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Posttraumatic Stress Disorder Across Traumatic Events: A Controlled

Study of Vulnerability and Resiliency Factors

by

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## Abstract

The present study explored risk and resiliency factors in the development of PTSD by comparing 25 people who experienced a traumatic event and developed PTSD with a control group of 27 individuals exposed to trauma who did not develop PTSD. Logistic regression analysis revealed that gender and the extent to which participants felt their life was in danger were significant predictors of PTSD, which was also found to be associated with a history of sexual abuse, social support, and type of trauma experienced. Many variables previously identified in the literature as significant risk factors for PTSD were not supported by the present research. This suggests that more research, using appropriate control groups, is needed to clarify the issue.

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## INTRODUCTION

### Background

The evolution of the concept of posttraumatic stress disorder (PTSD) was largely brought about through the observation and documentation of post war experiences of soldiers in combat during World War I and World War II (Fairbank, Schlenger, Caddell, & Woods, 1993). During World War I, the scientific study of behaviour was just beginning; therefore, there was little systematic research regarding soldiers in combat (Fairbank et al., 1993). However, postwar symptoms were noted and the syndrome was described as “shell shock”, believed to have been caused by neurological damage as a result of being near exploding shells (Everly, 1995). The postwar experiences of soldiers during World War II were studied in a more systematic fashion (Fairbank et al., 1993). Although there were some methodological problems with the research such as using samples of convenience, the studies clearly demonstrated that there were often long-term psychological difficulties following exposure to combat (Fairbank et al., 1993).

It was not until the publication of the DSM-III (APA, 1980), that the term posttraumatic stress disorder (PTSD) was officially acknowledged as a unique and valid disorder that could result in long-term psychological difficulties (Everly, 1995). Although the majority of studies related to PTSD have focused on veterans and warfare, DSM-III-R (APA, 1987) noted that PTSD may arise from any unusual distressing event such as rape, natural disasters (as in the case of floods or earthquakes), accidental disasters such as plane or car crashes, and deliberate trauma such as bombing and torture (cited in Everly, 1995). However, since the publication of the DSM-III-R, it has been noted that in fact

traumatic events such as rape and car crashes are not that unusual and indeed occur quite frequently. Therefore, DSM-IV (APA, 1994) has changed the definition of traumatic events to any event that involves “actual or threatened death or serious injury, or a threat to the physical integrity of self or others... the person's response involves intense fear, helplessness, or horror” (APA, 1994, p. 427).

### Symptoms

There are three major symptoms clusters associated with PTSD: 1) reexperiencing symptoms where the individual has intrusive memories and dreams of the traumatic event; 2) avoidance and numbing symptoms where the individual attempts to avoid any activities, people or situations that may be a reminder of the trauma or where the individual displays deficits in emotional responding; and 3) symptoms of increased arousal which may involve difficulties in initiating or maintaining sleep and/or an exaggerated startle response (APA, 1994).

### Prevalence

The prevalence of PTSD fluctuates according to the type of trauma (Fairbank et al., 1993). The DSM-IV (APA, 1994), notes that lifetime prevalence can range from 1% to 14%, and that high-risk populations such as combat veterans have prevalence rates ranging from 3% to 58%, depending on the severity of the trauma.

Using the current definition of trauma in the DSM-IV, the most recent epidemiological study estimated that about 90% of citizens in the US are exposed to at least one traumatic event during their lives, with many being exposed to more than one trauma throughout their life (Yehuda, 1999). Despite this high incidence, in recent years it

has become evident that PTSD does not occur in everyone who is exposed to traumatic events (Yehuda, 1999). Severity of the traumatic event has been implicated as one of the most salient predictors of PTSD (Yehuda, McFarlane, & Shalev, 1998). Results of the National Comorbidity Survey indicated that traumatic events such as torture and sexual assault were associated with the highest rates of chronic PTSD, whereas lower magnitude events such as motor vehicle accidents and life-threatening illness were associated with lower rates of trauma (Kessler et al., 1995). However, even among those who are exposed to very severe traumatic events, only a certain proportion of those individuals go on to develop PTSD as a consequence (Yehuda, 1999; Yehuda et al., 1998). Therefore, it is important to explore why some individuals exposed to traumatic events develop PTSD and others do not. The observation that trauma per se is not a sufficient determinant of PTSD raises the possibility that there may be particular risk and resiliency factors that account for an individual's vulnerability to developing a disorder (Yehuda & McFarlane, 1995).

### Risk Factors

Risk factors can be divided into two main categories: severity and type of traumatic event, and personal characteristics of the individual such as personality and gender (Harvey & Yehuda, 1999). Furthermore, recent research has begun to emerge suggesting possible biological and genetic contributions to the development of PTSD (Harvey & Yehuda, 1999).

The new emphasis on risk factors represents a major shift in thinking from the original intention of the diagnosis which was to provide a psychiatric category that

explained the presence of chronic symptoms after trauma exposure in otherwise “normal” individuals (Harvey & Yehuda, 1999). It was hoped that this diagnosis would spare the victims the indignity of being misunderstood as “neurotic” and instead put forth the notion that PTSD is a predictable response that would develop in anyone exposed to traumatic events. However, it has become evident that exposure to trauma alone does not always lead to PTSD.

