs were correlated with the most sensitive measure of the SCL-90-R, the GSI. All of the IVs that were significantly correlated with the GSI were entered into a stepwise multiple regression equation to assess which variables would account for the most variance in global distress.

## Results

### Phase One

Using the ADIS-IV Module, six individuals (15%) were diagnosed with acute stress disorder as a result of their MI during initial hospitalization. Thirty-four participants (85%) did not meet criteria for ASD associated with their MI (ASD-MI) during hospitalization. Table 2 reveals the scores for the various ASD/PTSD measures during Phase One for the non-ASD and ASD-MI groups. On the PSD, the ASD-MI group had a higher number and severity of re-experiencing symptoms, number and severity of avoidance symptoms, severity of arousal symptoms, number of areas of impairment, and overall number and severity of symptoms than the non-ASD-Mi group. No significant differences were found between the two groups on the Impact of Event subscales, number of arousal symptoms reported, and prior history of traumatic event exposure.

Table 3 depicts the medical variables related to history of cardiac problems, current cardiac interventions, and variables illustrating the severity of the participant's MI. In addition, a portion of the sample received a rating indicating the physician's perception of the participant's



Table 2. ASD/PTSD Variables for Participants with and without ASD Diagnosis During Initial Hospitalization (Phase One)

<u>ASD/PTSD Measures</u>	<u>Non-ASD Group</u> (N=34)	<u>ASD Group</u> (N=6)	<u>F</u>	<u>p</u>
<u>Impact of Events Scale</u>				
IES-Avoidance Subscale	10.6 (11.6)	18.0 (12.5)	1.8	.18
IES-Intrusion Subscale	9.6 (9.6)	14.8 (11.2)	1.1	.80
<u>Posttraumatic Stress Disorder Scale</u>				
Exposure to Traumatic Events	2.8 (1.9)	3.0 (1.5)	.0	.86
Number of Re-experiencing Sx (B)	1.3 (1.6)	3.0 (1.5)	5.2	.02*
Severity of Re-experiencing Sx	2.0 (2.7)	6.6 (4.1)	12.4	.00*
Number of Avoidance Sx (C)	1.7 (2.2)	4.0 (2.5)	5.2	.02*
Severity of Avoidance Sx	2.2 (2.7)	8.1 (6.7)	13.5	.00*
Number of Arousal Sx (D)	1.4 (1.4)	2.5 (1.0)	3.4	.07
Severity of Arousal Sx	2.0 (2.1)	5.2 (2.8)	9.5	.00*
Areas of Impairment from PSD	3.8 (4.2)	8.0 (2.4)	5.3	.02*
Overall No. of Sx	4.4 (4.5)	9.5 (4.8)	6.1	.02*
Overall Sx Severity	7.0 (7.7)	19.8(12.5)	10.9	.00*

Note. Categories are based on ADIS-IV PTSD Module; Six participants did not complete the ADIS-IV PTSD interview during phase one.

Table 3. Medical Variables for Participants with and without ASD Diagnosis During Initial Hospitalization (Phase One).

<u>Medical Variables</u>	<u>Non-ASD Group</u> (N=34)	<u>ASD Group</u> (N=6)
Emergent TX	10	1
Current CABG TX	5	0
H/O CABG TX	4	0
PTCA TX	26	4
H/O PTCA TX	7	0
Stent TX	14	2
H/O Stent TX	1	0
TPA	2	1
Defibrillation	3 (1 awake)	0
(+)Complications	11	2
Length of Stay (days)	6.9	6.8
CPK (Mean Value)	1768 (1923)	967 (959)
Ejection Fraction (percent) <sup>1</sup>	48	46
Mean Physician Ratings <sup>2</sup> (0-100 SUDS)	39.8	74.0

Note. Categories are based on ADIS-IV PTSD Module; N=6 participants did not complete the ADIS-IV PTSD interview during Phase One; <sup>1</sup> N<sub>ASD</sub> = 5, N<sub>NASD</sub> = 22; <sup>2</sup> N<sub>ASD</sub> = 5, N<sub>NASD</sub> = 25

distress. The physician rating is the only medical variable that was significantly different between the two groups during Phase One [ $F(1, 28)=17.9, p=.0001$ ].

Table 4 indicates the degree of relation between potential predictor variables and the various measures of ASD during phase one. Significant inverse relations were observed between ASD measures and age, post-MI assessment interval, seeks social support subscale from the WCCL-R, and perceived social support from family (PSS-FA). Positive correlations were observed between one or more of the ASD measures and number of pre-morbid traumatic events, physician ratings, perceived distress and disability (VAS I-III).

### Phase Two

Of the 46 participants who completed Phase One, 32 completed follow-up questionnaires and 26 completed the follow-up structured interview (Phase Two). Using simple t-tests with a Bonferroni correction, no differences were detected on demographic variables, medical variables, or psychological variables assessed during Phase One between the completers and noncompleters of Phase Two (see Table 5).

During Phase Two, ADIS-IV interviews indicated eight individuals (30%) reported symptoms sufficient to meet criteria for PTSD - three of whom met criteria for ASD during their hospitalization and five individuals who did not meet criteria for ASD during Phase One. Two individuals who met criteria for ASD during Phase One did not complete Phase Two. One individual who met criteria for ASD during Phase One, did not have sufficient symptoms to meet criteria for PTSD during Phase Two.

Table 4 . Correlation Coefficients for Independent Variables and the Various Dependent Variables at Phase One.

Potential Predictor Variables (IVs)	PSD Total Number of Sx	PSD Sx Severity Score	IES-Avoidance Subscale	IES-Intrusion Subscale	ADIS Number of Sx	ADIS Sx Severity
Age	-.33*	-.31*	-.29	-.52**	-.24	-.19
Post-MI Assess. Interval	.08	.04	-.36*	-.29	-.12	-.05
CPK	-.25	-.21	.32	.13	-.10	.03
EF	.12	.04	-.33	-.14	.06	.10
LOS	.17	.15	.22	.11	-.10	-.00
No. Prior MIs	.09	.06	-.08	.05	-.07	-.04
Family Stability	-.22	-.19	.13	-.03	-.12	-.15
Income	-.05	-.17	-.21	-.17	.35	.20
Education	.00	-.02	-.15	-.05	.23	.09
# Trauma Events	.25	.25	.20	.36*	.11	.01
Physician Rating	.60**	.60**	.24	.38*	.48**	.45*
VAS I	.56**	.50**	.57**	.63**	.34*	.27
VASII	.35*	.28	.34*	.30	.35*	.36*
VASIII	.43**	.36*	.33*	.41**	.33*	.27
WCCL-AV	-.20	-.10	-.02	-.09	-.21	-.09
WCCL-BS	-.12	-.06	-.01	.00	.08	.15
WCCL-PF	.11	.14	.06	.10	-.24	-.28
WCCL-SSS	-.36*	-.30	-.15	-.37*	-.11	-.02
WCCL-WT	.15	.10	.24	.27	-.08	-.10
PSS-Family	-.22	-.24	-.13	-.37*	-.17	-.12
PSS-Friends	.07	.07	.00	.01	-.00	-.02

Note. \*P<.05; \*\*p<.01

Table 5. Differences Between Individuals Completing and Not Completing Phase Two.