### Stress-Diathesis

The etiology of many psychiatric disorders has been studied in terms of the “stress-diathesis” model (Harvey & Yehuda, 1999). In this model, exposure to a “stressor” is hypothesized to interact with preexisting personality characteristics which activates a “diathesis” or predisposition toward a certain type of response as a result of being exposed to some environmental trigger (Harvey & Yehuda, 1999). According to Harvey et al. (1986) neither the stressor nor the diathesis has been specified clearly in most psychiatric conditions (cited in Harvey & Yehuda, 1999). However, a stress-diathesis model is relatively easier to apply to PTSD because the definition of PTSD specifies the type of stressor required for the diagnosis; therefore, the identification of predisposing factors becomes the most salient issue in a stress-diathesis model (Harvey & Yehuda, 1999). But because stressful events may vary in their power to cause PTSD, regardless of predisposing factors, and because certain traumatic events may differ in their magnitude, it becomes necessary to define the severity of the stressor operationally (Harvey & Yehuda, 1999). One needs to assess not only the type of stressor but also the severity of the stressor both objectively and subjectively (Harvey & Yehuda, 1999).

In the case of PTSD, identified diatheses or predisposing factors have included demographic variables such as age when exposed to trauma, gender, and prior mental illness, and more recently, genetic factors, neurocognitive factors, and personality characteristics (Yehuda, 1999).

## LITERATURE REVIEW

### Cognitive Appraisals and Coping

Coping has been defined as the processes individuals use to modify adverse aspects of their environment as well as to minimize internal threat induced by stress (Collins, Baum, & Singer, 1983). Previous research has suggested that the way people process and interpret traumatic events and its consequences may play a role in the development or maintenance of the disorder (Ehlers et al., 2000).

Lindeman, Saari, Verkasalo, and Prytz (1996) explored the potential traumatic stress on two types of victims who both served on the Finnish car ferries which took part in the M/S Estonia rescue operation. The first group of participants included crew members who were on board the night the ferry sank. The second group consisted of crew members who were not on board the night of the disaster. The aim of the study was to describe the impact of the disaster on the participants' stress symptoms, behaviour, world view, and work atmosphere (Lindeman et al., 1996).

The results of the study indicated that for those who reported changes in their behaviour, 36% had increased their alcohol intake and 64% reported a decrease in the amount of alcohol consumed. Of those who reported changes in physical exercise, 37.5% had decreased and 62.5% increased their level of physical activity. In terms of changes in

world view, the belief that people deserve what they get had decreased; in addition, their beliefs that the world is a good place and that people can control the world through their own behaviour decreased (Lindeman et al., 1996). The belief that the participants were lucky and that life events are a matter of chance increased. These results provide further support for the notion that one's cognitive appraisals surrounding the traumatic event play a salient role in how the trauma experience is processed. The results also showed that those participants who were on the ferry during the disaster and those who were not suffered similar stress symptoms. The number of fears and general symptoms were found to decline over time; however, those who displayed avoidant behaviour and who spent less time attempting to work through their experiences suffered from traumatic symptoms, somatic symptoms, and fears at the 8 month follow up. This finding suggests that the type of coping strategy used by those exposed to traumatic events may affect the development of disorder. It is worth noting that the participants in this study were not assessed for PTSD nor were any standardized measures of coping used to assess how participants dealt with their traumatic event.

Another study examining the role of cognitive processes in the development of PTSD examined the attributions of responsibility of 158 motor vehicle accident (MVA) victims (Hickling, Blanchard, Buckley, & Taylor, 1999). Participants were asked how much responsibility from 100% to 0% he or she had for the MVA and how much responsibility, again from 100% to 0% he or she felt someone else had for the MVA (Hickling et al., 1999). Of the 158 participants, 62 met full criteria for PTSD. Since the researchers were primarily interested in the results of those with greater psychological

distress, most of their analyses only focused on those who had “full” PTSD (Hickling et al., 1999). Most of the 152 participants attributed the responsibility of the MVA to someone else as opposed to themselves: 64% vs. 9% respectively. The remaining participants gave mixed ratings of responsibility to themselves, others and weather/road conditions. Among the 62 participants who were initially diagnosed with PTSD, 66% attributed responsibility for the accident to someone else whereas only 8% of those with PTSD attributed responsibility to themselves (Hickling et al., 1999). In addition, those who had PTSD and attributed responsibility to others were experiencing more posttraumatic stress symptoms and also scored higher on a scale measuring the severity of their injuries compared to those PTSD sufferers who attributed responsibility to themselves. At the 6 month follow up, 7 of the 8 PTSD sufferers who attributed responsibility to themselves had fully remitted whereas only 15 of the initial 62 other responsible survivors with PTSD remitted fully.

Although this study supports the notion that those victims who accept the responsibility or blame for their trauma cope better with the aftermath than those who blame someone or something else, no control group was used in this study. Therefore, more research employing appropriate controls is needed in addition to testing whether these findings of attribution of responsibility hold for other types of trauma such as rape or torture.

Feinstein (1993) completed a prospective, longitudinal study documenting the posttraumatic psychological sequelae in a sample of 48 patients injured in motor vehicle accidents and similar events where all participants had to have suffered a leg fracture.

Demographic data, including past psychiatric history were collected on all participants. Participants were asked to rate their responsibility for the event on a 3-point scale and also their opinion as to the stressfulness of the event on a 4-point scale (Feinstein, 1993).

The initial assessment revealed that 4 participants had a past history of psychiatric illness. Those who met criteria for psychiatric diagnoses were more likely to be female, to have experienced “life-threatening” accidents and to report that they were “not at all responsible” for the accident (Feinstein, 1993). At the 6 month follow up 12 participants were suffering from PTSD and were more likely to have a past history of psychiatric illness than those without psychopathology. The author concluded that caution must be exercised in drawing too many conclusions from these findings since this study was predominantly a descriptive one in which no attempts were made to control for various other variables that may have influenced the development of psychopathology such as subsequent life events and degree of social support (Feinstein, 1993).

Green, Grace, and Gleser (1985) examined the chronic responses of survivors of the Beverly Hills Supper Club fire. They were interested in exploring the individual differences in aspects of the fire experience to differential outcomes. This study included 117 participants who were in the club when the fire broke out. Symptoms of psychopathology such as self-mutilation, anxiety and depression were evaluated. No structured measures to assess formal DSM diagnoses were made. Participants were asked to rate their perceived stressfulness on a scale from 1 to 10. Coping style was also assessed by asking at the 1 year follow up how people coped with the stress of the fire. Responses were grouped into three categories: (1) denial which involved using drugs or

turning to work; (2) turning to religion; and (3) talking with others.

The results of the study found that the participants in this study suffered only mild levels of stress and psychopathology. In general, those who turned to religion as a method of coping had lower levels of psychopathology than those who relied on denial and talking to others. Total number of social supports utilized was positively related to outcome, where the more an individual used support systems the better they were doing at the 2 year follow up (Green et al., 1985). At the 2 year follow up, substance abuse reached significance and was present to a greater extent in those individuals who were involved in rescuing bodies from the fire. These results suggested that different aspects of a disaster may show their effects at different points in time and that various coping strategies have differential outcomes when dealing with traumatic experiences. (Green et al., 1985).

Three groups of male veterans of World War II were recruited to participate in a study assessing patterns of appraisal and coping as a function of having PTSD (Fairbank, Fitterling, & Hansen, 1991). Ten former prisoners of war with PTSD, 10 prisoners of war without PTSD and 10 non-prisoners of war veterans were compared on several measures assessing both how individuals with and without PTSD appraised extreme events and the coping strategies employed to deal with distressing recollections of their war experience.

The results of the study indicated that those veterans with PTSD reported higher levels of psychological distress and poorer psychological adjustment than those without PTSD and the noncombat veteran group (Fairbank, Fitterling, & Hansen, 1991). It was also found that those with PTSD appraised their WWII memories as more uncontrollable than the other two groups.

With regards to coping, veterans with PTSD tended to use wishful thinking, self-blame, and self-isolation more frequently than the veterans who were similarly exposed to extreme events but who were currently well adjusted. The prisoner of war veterans without PTSD most frequently used a coping strategy of emphasizing the positive which serves an emotional regulatory function by means of cognitively reappraising the event (Fairbank, Fitterling, & Hansen, 1991). In addition to assessing how veterans coped with the memories of WWII, coping responses to daily hassles was also studied. Interestingly, it was found that the veterans with PTSD used the same coping response in dealing with recent stressors as they did for the WWII memories. The veterans without PTSD similarly reported using the same coping behavior for recent stressors as they did for the WWII memories. This finding is in conflict with a popular and controversial view of coping as a fluid, stressor-specific phenomenon as opposed to a stable, trait-like coping style (Fairbank, Fitterling, & Hansen, 1991). The authors concluded that the study identified several potentially important observed similarities and differences between veterans with and without PTSD.

Collins, Baum, and Singer (1983) examined the effectiveness of different coping styles in 70 individuals who were affected by the accident at Three Mile Island. The authors hypothesized that participants who tended to use emotion-oriented coping strategies which involve attempts to regulate one's emotions would exhibit less stress than participants who are highly problem-oriented in their coping strategy and attempt to manipulate the situation. These predictions were based on the fact that there is little that one can do to directly alter the situation, other than moving from the area. It was also

hypothesized that because of the duration of the Three Mile Island problem and the difficulty one might have in ignoring it, that residents relying on denial as a coping style would exhibit greater stress than residents not using this strategy (Collins et al., 1983). As predicted, the results indicated that those residents who reported greater use of problem-oriented strategies reported more symptoms of distress and greater emotional disturbance than residents not using this strategy. Conversely, greater use of emotional coping was associated with fewer symptoms of distress and emotional disturbance. Residents using denial as a coping strategy reported experiencing more symptoms of distress than did residents not reporting any use of this option. It was concluded that emotion-oriented coping was more effective for coping with chronic stress than was problem-oriented coping and denial and suggests that when stress is chronic and the sources of stress are not easily changed, reappraisal-based emotional management appears to be most effective in reducing psychological and behavioral consequences of stress (Collins, Baum, & Singer, 1983).