<u>Variables</u>	<u>P2 C</u> (N=32 )	<u>2 NC</u> (N=14)	<u>t</u>	<u>p</u>
Age (years)	57.6 (16.7)	63.2 (14.8)	1.3	.26
Education (years)	11.5 (2.5)	11.0 (5.6)	.16	.69
CK (CPK; peak creatine kinase) <sup>1</sup>	1688.0(2187.0)	1052.9(1012.4)	.76	.38
Length of Stay (days)	7.8 (4.7)	7.6 (2.9)	.01	.91
Ejection Fraction (EF; percent) <sup>2</sup>	42.5 (15.2)	47.8 (15.5)	.62	.43
Time Since MI (days)	5.3 (5.4)	7.1 (8.3)	.61	.44
Physician Ratings <sup>3</sup>	46.0 (17.7)	41.1 (27.1)	.37	.54
VAS 1 (MM; distress)	41.8 (38.7)	28.0 (35.8)	.98	.33
VAS 2 (MM; concerned/death)	33.9 (37.4)	22.8 (35.3)	.72	.40
VAS 3 (MM; disability)	31.1 (38.9)	26.7 (41.3)	.10	.75
IES-A	13.4 (12.0)	8.2 (11.1)	1.3	.25
IES-I	11.3(10.0)	4.8 (6.1)	3.2	.07
PSD-Number Sx	5.6 (4.9)	4.7 (4.4)	.32	.57
ADIS-Number of Sx <sup>4</sup>	4.3 (3.7)	3.4 (3.9)	.36	.55
No. Previous. Trauma Events	2.8 (1.9)	2.4 (1.6)	.45	.50
SCL: GSI <sup>5</sup>	2.14 (7.4)	.69 (.60)	.37	.54

Note.<sup>1</sup> N<sub>P2C</sub>=24, N<sub>P2NC</sub>=10; <sup>2</sup> N<sub>P2C</sub>=21, N<sub>P2NC</sub>=7; <sup>3</sup> N<sub>P2C</sub>=23, N<sub>P2NC</sub>=9; <sup>4</sup> N<sub>P2C</sub>=30; N<sub>P2NC</sub>=10; <sup>5</sup> N<sub>P2C</sub>=31; N<sub>P2NC</sub>=10.

Table 6. PTSD Variables for Participants with and without PTSD Diagnosis During Follow-Up (Phase Two).

ASD/PTSD Measures	Non-PTSD (n=17)	PTSD (n=7)	<u>F</u>	<u>p</u>
<u>Impact of Events Scale</u>				
IES-Avoidance Subscale	5.82 (8.5)	11.86 (8.5)	2.59	.13
IES-Intrusion Subscale*	5.89(6.9)	15.71 (7.1)	9.82	.00
<u>Posttraumatic Stress Disorder Scale</u>				
Number of Re-experiencing Sx (B)*	.94 (1.5)	3.57 (1.3)	16.90	.00
Severity of Re-experiencing Sx*	1.65 (3.0)	5.29(2.6)	7.79	.01
Number of Avoidance Sx (C)*	1.71(2.1)	4.43 (1.7)	9.26	.00
Severity of Avoidance Sx*	2.59 (3.6)	7.14 (3.8)	8.54	.01
Number of Arousal Sx (D)*	1.6 (1.6)	3.43 (1.5)	6.86	.02
Severity of Arousal Sx	3.24 (3.6)	4.86 (3.9)	1.04	.31
Areas of Impairment from PSD	3.18 (3.9)	6.00 (4.1)	5.90	.02
Overall No. of Sx*	4.23 (4.5)	11.43 (3.7)	14.01	.00
Overall Sx Severity*	7.30 (8.9)	18.43 (8.9)	7.94	.01

Note. Sample size changes due to one subject in each group who did not complete the IES and PSD accurately.

Table 6 provides results of trauma-related questionnaires during Phase Two between the two diagnostic groups. Individuals with PTSD has significantly higher scores on the Intrusion subscale of the Impact of Events Scale. On the PSD, the PTSD group had higher overall number and severity of PTSD symptoms, number and severity of re-experiencing symptoms, number and severity of avoidance symptoms, number of arousal symptoms and areas of impairment. On the SCL-90-R, the PTSD group had higher scores on the somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism subscales. Significant group differences were also observed on overall indices of distress: GSI, PST, and PSDI (see Table 7).

Table 7 shows the relation between the various PTSD measures obtained during Phase Two. All of the measures were significantly inter-correlated except for the number of ADIS-IV symptoms endorsed and the IES-Avoidance subscale; however, strength of the relations varied between all measures.

#### Phase One Correlates of Phase Two PTSD Responses

Correlations between variables assessed at Phase One and the PTSD measures administered during Phase Two are shown in Table 8. Significant positive correlations were observed between various PTSD measures and history of traumatic events, physician ratings of distress, perceived distress (VAS I) and disability (VASIII). Indirect relations were observed between various PTSD measures and age, WCCL-R Avoidance Subscale, WCCL-Seeks Social Support, and Perceived Social Support -Family subscale. Finally, significant direct correlations were observed between number of previous traumatic events and physician ratings of distress with

Table 7. Correlations Among the Various PTSD measures at Phase Two.

	PSD Total Number of Sx	PSD Sx Severity Score	IES-Avoidance Subscale	IES-Intrusion Subscale	ADIS Number of Sx	ADIS Sx Severity
PSD Total Number of SX		.91**	.74**	.77**	.61**	.58**
PSD Sx Severity Score			.81**	.84**	.51**	.58**
IES-Avoidance Subscale				.83**	.32	.43*
IES-Intrusion Subscale					.45*	.54**
ADIS Number of SX						.87**



the SCL-90-R GSI and a significant indirect correlation was observed between the SCL-90-R GSI index and age.

### Regression Analyses

Variables that were significantly correlated with the various PTSD measures were selected for entry into stepwise regression analyses to determine which variable (or combination of variables) best correlated with PTSD symptoms during Phase Two. Because physician ratings of distress during initial hospitalization were not available for several patients (missing for  $\geq 10$  individuals completing Phase Two), this variable was not used in these analyses. Only variables with significant correlations with the PTSD measures were entered into the regression equations. Separate regression analyses were computed for the AIDS-IV PTSD Interview (number and severity of symptoms), Impact of Events Scale (intrusion and avoidance subscales), Posttraumatic Stress Disorder Scale (number and severity of symptoms), and the SCL-90-R GSI Index.

ADIS-IV. Four variables were significantly correlated with number of symptoms reported during the ADIS-IV PTSD interview ( age, PSS-Fa, number of traumatic events experienced prior to MI, and VAS-3; distress rating for "perceived disability" as a result of MI.) thus were entered into a step-wise regression model. Table 9 shows that age and PSS-Family score accounted for approximately 48 percent of the variance in number of symptoms reported during ADIS-IV interview.

Three variables showed significant correlations with severity of symptoms reported during the follow-up ADIS-IV interview and were entered into a stepwise regression analysis (age, PSS-Fa, and number of traumatic events). Table 9 again shows that age and perceived social support

Table 8. Correlation Coefficients for Medical, Psychosocial, and Demographic Variables and the Various Dependent Variables at Phase Two.