### Sex Differences

Breslau, Chilcoat, Kessler, Peterson, and Lucia (1999) examined the sex differences in PTSD comparing the conditional risk of PTSD in females versus males across traumatic events and examined whether the excess risk in females varies across types of events. The results of the study indicated that the vast majority of both females and males reported exposure to at least one trauma but the lifetime prevalence in females was lower than in males; however, females had a significantly lower prevalence of assaultive violence (such as being beaten up or mugged) than males (Breslau et al., 1999).

There were little differences found between men and women in the rates of learning about traumas that happened to others or learning of an unexpected death. Within the category of assaultive violence, females experienced significantly higher rates of rape and other sexual assaults, but significantly lower rates of other types of assaultive violence such as being shot or stabbed (Breslau et al., 1999). Men were also more likely to have been in serious accidents such as MVAs and witnessing acts of violence. The conditional risk of PTSD associated with any trauma was 13% in women and 6.2% in men (Breslau et al., 1999). In both sexes, the most frequent cause of PTSD was the sudden and unexpected death of a loved one with 26.6% of women and 38.5% of males experiencing an event of this type. These findings replicated previous results regarding the sex differences in PTSD and indicated that the higher rates of PTSD in women are not solely due to females' more frequent exposure to rape (Breslau et al., 1999). Although females do experience rape more often than males, this accounted for only a part of the sex difference in the conditional risk of PTSD. The authors concluded that the higher risk for PTSD in females is not due to a generalized vulnerability, but to a vulnerability observed primarily with respect to the effects of assaultive violence in general such as being threatened with a weapon or mugged, as opposed to rape specifically (Breslau et al., 1999).

Previous research has not examined whether preexisting vulnerabilities are distributed differently between participants of both sexes (Breslau, Davis, Andreski, Peterson, & Schultz, 1997). Therefore, Breslau et al. (1997) examined the extent to which the observed sex difference in PTSD might be explained by previously identified risk factors and whether the sex difference in PTSD varied according to age of exposure

to the traumatic events. A sample of 1007 young adults exposed to trauma was assessed for psychopathology and interviews were conducted to inquire about sociodemographic characteristics such as history of familial psychiatric disorders and early separation from parents. The key findings of the study were that the risk for PTSD after exposure to traumatic events was double for women than for men; preexisting anxiety disorders or major depressive disorder played a small part in the observed sex difference in PTSD; family history of anxiety disorders and early separation from parents, although a significant risk factor for PTSD in both men and women exposed to trauma, did not contribute to the observed sex difference in PTSD; and finally, women who experienced their first trauma prior to the age of 15 had an increased risk of developing PTSD after exposure to a subsequent traumatic event (Breslau et al., 1997). Three preexisting characteristics were found to be significant risk factors for PTSD in both men and women and included preexisting anxiety or depression, a family history of anxiety disorders and early separation from parents. However, none of these factors differentially increased women's vulnerability to PTSD (Breslau et al., 1997). Again, it should be noted that no control group was used in this study.

#### Previous Exposure to Trauma

There is an association between previous exposure to traumatic experiences and PTSD. However, apart from the few reports on the effects of childhood trauma as a risk factor for later developing PTSD, little is known about the influence of previous exposure to trauma on PTSD (Breslau, Chilcoat, Kessler, & Davis, 1999). A sample of 1,922 participants was assessed for previous exposure to trauma and the results indicated that

participants who reported any previous trauma were significantly more likely to experience PTSD than were participants with no previous exposure to trauma (Breslau et al., 1999). The risk of PTSD varied depending on the type of trauma, where assaultive violence was associated with the highest risk for developing PTSD upon exposure to a second trauma. A history of two or more traumatic events involving assaultive violence in childhood was also associated with a high risk of PTSD from trauma in adulthood. It was concluded that those respondents who experienced previous trauma were more vulnerable to the PTSD effects of subsequent trauma than those with no previous trauma (Breslau et al., 1999).

The study by Breslau et al. (1999) provides additional support for the notion that adult victimization is associated with prior victimization and that either one or both hamper the recovery from victimization. Therefore, it becomes important to examine the independent and joint contributions of prior childhood trauma and subsequent adult trauma in the development of PTSD (Nishith et al., 2000). A sample of 117 female rape victims was assessed within 1 month of an assault for a history of child sexual and physical abuse, other adult sexual and physical assaults, and current PTSD symptoms in the attempt to clarify the relationship of childhood and adult abuse in predicting current PTSD symptoms (Nishith et al., 2000). The results of the study indicated that childhood sexual abuse, but not childhood physical abuse, predicted exposure to high-impact traumatic events such as physical and sexual assault during adulthood. However, childhood sexual abuse alone was not a significant independent predictor of current PTSD symptoms (Nishith et al., 2000). These results suggested that current PTSD symptoms were due to the cumulative impact of childhood sexual trauma and prior adult victimization rather than

to the impact childhood sexual abuse alone (Nishith et al., 2000). It is important to note that a limitation of the study is that no control group was used. Therefore, one cannot be certain that these same results would not have been found in rape victims without PTSD.

#### History of Psychopathology

Resnick, Kilpatrick, Best, and Kramer (1992) examined the relationship between precrime psychiatric diagnoses, specific crime characteristics and PTSD in 295 female victims of crime. Resnick et al. (1992) were testing the hypothesis that precrime diagnoses had an indirect effect on PTSD by increasing the risk of experiencing high crime stress. Participants who met lifetime criteria for any of the non-PTSD disorders were asked whether the disorder was present before or after the trauma occurred. The victimization experiences were defined as high crime stress if the crime experienced met the behavioural definition of a completed rape, the participant had suffered physical injury during the crime or reportedly feared death or serious harm during the traumatic event. Victimization experiences were classified as low crime stress if none of these criteria was met (Resnick et al., 1992). There was no control group used in this study.

The findings indicated that of the 295 victims, 21% had developed PTSD after the victimization. Rape was the most frequent crime type in the high crime stress group, followed by other sexual assaults and aggravated assault. The results of the study supported the hypothesis of an association between level of crime stress and the development of PTSD, where those who were classified as experiencing high crime stress were more likely to develop PTSD than those who experienced low crime stress (Resnick et al., 1992). This study did not find any support for the hypothesis that having a history

of psychopathology increased one's experience of high crime stress. Thus, the participants who had been exposed to some type of trauma and had a history of psychopathology were not at a higher risk for being exposed to specific crime characteristics that are associated with risk of PTSD (Resnick et al., 1992). However, it was found that a history of depression increased the risk of developing PTSD after exposure to high crime stress. The authors concluded that it is important to assess the characteristics of the crime, perceptions of threat to life or physical integrity, and physical injuries sustained as these factors are associated with an increased risk of PTSD (Resnick et al., 1992).

#### Multiple Risk Factors

Many studies have examined the effects of various risk factors in tandem in the development of PTSD. Breslau and Davis (1992) examined the characteristics of chronic PTSD, a term used when the symptoms last three months or longer (DSM-IV, 1994), to determine if the following risk factors predicted who developed chronic PTSD: age of exposure to the traumatic event; family history of psychiatric disorders; a history of prolonged childhood separation from parents; personality factors; and sociodemographic characteristics.

Interestingly, personally experienced violence such as sudden injury, physical or sexual assault was not more likely to lead to chronic symptoms of PTSD than were vicarious experiences such as seeing someone seriously hurt or receiving news of the violent death of a close relative or friend (Breslau & Davis, 1992). Women were more than four times as likely to develop chronic PTSD than men after exposure to traumatic events. It was also found that experiencing separation from one's parents during

childhood, and having a family history of anxiety and antisocial behaviour increased the risk of developing chronic vs. nonchronic PTSD. Those participants with a personal history for anxiety or affective disorder were three times more likely to develop chronic PTSD than nonchronic PTSD. Although in the initial part of the study there is mention of a group of trauma exposed individuals without PTSD, they were not included in the analyses of these risk factors. Also, there was no measure used to equate groups on the severity of the trauma.

King, King, Foy, Keane, and Fairbank (1999) examined the relationship between pretrauma risk factors and posttrauma resilience-recovery variables and PTSD in a national sample of 432 female and 1,200 male veterans. Although no control group was used in this study, results indicated that the following variables were associated with PTSD for both women and men: early trauma history, low socioeconomic status, having a poor relationship with one's father, family instability, the war-zone stress of viewing atrocities and perceived threat, and postwar resilience-recovery variables of additional stressful life events, hardiness, and social support. The researchers concluded that PTSD is multiply determined and that pretrauma, trauma, and posttrauma variables appear important to understanding individual differences in the display of symptoms.

Most studies examining predictors for PTSD in Vietnam veterans have focused on aspects of the soldiers' war experiences which have shown for the most part that exposure to violence predicts the development of PTSD (Green, Grace, Lindy, Gleser, & Leonard, 1990). Green et al. (1990) examined the contribution of premilitary, military, and postmilitary risk factors for PTSD in 200 Vietnam veterans. No control group was used

in this study. The findings indicated that younger and less well educated soldiers were exposed to the more severe combat situations and that having a preexisting axis I disorder made a significant contribution to the subsequent development of PTSD. The strongest predictor of PTSD was being exposed to grotesque death, and the feeling that one's life was threatened also significantly contributed to the prediction of PTSD. Social support was found to play a significant role in the prediction of PTSD (Green et al., 1990). Those veterans who received support upon returning from the war had a decreased risk of developing and continuing to have PTSD. However, there was an association between support and the veterans' experiences of war. Those veterans who were highly stressed tended to have less support suggesting that they may have been less open to interacting with others and had a reduced capacity to make use of available social supports. PTSD was shown to be a diagnosis that was related primarily to the veterans' war experience and was not influenced a great deal by preservice factors.