Potential IVs	PSD Total # of Sx	PSD Sx Severity Score	IES-Avoidance Subscale	IES-Intrusion Subscale	ADIS # of Sx	ADIS Sx Severity	SCL-90 GSI
Age	-.50**	-.54**	-.40*	-.52**	-.59**	-.71**	-.60**
CPK	-.09	-.08	-.19	-.14	.29	.42	-.16
EF	-.04	-.11	-.14	-.08	.24	.16	.03
LOS	-.26	-.09	.11	.01	-.15	-.05	-.09
No. Prior MIs	-.19	-.23	-.20	-.26	-.20	-.21	-.31
Family Stability	-.15	-.22	-.18	-.13	.11	.15	-.24
Income	-.07	-.14	.23	-.10	-.13	-.04	-.21
Education	.13	.13	.13	.18	.01	.10	.04
#Trauma Events	.42*	.43*	.24	.46*	.51**	.48*	.62**
Physician Rating	.82**	.71**	.71**	.67**	.54*	.62**	.63**
VAS I	.42*	.35	.29	.22	.28	.23	.33
VASII	.10	.09	-.00	-.02	.28	.23	.12
VASIII	.26	.10	.09	-.02	.39*	.36	.12
WCCL-AV	-.26	-.40*	-.42*	-.39*	.12	.16	-.28
WCCL-BS	-.39	-.41*	-.31	-.32	.15	.03	-.21
WCCL-PF	-.12	-.06	-.01	.00	.08	.15	.15
WCCL-SSS	-.32	-.39*	-.28	-.26	-.20	-.26	-.36
WCCL-WT	.08	.02	-.01	.11	.25	.08	.05
PSS-Family	-.25	-.22	-.26	-.25	-.57**	-.57**	-.33
PSS-Friends	-.03	.03	-.01	.27	-.10	-.02	.01

Note. \* significant at .05 level \*\* significant at .01 level (EF= Ejection Fraction; LOS=Length of Stay; WCCL: BS=Blames Self, PF=Problem Focused, SSS=Seeks Social Support, WT=Wishful Thinking)

from family members accounted for 58% of the variance in severity of symptoms reported during the PTSD interview.

Impact of Events Scale. Three variables were significantly correlated with the Intrusion subscale of the IES and were entered into a stepwise regression analyses (age, Avoidance Subscale of the WCCL-R, and number of traumatic events). Table 9 indicates that age and WCCL-Avoidance subscale accounted for 51% of the variance in IES-Intrusion Scores. The IES-Avoidance subscale correlated significantly with age and the WCCL-Avoidance subscale. These two variables were entered into a stepwise regression; Table 9 shows the results of the regression. Age and Avoidance Coping accounted for 39% of the variance in IES-Avoidance subscale score.

Posttraumatic Stress Disorder Scale. Age, number of traumatic events exposed to, and intensity of perceived distress associated with MI were significantly correlated with number of symptoms reported on the PSD Scale. These variables were entered into a stepwise regression analysis; however, only age was retained in the equation and accounted for 26% of the variance in symptoms reported (see Table 9).

Age, number of traumatic events exposed to, Blames Self, Avoidance, and Seeks Social Support subscales from the Ways of Coping Checklist -Revised were significantly correlated with severity of symptoms reported on the PSD Scale thus were entered into a stepwise regression analysis. Age and avoidance coping were retained in the equation and accounted for 57% of the variance in severity of symptoms reported (see Table 9).

Table 9. Summary of Step-Wise Regression Analysis for Variables Correlating with PDS, ADIS-IV, IES, and SCL-90-R (GSI) at Follow-Up Interview.

<u>Variable</u>	<u>B</u>	<u>SE B</u>	<u>Beta</u>	<u>Adj.R Square</u>	<u>Model R Square</u>
ADIS -IV (Number of SX; N=26)					
Model 1:					.32
Age	-.154	.043	-.593*	.32	
Model 2					.48
Age	-.120	.039	-.463*	.32	
PSS-FA	-.354	.123	-.433*	.16	
ADIS-IV (Severity of SX; N=26)					
Model 1:					.48
Age	-.79	.16	-.71*	.48	
Model 2					.58
Age	-.65	.15	-.58*	.48	
PSS-FA	-1.21	.47	-.35*	.10	
IES-Intrusion; N=26					
Model 1:					.28
Age	-.36	.11	-.56*	.28	
Model 2					.51
Age	-.41	.09	-.64*	.28	
WCCL-AV	-.72	.20	-.49*	.23	
IES-Avoidance; N=26					
Model 1:					.17
Age	-.32	.13	-.45*	.17	
Model 2					.39
Age	-.37	.11	-.53*	.17	
WCCL-AV	-.80	.25	-.50*	.22	

Continued on next page

<u>Variable</u>	<u>B</u>	<u>SE B</u>	<u>Beta</u>	<u>R Square</u>	<u>Model R Square</u>
PSD Scale Number of SX; N=26					
Model 1:					.26
Age	-.19	.05	-.54*	.26	
PSD (Severity of Sx; N=26).					
Model 1:					.33
Age	-.50	.14	-.59*	.33	
Model 2:					.57
Age	-.57	.11	-.67*	.33	
WCCL-AV	-.97	.25	-.51*	.24	
SCL-90-R GSI Index; N=26					
Model 1:					.36
Number of Trauma Events	-.04	.01	.69*	.36	

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Note.\*p < .05

### SCL 90-R/GSI Index

Age and prior exposure to traumatic events were significantly correlated with the SCL-90-R GSI thus were entered into a stepwise regression analysis. Exposure to multiple traumas was retained in the equation and accounted for 36% of the variance in GSI scores for individuals during Phase Two (see Table 9).

### Discussion

Of the forty participants completing a diagnostic interview, fifteen percent of the individuals were diagnosed with Acute Stress Disorder immediately following their MI. On the PSD, these individuals reported more re-experiencing and avoidance symptoms than individuals not meeting criteria for ASD/PTSD. Further, these individuals reported more severe re-experiencing, avoidance, and arousal symptoms than their non-ASD counterparts; however, no differences were observed on the IES between the two groups.

Approximately 30% of individuals who completed both assessment phases reported symptoms sufficient to meet criteria for PTSD at follow-up. These individuals reported significantly more re-experiencing, avoidance, and severe arousal symptoms than their non-ASD counterparts on the PSD. The PTSD group endorsed significantly more intrusion items on the IES than their non-PTSD counterparts. These individuals similarly reported higher levels of distress on all of the subscales and global indices of the SCL-90-R during Phase-Two than the non-PTSD group.

During the follow-up evaluations, only three of the individuals reporting symptoms sufficient to meet criteria for ASD post-MI continued to exhibit symptoms sufficient for a PTSD diagnosis at follow-up. Of the remaining three individuals in the ASD group during Phase One,

two did not complete Phase Two and one individual's symptoms were not sufficient for a diagnosis of PTSD at follow-up. Thus five individuals who eventually received a PTSD diagnosis experienced subclinical symptoms during Phase One. It is quite clear from this pattern of findings that time since MI appears to be a significant factor in determining the incidence of ASD/PTSD symptoms with cardiac populations. Recently Bryant and Harvey (1998) assessed the relation between ASD and PTSD over time in a sample of motor-vehicle accident (MVA) survivors with mild traumatic brain injury. Bryant and Harvey similarly reported a higher percentage of individuals diagnosed with PTSD six months post-trauma (25%) than individuals meeting criteria for ASD within one month post-accident (14%). In that sample, 82% of patients with Acute Stress Disorder subsequently were diagnosed with PTSD and 11% of individuals meeting criteria for PTSD at six months did not receive an ASD diagnosis within one month of their trauma.

Due to subject attrition from Phase One to Phase Two in the present study, evolution of ASD to PTSD could not be adequately determined because two of the six individuals with ASD diagnoses during Phase One failed to complete Phase Two. It is possible they continued to meet criteria for a trauma-related disorder. The delayed onset of PTSD responses has been well documented in the literature; therefore, the five individuals with subclinical symptoms during Phase One who were later diagnosed with PTSD is not surprising. It is clear from these findings, as well as previous work, (Bryant & Harvey, 1998) that while ASD and PTSD represent similar diagnostic categories-they do not perfectly correspond with one another. In other words, ASD does not always lead to PTSD and PTSD is not always preceded by ASD. Bryant and Harvey (1997) discussed the discrepancies between the assumption that acute stress reactions are similar and correlate with Post-Traumatic Stress Disorder and concluded that at this time there is

insufficient research to support that the two responses are temporally and topographically the same. The uniqueness of a medical event, like MI, as a traumatic event may also result in a different pattern of ASD and PTSD symptoms than observed in samples exposed to other traumas.

The percentage of individuals experiencing ASD/PTSD symptoms immediately post-MI described in the present study approximates incidence findings reported in other post-MI samples. For example, Kutz et al. (1994) reported a 25% incidence of PTSD following MI, and Doerfler et al. (1994) reported that 18% of their sample had scores on the Reaction Index suggestive of the presence of PTSD. However, the study by van Driel and Op den Velde (1995) reported a somewhat lower incidence finding of PTSD among cardiac patients. In that study, only 1 of 20 individuals without a prior history of trauma met criteria for PTSD within two weeks of the participant's MI. Three individuals completing their study had a prior history of trauma but no information was provided regarding these individual's responses to their MI other than their trauma symptoms from previous events had not worsened. This finding is inconsistent with Hamner (1994) who reported exacerbation of PTSD with medical illnesses. Similarly Kutz et al. (1994) reported that individuals with a previous history of PTSD were at increased risk of experiencing PTSD responses to their MI. Other studies have shown that previous trauma exposure will increase the likelihood that an individual will develop PTSD symptoms to subsequent traumatic events (cf. Steketee & Foa, 1987; Roth, Wayland, & Woolsey, 1990). In light of these findings, it seems likely that the three individuals with a history of trauma in the van Driel and Op den Velde (1995) study may have been at risk for experiencing new or more severe PTSD/ASD symptoms than the other participants. Lack of information regarding their response



to their MI may have resulted in an underestimation of the incidence of PTSD/ASD in this sample. Further, individuals in this study were assessed up to two weeks post-MI (mean time interval was not reported) which represents a different time interval than the mean of four days post-MI or approximately four months post MI that was used in this study. It is possible that ASD symptoms may have remitted for some individuals who completed assessments several weeks after their MI. In fact, we observed this in one patient who met criteria for ASD in Phase One, but did not meet criteria for PTSD at Phase Two.

Additionally, a substantial number of individuals who were approached to participate in the current study did not complete the assessment protocol. It is possible that included in this non-completer group were individuals who attempted to avoid completing questionnaires which further required that the individuals recall their MI or other possible traumatic events. A study by Cohen et al. (1996) found that 57% of post-MI patients refusing to complete psychological assessments associated with their MI subsequently were referred and accepted psychological intervention by a social worker or psychologist. This finding suggests that many individuals who are acutely distressed may avoid assessments such as the questionnaire packet utilized in this study leading researchers to underestimate the number of individuals with PTSD in this sample.

The individuals reporting trauma responses sufficient to meet DSM-IV criteria in this study differed from the non-ASD/PTSD groups in many ways. ASD/PTSD patients reported more symptoms with more frequent occurrences from the re-experiencing and avoidance symptom clusters. The only non-significant difference between the two groups on the PSD was the experience of arousal symptoms during Phase One. This finding is consistent with reports from patients who endorse one or more symptoms of PTSD following various traumas such as

robbery, physical assault, fire, motor-vehicle accidents, and other types of disasters and hazards (Norris, 1992). Experiencing of arousal symptoms appears to be common following traumatic events, even among individuals who do not go on to develop PTSD (Norris 1992). Similarly, the number of arousal symptoms was not different between the ASD and non-ASD groups during Phase One; however, the ASD group reported significantly more frequent or more severe arousal symptoms than non-ASD patients.

### Prediction of PTSD

Objective and subjective variables measured during Phase One were examined regarding their relation with PTSD onset at Phase Two. For example, the variables assessing perceived distress and disability associated with the MI were significantly correlated with several ASD/PTSD measures. This is consistent with Kutz et al. (1994), who reported that anticipated incapacitation as a result of MI was significantly correlated with development of PTSD. Although Kutz et al. (1994) did not state how they assessed "anticipated incapacitation," the VAS used in this study to assess perceived distress and disability was found to be correlated with number of PTSD symptoms and to be significantly higher in the acute ASD sample in contrast to their non-ASD counterparts.

Individuals reporting more PTSD symptoms also had significantly more exposure to previous traumatic events. This findings is consistent with Kutz et al. (1994) who reported increased risk of PTSD symptoms among post-MI patients who were previously exposed to traumatic events. This is also consistent with other studies reporting a positive relation between prior trauma history and PTSD symptoms following subsequent traumatic events (cf. Steketee & Foa, 1987; Roth, Wayland, & Woolsey, 1990; Ullman & Siegel, 1994). Although exposure alone

to traumatic events does not necessitate a diagnosis of PTSD, much debate exists regarding the subjective experience of trauma versus the pure objective factor of exposure to trauma alone (cf. Bryant & Harvey, 1997). Perhaps a cumulative effect for trauma exposure can occur, thus lowering the threshold for an individual to subsequently develop PTSD in response to a new event. Although this relation was observed in this study, it did not contribute additional variance to PTSD responses beyond that which was accounted for by age, perceived social support, and avoidant coping style. However, a previous trauma history did significantly account for 39% of the variance in the distress index on the SCL-90-R. Perhaps cumulative exposure to stress including health-related events such as MI is more helpful in predicting the subjective distress individuals experience than in measures specific to PTSD.

Subjective ratings of distress by physicians (residents) caring for these individuals significantly correlated with trauma responses reported across the various measures of trauma (i.e., ADIS-IV, IES, PSD). The distress that post-MI patients experience appears to be easily recognized by the health care providers caring for these patients; however, this recognition did not necessarily result in a formal request for a psychiatric evaluation of this problem and possible intervention. Anecdotally, the physicians providing ratings in this study stated that they perceived the level of distress observed as a normal reaction to this type of medical problem.

As this study demonstrated with this unique type of trauma, an individual's perception of a traumatic event (i.e., MI) accounted for more variance on PTSD measures than objective measures of the severity of the trauma. Congruent with Kutz et al. (1994), this study did not find significant relations between medical variables assessing actual severity of the MI and number of ASD/PTSD symptoms reported. This finding is also consistent with Trelawney-Ross & Russell's

(1987) finding that severity of MI was not correlated with level of anxiety and depressive symptoms reported up to six months post-MI. Similarly these authors reported that severity of physical injuries, such as those resulting from severe burns, also did not significantly account for variance on PTSD measures whereas more subjective baseline factors did. Nonetheless, inquiry into the relation between objective measures of severity and PTSD responses to MI continues to be of interest in the literature (Gross & Kindler, 1994).

Among all previous studies assessing PTSD in cardiac populations, only Kutz et al. (1994) identified potential predictors of PTSD. Kutz et al. (1994) identified perceived disability as a result of MI, prior MI or cardiac hospitalization, previous history of PTSD unrelated to MI, and an ethnic variable (i.e., Asian or African descent) as potential predictors of PTSD after a cardiac event. In this current study, age of the participant (pre-trauma factor) was significantly related to PTSD symptoms at follow-up across all measures of PTSD; younger patients were more likely to report trauma symptoms as a result of their MI than older patients. Further, use of avoidant coping style (post-trauma factor) accounted for a significant amount of the variance on the IES subscale scores and severity of symptoms reported on the PSD. Finally, low levels of perceived social support from family (post-trauma factor) accounted for a significant amount of variance for number and severity of symptoms during the ADIS-IV PTSD interview. Younger individuals consistently experienced more trauma responses post-MI with greater severity across all three PTSD measures than older patients. This supports the findings by Uuskula (1996) who found that younger survivors of MI require additional psychosocial intervention following first MI in comparison to older surviving patients. The possibility that a significant medical illness at an earlier age is considered less likely may also explain the higher level of trauma responses

among younger patients. The unpredictable aspect of a sudden serious illness may contribute to this finding. The possibility of an early death and loss of physical abilities at an earlier age increases the likelihood that younger individuals will develop traumatic responses. Due to the ease with which age is obtained in comparison to other constructs investigated in this study, this variable should be of considerable utility to healthcare providers who wish to identify individuals at risk for developing psychological complications that place them at further risk for increased rates of mortality and morbidity from their heart condition.