Fifty-four psychiatric outpatients were interviewed for a history of traumatic experiences in addition to information regarding their reactions and perceptions of the trauma and their ages at the time of each traumatic event (Davidson & Smith, 1990). Trauma exposed participants categorized according to the presence of PTSD, post-traumatic stress symptoms (PTSS), a no-symptom group, and a group of individuals who had never been exposed to trauma were assessed. The findings indicated that 44 participants reported a history of at least one traumatic event. Of these participants, 12 met the diagnostic criteria for either current or past PTSD, 5 met criteria for PTSS and 27 did not experience any symptoms (Davison & Smith, 1990). The PTSS group reported

being younger when their first traumatic event occurred which was prior to the age of 10, and also reported a greater number of traumatic events compared to the no symptom group. An equal proportion of men and women developed PTSS or PTSD. This finding is inconsistent with previous research which has found higher rates of PTSD in women. Experiencing the event as frightening, being physically injured, perceiving the traumatic event as life threatening, seeing a physician afterwards, and being hospitalized were associated with an increased risk of developing PTSS (Davidson & Smith, 1990). Although this study used a control group of individuals exposed to trauma who did not develop any PTSD symptoms, the target group was flawed as it was composed of both people with a current and past diagnosis of PTSD; therefore, both the target group and the control group had participants exposed to trauma who were not currently experiencing the symptoms of PTSD.

Lifetime and six month prevalence rates of PTSD in addition to preexisting vulnerability factors were assessed as a part of an extensive epidemiological study in North Carolina (Davidson, Hughes, Blazer, & George, 1991). Several sociodemographic variables were assessed such as level of education, and socioeconomic status. Family and childhood variables such as death of a parent and/or separation or divorce of parents before the age of 10, evidence of childhood conduct disorder prior to age 15, having been physically abused as a child, and parental poverty were assessed. Information on social network size, amount of social interaction and perceived adequacy of support was also obtained (Davidson et al., 1991).

Forty-three participants met the diagnostic criteria for PTSD. PTSD and non-

PTSD participants were compared with respect to characteristics of their early environments and the results indicated that those with PTSD were more likely to have experienced parental poverty, familial psychiatric illness, early parental separation and abuse as a child (Davidson et al., 1991). Those with PTSD reported lower subjective social support and interaction scores than the non-PTSD group. It was concluded that individuals who develop PTSD have frequently suffered from adverse events during childhood and that some of these events may serve as either predisposing risk factors or as traumatic events themselves (Davidson et al., 1991).

Risk factors for exposure to traumatic events and subsequent development of PTSD was examined in a sample of 1,007 21 to 30-year-old members of a maintenance organization (Breslau, Davis, Andreski, & Peterson, 1991). Several sociodemographic characteristics were assessed such as psychiatric history and early conduct problems. A total of 39% of the sample reported experiencing one or more traumatic events. Exposure to traumatic events was more common in men. A history of three or more early conduct problems, and individuals of lower socioeconomic status resulted in an increased risk of being exposed to traumatic events. Sex comparisons across the four most frequent types of traumatic events revealed that assault and sudden injury or accident affected men and women equally. However, witnessing someone being killed or seriously hurt and news of sudden death of a close relative or friend led to significantly higher rates of PTSD in women than in men (Breslau et al., 1991).

Risk factors for PTSD after exposure to traumatic events included neuroticism, being female, early separation from parents, and having a preexisting personal or family

history of anxiety disorders (Breslau et al., 1991). In contrast to the findings by Davidson et al. (1991), a history of conduct problems did not increase the vulnerability to PTSD following traumatic events. However, the sample used in this study was rather restricted in age range which makes it difficult to generalize the findings to individuals outside this range. It is important to note that this study did not include a control group and did not assess either subjective or objective severity of the traumatic event.

### Conclusions

Although much effort has been directed towards identifying risk factors for developing PTSD, the majority of studies have either failed to include control groups or have not equated the groups on severity of the traumatic event. The absence of a control group in previous studies must be considered a serious methodological flaw because one cannot conclude from these studies that the alleged risk factors found so far in PTSD patients would not have occurred equally amongst controls. We can speculate that in the few studies which have included control groups that the participants who did not develop PTSD had compensatory experiences during the trauma which enabled them to cope better at the time of the trauma or that they possessed resiliency traits which helped them overcome its delayed adverse psychological effects spontaneously. In fact, Harvey and Yehuda (1999) have noted that virtually no studies to date have looked at risk and resiliency factors in tandem.

Comparisons between trauma exposed survivors with PTSD and nonexposed control subjects do not allow a determination of whether abnormalities are consequences of chronic PTSD, consequences of stress exposure, or reflect vulnerability to the disorder

(Harvey & Yehuda, 1999). Including a group of trauma-exposed participants without PTSD would greatly enhance the information that can be obtained from cross-sectional studies (Harvey & Yehuda, 1999). If any abnormality is uniformly present in individuals with PTSD but absent in traumatized individuals without PTSD, then the abnormality must be a consequence of the PTSD or a predisposing factor, but it is not a direct consequence of exposure to the traumatic event (Harvey & Yehuda, 1999).