Additionally, the more social support an individual perceived from family members appeared to serve as a buffer against more numerous and severe symptoms of PTSD but only on the ADIS-IV interview. Increased perception of social support has consistently been identified as a buffer to traumatic responses across types of trauma and against deleterious post-MI complications among cardiac patients (Friedman & Thomas, 1995; Schaefer, Coyne, & Lazarus, 1981). This study not only found that perceived social support was significantly related to trauma responses but that the source of the support was also significant. Perceptions of increased support from family members in contrast to friends accounted for more variance on PTSD interview indices following MI. Enhanced perception of social support has consistently been shown to have a positive influence on mortality and morbidity following medical illnesses, including MI (Berkman, Summers, & Horowitz, 1992; Case, Moss, & Case, 1992).

Finally, avoidant coping style was predictive of severity of symptoms reported on the PSD, IES-Intrusion, and IES Avoidance subscales. This is inconsistent with studies indicating that avoidant coping style significantly accounts for variance on PTSD measures following trauma (Bryant & Harvey, 1995; Bryant & Harvey, 1998) The current study observed that

individuals who used avoidance coping tended to endorse fewer symptom responses on questionnaires, whereas those who did not use avoidant coping endorse more symptoms. This relation was not observed between avoidance coping and ADIS-IV indices of PTSD. It is possible that the inverse relation between avoidant coping and trauma responses on the questionnaires observed in this study was the result of avoidance-coping patients successfully using their avoidance-based strategies. For example, individuals with the highest avoidance scores were less likely to endorse higher occurrence of symptoms on the SCL-90-R. When examining the various subscales of the SCL-90-R, individuals with highest avoidance scores reported very little distress whereas the remaining two-thirds of the individuals with lower avoidance scores reported much higher levels of distress. This observation suggests higher endorsement of symptom occurrence among individuals with lower avoidance scores, but only on questionnaires. Presumably the reason this relation was not observed during the interview was that it is much harder to avoid or deny distress when directly questioned than when asked to complete a questionnaire.

#### Concurrent Validation of PTSD Measures

Finally, analyses examining the concurrent validity of the PTSD measures via the two assessment modalities (interview & questionnaires) were examined. Significant correlations were observed across all trauma measures during Phase Two except for the relation between the IES-Avoidance Scale and the overall number of symptoms reported during the ADIS-IV interview. The lack of a significant correlation between the IES-Avoidance subscale and the overall number of symptoms reported on the ADIS-IV PTSD module is not surprising. The significant correlations across all PTSD measures fell between .46 to .84 which suggests that these variables

tap different domains of PTSD. The diagnostic domains/clusters that comprise PTSD are by definition somewhat unique and different. Comparison between overall symptom indices with the individual subscales of the IES (because there is no overall score), would predictably result in lower correlations than comparisons of two overall symptom indices (e.g., ADIS-IV and PSD overall indices). Additionally, the IES -Avoidance and Intrusion subscales are not diagnostic checklists. As such, they would be expected to correlate, but not perfectly, with PTSD diagnostic symptom domains (re-experiencing, avoidance, hyperarousal). However, the strongest correlations observed were between within scale items indicating a possible method/measure difference observed in this study. Individuals in the study may have responded differently to an interviewer assessing symptomatology versus responding to a paper and pencil assessment instrument. This may, in part, account for the lower correlations observed between PTSD measures. Additionally, the relative time between obtaining self-report and interview measures may have resulted in lower correlation coefficients. Some individuals completed the questionnaire packet prior to the interview. Other individuals completed the interview and at that time were reminded to complete and return the questionnaire packet. The follow-up contact time ranged from 15 to 46 weeks since MI across the Phase Two sample. The variable duration between these two assessments could easily result in lower correlation coefficients due to the fluctuating nature of PTSD symptoms or severity of symptoms over time.

### Limitations Of This Study

Although this study attempted to overcome methodological weaknesses associated with previous studies assessing PTSD among post-MI patients, there were some limitations associated with this study. The overall sample size, for example, was somewhat small in comparison to Kutz

et al. (1994). High subject attrition during Phase One seriously limited the number possible participants available for the follow-up evaluation. Secondly, individuals reporting exposure to more than one traumatic event (including their MI) did not complete the Phase One PTSD questionnaires with instructions to specifically respond considering their recent MI. This limited the number of dependent variables available during Phase One to measure trauma-related responses. Some individuals responded to the initial questionnaires by reporting symptoms associated with other more distressing traumatic events that had occurred prior to their MI. In contrast, ADIS-IV interviews during Phase One were conducted for PTSD/ASD responses to MI only. To permit a better assessment of PTSD symptoms during Phase Two, the questionnaire instructions were modified so that each patient was asked to answer the items in response to their recent MI; exposure to other traumatic events was assessed as well. Another limitation of this study is the lack of complete data regarding physician ratings of distress for all patients. This is particularly problematic, because this variable was significantly correlated with PTSD onset and global distress during Phase Two. The low collection rate for this variable limited our ability to extensively evaluate its unique ability to account for variance on measures of PTSD.

Another problem pertained to the fact that assessments for PTSD (questionnaire vs. interview) were administered at different time periods in a patient's recovery. Some individuals completed questionnaire packets during their hospitalization at Phase One, while others completed them after returning home. Some individuals completed interviews in the hospital but did not complete the questionnaires until they recovered from a medical procedure or felt the endurance to do so at a later time period either in the hospital or at home. Other participants completed questionnaires over several days of their hospitalization. Rarely were patients able to



complete the interview and questionnaire packet in the same day. Finally, some individuals completed the interview, but not the questionnaires and vice versa. All of these factors likely influenced the outcomes for assessing concurrent validity of the PTSD measures and accurately assessing the transient state of ASD during Phase One. Future studies could avoid these problems by utilizing more brief questionnaires to increase compliance and quick assessment of PTSD symptoms.

Phase Two limitations are similar to those at Phase One, including, a time divergence between the two assessment modalities (interview & questionnaires), perhaps influencing data regarding PTSD incidence and impacting data regarding concurrent validity of the PTSD measures. Secondly, the follow-up evaluations were completed without face-to-face contact which may have increased subject attrition for Phase Two and resulted in the divergence in symptoms reported across the two assessment modalities. Like Phase One, some individuals completing Phase Two did not return the questionnaires but did respond to the phone interview and vice versa.

Data regarding other possible diagnoses (e.g., mood disorders, other anxiety disorders, substance abuse disorders) via a comprehensive psychological interview were not collected for this sample. Past or concurrent treatments for psychological problems were not assessed across both Phase One and Two which may have influenced the accurate reporting of incidence. Finally, two other studies, including a treatment study for post-MI depression, were being conducted at the same time as this study and likely influenced a patient's choice to participate in this study.