## METHOD

The present study sought to explore risk and resiliency factors in the development of PTSD. The majority of the factors under study have been previously identified in the literature; however, this study will attempt to improve previous research methodology including an appropriate control group by comparing those people who experienced traumatic events and succumbed to PTSD with a control group who have also been exposed to trauma but did not develop PTSD. The use of a control group that has also experienced trauma, in addition to the examination of the severity of the trauma will increase our confidence in identifying risk and resiliency factors associated with PTSD.

### Participants

Fifty-two participants of both genders who were exposed to traumatic events were recruited from the community. A letter describing the study was distributed to clinicians in private practice and a local hospital inviting trauma survivors to participate in the study (see Appendix A). In addition, the letter was distributed to several fire stations inviting fire fighters to take part in the study. Finally, participants were recruited through the media and were presented with the same information in Appendix A. Participants were

included in the study if they were between the ages of 18 and 65 and experienced a traumatic event meeting the DSM-IV PTSD criterion A (APA Association, 1994) at least one month prior to taking part in the study.

### Measures

Posttraumatic Stress Diagnostic Scale (PDS; Foa, 1995). The PDS was used to aid in making the diagnosis of PTSD. The PDS is a 49-item self-report instrument which measures all six criteria for PTSD in the DSM-IV (APA, 1994). The scale consists of a 13-item checklist of possible traumatic events, and participants indicate which events they experienced. Participants then rate which traumatic event was most stressful for them and this event is the one that is subsequently assessed. A diagnosis of PTSD is made if all six DSM-IV criteria (APA, 1994) are met. The test-retest reliability of PTSD diagnoses obtained from the PDS was assessed using kappa, a chance-oriented measure of agreement. A kappa of .74 was obtained, indicating good agreement. Percent agreement between diagnoses for the two administrations was 87.3%, indicating a high degree of reliability. A Cronbach alpha of .92 was calculated for the items on which the symptom severity score is based, indicating that the symptom severity score is internally consistent. The sensitivity of the PDS was 82.0%, and its specificity was 76.7%.

Coping Inventory for Stressful Situations (CISS; Endler & Parker, 1999). The CISS is a 66-item multidimensional measure which assesses the following three coping styles: task-oriented coping which refers to efforts aimed at solving the problem; emotion-oriented coping which describes emotional reactions that are self-oriented through responses such as self-blame, self-preoccupation, or fantasizing; and avoidance-

oriented coping which describes activities, and cognitive changes aimed at avoiding the stressful situation. Participants are asked to indicate how much they engage in various types of activities when they encounter a difficult, stressful, or upsetting situation. Sample items of the CISS include “thinking about the good times I’ve had and taking corrective action immediately”. Participants must rate the extent to which they engage in such activities on a 5-point scale ranging from very much to not at all. Test-retest reliabilities were moderate to high ranging from .51 to .73. The results of the numerous construct validity studies reported by Endler and Parker (1999) provide strong support for the CISS as a multidimensional instrument that independently assesses task, emotion, and avoidance oriented coping.

State-Trait Anxiety Inventory (STAI; Spielberger, 1983). This measure comprises separate self-report scales for assessing state and trait anxiety. For the purposes of the present study only the S-Anxiety scale was utilized. The S-Anxiety scale consists of twenty statements that evaluate how respondents feel “right now, at this moment”. For example, participants respond to the statement “I feel calm” and must rate this item on a 4-point scale ranging from not at all to very much so. Essentially, the STAI S-Anxiety scale evaluates feelings of apprehension, tension, nervousness, and worry (Spielberger, 1983). The STAI S-Anxiety scale may also be used to evaluate how respondents felt at a particular time in the recent past *which is how this measure was used in the present study*. To obtain a measure of the degree of stress or anxiety at the time of the traumatic event, participants were asked to answer the inventory in terms of *how they felt during their traumatic event*. Test-retest reliabilities for the S-Anxiety scale are relatively low, ranging

from .16 to .62, with a median reliability coefficient of .33. However, relatively low stability coefficients were expected for the S-Anxiety scale as a valid measure of state anxiety reportedly should reflect the influence to unique situational factors that exist at the time of testing (Spielberger, 1983). The median alpha coefficient for the samples of adults, students, and the military was .93.

Finally, an ad hoc questionnaire was administered to assess the following vulnerability and resiliency factors which have previously been identified in the literature: gender; education level; prior traumatization such as childhood sexual and/or physical abuse; personal history of psychopathology; familial history of psychopathology; early separation from parents (which was defined as a positive reply to the question of whether one had been brought up by someone other than one's parents for a period of 4 months or more before age 16); attribution of responsibility where participants indicated how much responsibility from (100% to 0%), he or she felt they had for the traumatic event and how much responsibility he or she felt someone else had for the traumatic event; objective severity of the trauma which was assessed by having participants rate on a 4-point scale six questions based on generic stressor dimensions identified in the literature by Green (1990) which are suggested to cut across different types of traumatic events; and finally participants responded to three questions regarding social support. Refer to Appendix C.