Significance of PTSD Symptoms Among Post-MI Individuals and Future Directions

Psychological complications have been reported in 40-80% of patients assessed post-MI (Glassman & Shapiro, 1998). Persistent distress has been reported in 20-30% of samples (Byrne, & Whyte, 1978; Cassem & Hackett, 1971; Crowe et al., 1996; Garcia et al., 1994; Hackett & Cassem, 1969; Lloyd & Cawley, 1982; Naismith et al., 1979; Rosen & Bibring, 1966; Stern et al., 1976; Wiklund et al., 1984). The nature and influence of anxiety disorders including PTSD, among post-MI patients, has been less frequently studied in comparison to other diagnoses like post-MI depression (Glassman & Shapiro, 1998). Although morbidity, mortality, and decreased functional outcomes associated with PTSD symptoms for post-MI individuals is unknown, the long-term impact of generalized anxiety responses upon cardiac mortality has been of increasing interest (Kubzansky, Kawachi, Weiss, & Sparrow, 1998). Kubzansky et al. (1998) recently reviewed pathophysiologic mechanisms by which anxiety may contribute to the development of CHD. Sudden increased sympathetic arousal, as seen in PTSD and ASD, is speculated to contribute to electrical instability of the myocardium, promote atherosclerotic processes, and alter cardiovascular autonomic control (Kubazansky et al., 1998). For example, anxiety at one year post-MI has been more closely associated with decreased physical functioning of the patient in comparison to severity of coronary disease at time of diagnosis (Sullivan et al., 1997). After controlling for factors associated with increased complications, Moser and Dracup (1996) reported that individuals with increased anxiety responses 48 hours after myocardial infarction have been found to be 4.9 times more likely to experience complications such as reinfarction, new onset of ischemia, ventricular fibrillation, sustained ventricular tachycardia, and in-hospital death. Similarly, Allison et al. (1995) reported that individuals reporting higher levels of anxiety had significantly higher rates of cardiovascular rehospitalization and recurrent events (including

cardiac death, MI, SCD) within 6 months following discharge from initial hospitalization.

Additionally, the acutely distressed participants had 3 to 4 times higher rehospitalization costs than non-distressed cardiac patients.

These studies highlight the significance of treating anxiety responses among post-MI individuals in both the acute and subsequent recovery periods. Although most studies of this type have examined anxiety responses, yielding a diagnosis of PTSD or ASD is quite salient in the context of a hospital environment, where various disciplines recognize the culmination of symptoms in a diagnosis as critical as the starting point for treatment decision making. The diagnostic label permits more precise communication among team members in hospital environments. Despite the importance of meeting diagnostic criterion, treatment of "subsyndromal" PTSD may also be critical for post MI patients. This is particularly true because treatment of "subsyndromal" PTSD has been shown to be effective in remission of symptoms (Blanchard, Hickling, Vollmer, & Warren, 1995).

Others have examined the contribution of psychosocial interventions aimed at long-term health outcomes for cardiac patients (Allan & Scheidt, 1996). A recent meta-analysis revealed that psychosocial interventions combined with standard cardiac rehabilitation components produced a 41% reduction in cardiac mortality and 48% reduction in nonfatal cardiac events (Linden, Stossel, & Maurice, 1996). However, these programs reportedly do not adequately address distress experienced acutely that results in complication during the acute recovery phase. Elucidating the nature of anxiety responses, including PTSD, among post-MI individuals is necessary in order to identify effective interventions in the post-MI acute recovery phase. Although the specific nature of the mechanism for increased complications and mortality has not

been specified, increased sympathetic nervous system arousal and unhealthy coping strategies (e.g., increased tobacco use) have been implicated (Fricchione & Vlay, 1986; Kamarck & Jennings, 1991; Niaura & Goldstein, 1992). Identifying interventions that will effectively ameliorate or lower anxiety responses and the mechanisms that increase risk for mortality, morbidity, and decreased quality of life is an important step for future research.

Physicians caring for individual's with post-MI related anxiety disorders should be more aware of its potential occurrence and future research should attempt to delineate when appropriate intervention is warranted. Many cognitive and behavioral interventions are available for individuals with acute and chronic stress responses and could easily be employed with patients while they are still in the hospital (cf. Fairbank & Brown, 1987). Utilization of multi-disciplinary teams with a mental health professional or appropriate referral to individuals specialized in working with this population may provide opportunities for patients to be thoroughly evaluated and appropriate interventions implemented to improve quality of life and possibly decrease complications during the course of recovery from MI.

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Appendix A  
Curriculum Vitae

**CURRICULUM VITAE****IDENTIFYING INFORMATION**

NAME: Risa Nakase Thompson

BORN: January 11, 1971 in Akashi City, Japan

NATIONALITY: U.S. Citizen

ADDRESS: Mississippi Methodist Rehabilitation Center  
Neuropsychology Department  
1350 East Woodrow Wilson  
Jackson, MS 39216

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**EDUCATION**

1998-Present Post-Doctoral Neuropsychology Fellow, Neuropsychology Department, Mississippi Methodist Rehabilitation Center, Jackson, MS

1997-1998 Behavioral Medicine Psychology Resident, Department of Psychiatry & Human Behavior, University of Mississippi Medical Center & Jackson VAMC Consortium, Jackson, MS

1993-1999 Ph.D., Department of Psychology, West Virginia University, Morgantown, WV. *Dissertation: Medical and Psychological Predictors of PTSD Symptoms Following Myocardial Infarction*, Chair: Kevin Larkin, Ph.D. Committee Members: Barry Edelstein, Ph.D., Stanley Cohen, Ph.D., Joseph Scotti, Ph.D., & Stanley Schmidt, M.D.

1996 M.A., Masters Degree in Clinical Psychology, West Virginia University, Morgantown, W.V.

1993 B.S., Magna Cum Laude, Psychology, Mississippi College, Clinton, MS

1989 H.S. Diploma, High Honors, Biloxi High School, Biloxi, MS

**HONORS AND AWARDS**

1993	HERF Award, West Virginia University
1993	Perry Academic Award, Mississippi College
1993	Senior Psychology Award, Mississippi College
1992	Psi Chi Outstanding Junior in Psychology Award
1992	Who's Who Among Students in American Universities
1992	Psi Chi, National Psychology Honor Society, President of the Mississippi College Chapter
1992	Mortar Board, National Honor Society, President of the Mississippi College Chapter
1992	Alpha Chi, National Academic Honor Society
1992	Omicron Delta Kappa, National Honor Society
1990	Freshman Woman of the Year, Mississippi College
1989-1993	Mississippi College Honors Scholarship

**TEACHING EXPERIENCE**

<b>1996-1997</b>	<b>T.A., Department of Psychology, West Virginia University, Morgantown, WV. Supervisor: Tracy Morris, Ph.D.</b>
<b>Fall, 1996</b>	<b>Guest Lecture, Department of Psychology, WVU, Morgantown, WV. Course Supervisor: Barry Edelstein, Ph.D.</b>
<b>Spring, 1996</b>	<b>T.A., Department of Psychology &amp; School of Dentistry, WVU Morgantown, WV. Course Supervisor: Daniel McNeil, Ph.D.</b>
<b>1996</b>	<b>T.A., Department of Psychology, WVU. Morgantown, WV. Course Supervisor: Tracy Morris, Ph.D.</b>
<b>1993</b>	<b>T. A., Department of Psychology, WVU. Morgantown, WV. Course Supervisor: John Crosby, Ph.D.</b>
<b>1995</b>	<b>T.A. , Department of Psychology, WVU. Morgantown, WV.</b>

## RESEARCH EXPERIENCE

- 1998-Present**                    **TBI Model Systems of Mississippi, Mississippi Methodist Rehabilitation Center, Jackson, MS.**
- Duties: 1) Serve as the Data Collection Manager for the Traumatic Brain Injury Model Systems of Mississippi, NIDRR Grant at MMRC.
- 1997-Present**                    **Cognitive Clinic, Behavioral Education and Consultation Service, Jackson VAMC, Jackson, MS. Supervisor: Phil Godding, Ph.D.**
- Duties: 1) Establishing database for cognitive and neuropsychological assessments conducted by the service, 2) Data-entry and analyses for study investigating normative profiles on the Cognitive Capacity Screening Examination across various clinical samples (i.e., dementia, general medical, substance abuse, cancer, and psychiatric) and concurrent validity with the Dementia Rating Scale, 3) Data-entry and writing responsibilities for a structural equation analysis of the Wechsler Memory Scale-Revised, California Verbal Learning Test, and Rey Auditory Verbal Learning Test.
- 1997-Present**                    **Health Behavior Program, Jackson VAMC, Jackson, MS. Supervisor: Thomas Payne, Ph.D.**
- Duties: 1) Data entry and assistance with analyses of study investigating cued psychophysiological responses to smoking, 2) Data-entry for study investigating effects of cognitive-behavioral smoking cessation intervention.
- 1995-1997**                        **Cardiology Service, Department of Medicine, West Virginia University Hospitals, Morgantown, WV. Supervisor: Kevin Larkin, Ph.D, Anthony Morise, M.D., & David Beckner, M.D.**
- Duties: Designing methodology and coordinating data collection for a study investigating gender differences in presentation of coronary artery disease and for a study investigating psychological responses to the implantable cardioverter defibrillator.
- 1996-1997**                        **Physician's Office Center, Morgantown, WV. Supervisor: Kevin Larkin, Ph.D.**
- Duties: Data collection on daily stress and ambulatory blood pressure in individuals with essential hypertension.
- 1996-1998**                        **Forensics Research Group, Department of Psychology, WVU. Morgantown, WV. Supervisor: Bill Fremouw, Ph.D, ABPP**
- Duties: Methodological development and data-analysis of 1) Study investigating the impact of Stalking on Victims, and 2) Study investigating attachment styles in acquaintance stalking relationships compared to non-stalking relationships.
- 1993-1996**                        **Center for Anxiety Disorders, West Virginia University Morgantown, WV. Supervisor: Georg H. Eifert, Ph.D.**



Duties: 1) Assisted with the set-up and data collection of a study measuring conditioned panic responses via physiological and self-report methods to video presentations of interoceptive and exteroceptive stimuli, 2) Collected data in the WVUH Pain Clinic at the Physicians Office Center for a study examining the influence of trait anxiety and depression's effect on chronic pain patient's coping methods and pain responses, 3) Revised and validated the Cardiac Anxiety Questionnaire on a sample of patients referred for cardiac catheterization at Ruby Memorial Hospital.

1993-1995

**Post-Traumatic Stress Disorder Research Group, West Virginia University, Morgantown, WV. Supervisor: Joseph Scotti, Ph.D.**

Duties: Data entry for a study examining the impact of the Gulf War on veterans, their spouses and children, 2) literature review for and editing of a chapter examining the impact of accidental injury on behavioral health.

1992-93

**Trauma Recovery Program, Veteran's Affairs Medical Center, Jackson, MS. Supervisors: Judith Lyons, Ph.D. and Patrick Smith, Ph.D.**

Duties: Reviewed the literature and assisted in designing a study investigating cue-induced analgesia in Vietnam Veterans with Post Traumatic Stress Disorder, 2) Edited heart rate data for a study investigating the effects of various stressors on physiological responses in Veterans with Post Traumatic Stress Disorder.

1991-93

**Honors Program, Mississippi College, Clinton, MS. Supervisor: Gloria Fisher, Ph.D.**

Duties: Designed and implemented a study investigating the Path-Goal Theory of Leadership. Assessed how locus of control moderated predicted relationships between leader initiating structure and subordinate satisfaction.

1992

**Psychology Service, Veteran's Affairs Medical Center, Biloxi, MS. Supervisors: Kenneth R. Jones, Ph.D. and Steven McNally, Ph.D.**

Duties: 1) Administered questionnaires investigating critical incidents in health care provider responses to the needs of patients with chronic illnesses, 2) Administered structured interviews to patients for a study investigating the prevalence of substance abuse among male substance abusers.

1992

**Semko and Associates, Jackson, MS. Supervisor: Gloria Fisher, Ph.D.**

Duties: Conducted literature reviews of legal cases for the development of a test to measure hostile-interpersonal environments.

**CLINICAL EXPERIENCE**

**1998-** **Neuropsychology Fellow, Mississippi Methodist Rehabilitation Center (MMRC) & University of Mississippi Medical Center (UMMC), Jackson, MS**

MMRC: Neuropsychological assessment and management of adult and adolescent inpatient and outpatients referred following traumatic brain injury, stroke, tumor resection, and spinal cord injury.

UMMC: Neuropsychological assessment of adult and pediatric inpatient and outpatients referred following traumatic brain injury, stroke, epilepsy surgery, and chemical poisoning.

**1997-1998** **Psychology Resident, University of Mississippi Medical Center & Jackson VAMC Consortium, Jackson, MS.**

Behavioral Education and Consultation Rotation (BE&C), Supervisor: Phil Godding, Ph.D. (8/97-11/97): Neuropsychological, personality, competency, malingering, anxiety, depression, and cognitive assessments for medical inpatients, medical outpatients, and compensation and pension claimants. Other duties include consultation to oncology/radiation therapy, primary care clinics, and comprehensive pain management clinic. Finally, co-leader of 6-week chronic pain management group utilizing cognitive-behavioral and educational interventions.

(11/97-2/98): Health Behavior Program, Supervisor: Thomas Payne, Ph.D.

Assessment and treatment of inpatients and outpatients presenting with cardiovascular risk factors and other stress-related medical disorders via a cardiac and smoking cessation clinic. Participation on cardiac rehabilitation team and consultation to primary care clinics.

Joint Rotation: Chemical Dependency Treatment Program (CDTP)- Supervisors: James Fitterling, Ph.D. or Jefferson Parker, Ph.D., and Clinical Neuropsychology, Supervisor: Bradley Burton, Ph.D. (2/98 - 5/98): CDTP: Individual and group behavioral treatment of psychoactive substance use disorders and concomitant psychosocial problems via inpatient residential and outpatient rehabilitation programs. Neuropsychology (see below)

Clinical Neuropsychology, Supervisors: D. Bradley Burton, Ph.D. & Mark Sherer, Ph.D.(5/98-8/98):

Neuropsychological evaluation of neurologically and psychiatrically impaired individuals, instituting cognitive rehabilitation programs, consultation to multi-disciplinary teams, and developing intervention programs for neurologically impaired individuals.

**1995-1997** **Section of Cardiology, Department of Medicine, West Virginia University Hospital, Morgantown, WV. Supervisor: Kevin Larkin, Ph.D. & David Beckner, M.D.**

Duties: Psychological assessment of cardiac patients receiving an implantable cardioverter defibrillator (ICD) and/or pacemaker. Administration of psychological component of ICD support group. Bedside assessment and brief intervention for individuals with psychological factors complicating medical condition or atypical chest pain during cardiology rounds.

**1996-1997**      **Vertical Team, Quin Curtis Center, WVU, Morgantown, WV.**  
**Supervisor: Kevin Larkin, Ph.D.**

Duties: Individualized assessment and treatment of patients with anxiety and depression referred from Section of Cardiology, Department of Medicine.

**1995-96**      **Practicum Student, Sharpe Hospital and Summit Center, West Virginia. Supervisors: Barry Edelstein, Ph.D., Mike Todt, Ph.D., Peggy Allman, M.A. & Paul Macom, M.A.**

Duties: Implement relapse prevention group in day treatment program at CMHC, write behavioral plans, and evaluate treatment plans for recidivists in day treatment program. Program evaluation of continuity of care between inpatient psychiatric setting to community mental health center placement and treatment.

**1994-95**      **Practicum Student, Carruth Center for Counseling and Psychological Services, Morgantown, WV. Director of Training: Scott Friedman, Psy.D. Supervisor: Phil Comer, Ph.D.**

Duties: Provided individual and group treatment for undergraduate and graduate students as well as individual psychological assessment at West Virginia University.

**1994-95**      **Vertical Team, Quin Curtis Center, WVU, Morgantown, WV.**  
**Supervisor: Georg H. Eifert, Ph.D.**

Duties: Individualized assessment and treatment.

**1992**      **Psychology Apprentice, Veteran's Affairs Medical Center, Biloxi and Gulfport, MS. Director of Training: Kenneth R. Jones, Ph.D. (400 hours)**

Duties in Biloxi: Assisted in the assessment of patients in the Walk-in Clinic of Behavioral Medicine and conducted Reminiscence Therapy in the Nursing Home Care Unit.

Duties in Gulfport: Received training and administered Mental Status Examinations on the Admissions Ward of an in-patient unit.

## PROFESSIONAL AFFILIATIONS

International Association of Neuropsychology  
National Association of Neuropsychology  
American Psychological Association  
Division for Clinical Psychology, APA  
American Psychological Association of Graduate Students  
Association for the Advancement of Behavior Therapy  
Disaster and Trauma SIG of AABT  
Society for Behavioral Medicine

## **PUBLICATIONS**

Thompson, R., Brown, S., Beach, B., & Beeler, B. (1994). The hidden victim. *Disaster and Trauma Currents*, 3, 5-6.

Forsyth, J.P., Eifert, G.H., & Thompson, R.N. (1996). Systemic alarms in fear conditioning II: An experimental methodology using 20% carbon dioxide inhalation as an unconditioned stimulus. *Behavior Therapy*, 27(3). 391-415.

Westrup, D., Fremouw, W.J., Thompson, R.N., & Lewis, S.F. (in press, 1998). The psychological impact of stalking on female undergraduates. *Journal of Forensic Sciences*.

Eifert, G.H., Thompson, R.N., Edwards, K., Frazer, N.L., Haddad, J.W., and Davig, J. (under review). The cardiac anxiety questionnaire: development and preliminary validity. Submission to *Behaviour Research and Therapy* (Behavioral Assessment Section).

## **MANUSCRIPTS IN PROGRESS**

Thompson, R.N., Larkin, K., & Beckner, D. Psychological responses to the implantable cardioverter defibrillator: a review and critique of the literature.

Eifert, G.H., Schermelleh-Engel, K., Thompson, R.N., & Suchday, S. The pain regulation questionnaire: reliability and validity of a measure of pain competence, experience, and behavior.

Eifert, G., Edwards, K., Thompson, R.N., Haddad, W., Frazer, N. & Davig, J. Panic symptoms in cardiac and non-cardiac chest pain patient samples.

## **RESEARCH COMPLETED \ DATA COLLECTED**

Westrup, D., Fremouw, W., & Thompson, R.N. Attachment styles among acquaintance-stalking victims and age-matched controls in non-stalking relationships.

Thompson, R.N., Larkin, K.T., Beckner, D., & Schmidt, S. Medical and psychological predictors of PTSD symptoms following myocardial infarction.

Thompson, R.N., Beckner, D., Palmer, D., Larkin, K.T., & Schmidt, S. Prospective analysis of anxiety and depression in recipients of the implantable cardioverter defibrillator.

## **RESEARCH IN PROGRESS**

Normative profiles on the Cognitive Capacity Screening Examination for Rural Medical Center Populations.

Development of the Mississippi Brief Aphasia Screen.

Correlates of the stages of consciousness: Assessment using behavioral and electrophysiologic correlates.

## **CONFERENCE PRESENTATIONS**

Eifert, G.H., Thompson, R.N., Sorrell, J.T. (1998, November). Validation of the cardiac anxiety questionnaire: preliminary data from cardiology patients. Paper presented at the annual meeting of the Association of the Advancement of Behavior Therapy, Washington, D.C.

Thompson, R.N. (1998, October). Psychological responses to the implantable cardioverter defibrillator: A review. Paper presented at the annual meeting of the Mississippi Psychological Association in Biloxi, MS.

Westrup, D., Thompson, R.N., & Fremouw, W.H. (1997, November). *Incidence and Impact of Stalking Among Female College Students*. Paper presented at the annual meeting of the Association of the Advancement of Behavior Therapy, Miami, FL.

Westrup, D., Thompson, R.N., & Fremouw, W.H. (1997, November). *Attachment Style and Stalking Behavior of Former Intimates: A predictor?* Paper presented at the annual meeting of the Association for the Advancement of Behavior Therapy, Miami, FL.

Thompson, R.N., Beckner, D.H., Palmer, D., Larkin, K., Schmidt, S., & Lobban, J. (1996, November). *Anxiety and depression in recipients of the implantable cardioverter defibrillator.* Poster presented at the Association for the Advancement of Behavior Therapy, New York, NY.

Thompson, R.N., Eifert, G.H., Weaver, K., Haddad, W., Frazer, N., & Davig, J.P. (1996, November). *Development and validation of a measure of heart-focused anxiety.* Poster presented at the Association for the Advancement of Behavior Therapy, New York, NY.

Eifert, G.H., Thompson, R.N., Schermelleh-Engel, K., & Suchday, S. (1996, March). *The pain regulation questionnaire: reliability and validity of a measure of pain competence, experience, and behavior.* Poster presented at International Society of Behavioral Medicine.

Forsyth, J.P., Eifert, G.H. & Thompson, R.N. (1995, November). *An experimental methodology for studying systemic alarms in fear conditioning using 20% CO<sub>2</sub> Inhalation.* Poster presented at Association for the Advancement of Behavior Therapy, Washington, D.C.

Thompson, R.N., Forsyth, J.P., Davig, J.P., & Eifert, G.H. (1995, April). *Correlates of cardiophobic fears in college students.* Paper presented at the annual meeting of the Anxiety Disorder's Association of America, Pittsburgh, PA.

Thompson, R.N., Davig, J.P., Forsyth, J.P. & Eifert, G.H. (1994, November). *Prevalence and significance of cardiophobic and generalized illness fears as a function of parental medical history.* Paper presented at the annual meeting of the Association of the Advancement of Behavior Therapy, San Diego, CA.

#### **GRAND ROUNDS PRESENTATIONS**

Thompson, R.N. (1997). Assessment of the Stages of Consciousness. Grand Round presentation to Department of Psychiatry & Human Behavior, University of Mississippi Medical Center, Jackson, MS.

Thompson, R.N. (1992). *Depression.* Grand Round presented to panel of supervising psychologists, Psychology Service, Veteran's Affairs Medical Center, Biloxi, MS.

#### **AD HOC REVIEWER FOR:**

Clinical Psychology and Psychotherapy  
Journal of Cognitive Psychotherapy  
Psychology of Addictive Behaviors  
Diabetes Care

**REFERENCES**

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