### Procedure

Informed consent was received from all participants (see Appendix B). The participants had the choice of making an appointment to complete the measures in person or have the questionnaires mailed to their homes. The measures took approximately 15 to

25 minutes to complete. Participants were paid \$10.00 to defray their expenses.

### Analysis

Chi-square and t-tests were first used to determine the statistical significance of associations between PTSD and the predictor variables. In order to predict PTSD from the set of identified variables, a logistic regression analysis was conducted. Some statisticians recommend that there be a minimum of 10 participants for every variable studied for adequate power in detecting group differences. Due to the small sample size obtained in the present study, it was not possible to include all 21 variables into the logistic regression. As such, a direct logistic regression analysis using five predictor variables was performed on the probability of having PTSD. The predictor variables entered into the analysis were: gender, having a history of sexual abuse, the extent that one felt their life was in danger, the extent to which one felt that their traumatic event was a result of a deliberate act, and whether or not someone to talk to about the trauma was available to the victim. It is important to note that Tabachnick and Fidell (2001) suggest that larger sample sizes are needed to detect significance, and recommend a sample size greater than or equal to 104 participants plus the number of predictor variables examined.

## RESULTS

### Descriptive Statistics

Of the 52 participants who were exposed to traumatic events, 44.1% met DSM-IV criteria for PTSD and 51.9% did not meet criteria for the disorder. There were more women ( $n = 31$ ) than men ( $n = 21$ ) who participated in the present study and the mean age of participants was 36.8 years. As to the types of trauma reported, in descending order of

frequency they were: physical assault ( $n = 14$ ); accident ( $n = 10$ ); sexual assault ( $n = 9$ ); combat ( $n = 5$ ); sudden death of family member ( $n = 4$ ); suicide of family member ( $n = 4$ ); and life threatening illness ( $n = 3$ ). More females (76.0%) developed PTSD than males (24.0%) a difference that was found to be statistically significant,  $\chi^2(1, N = 52) = 5.37, p = .02$ . Those with PTSD had a higher frequency of not being married (56.0%) as opposed to those without PTSD (29.6%). However, this finding was not significant,  $\chi^2(1, N = 52) = 3.70, p < .05$ . Although not statistically significant, those without PTSD were more likely to have completed some college and to have a college degree than those with PTSD: 25.9%: 29.6%: and 20.0%: 16% respectively. There was no significant difference in the amount of time since the traumatic event occurred for those with and without PTSD, with 55.2% and 44.8% respectively of participants experiencing their event more than five years ago. Refer to Table 1 for complete information on respondent demographic characteristics.

The associations between PTSD and early environmental factors revealed that approximately equal numbers of participants with PTSD (88.0%) and without PTSD (88.9%) reported having experienced at least one other traumatic event during their lifetime. Although not statistically significant, those with PTSD (40.0%) were almost twice as likely as those without PTSD (18.5%) to have had a history of physical abuse as a child. Participants with and without PTSD had similar frequencies in terms of having a family history of mental illness, a personal history of mental illness, and being raised by someone other than their parents for at least 4 months prior to the age of 16 (see Table 2). Chi-square tests revealed that none of these early environmental factors was found to be

statistically significant. However, having a history of sexual abuse as a child was found to be more common in those with PTSD (56.0%) than those without PTSD (22.2%), a statistically significant difference between groups,  $\chi^2 (1, N = 52) = 6.26, p < .01$ .

The associations between PTSD and the variables assessing severity of the traumatic event revealed that respondents with and without PTSD had similar frequencies for receiving physical injuries as a result of their trauma, having to be hospitalized due to the event, and witnessing the death or severe injury of another person (see Table 3). A statistically significant difference was found with regards to the type of traumatic event experienced by the respondents. Eighty-four percent of participants with PTSD directly experienced their traumatic event while 44.4% of those without PTSD witnessed a traumatic event,  $\chi^2 (1, N = 52) = 8.76, p < .01$ .

The results from the S-Anxiety scale revealed no significant differences between those with and without PTSD on the degree of anxiety experienced while the traumatic event was occurring: 68.40 (SD = 13.03), and 64.41 (SD = 12.55) respectively,  $t (50) = 1.14, p < .26$ . Also, there was no significant difference between those with and without PTSD on the severity of injuries they received as a result of the trauma: M = 3.48, SD = 1.56 and M = 4.00, SD = 1.57 respectively,  $t (50) = -1.20, p = .24$ . However, significant differences were found between participants with regard to the extent that they felt that their life was in danger, with those with PTSD reporting a higher mean score than those without PTSD: M = 3.84, SD = 1.52 and M = 2.44, SD = 1.40 respectively,  $t (50) = 3.45, p < .01$ . Significant differences between those with and without PTSD were also found on the variable assessing the extent to which participants felt that their traumatic event

was the result of an intentional act with those with PTSD reporting a higher mean score than those without PTSD:  $M = 3.92$ ,  $SD = 1.53$  and  $M = 2.81$ ,  $SD = 1.90$  respectively,  $t(50) = 2.30$ ,  $p < .05$ .

The associations between PTSD and social support and coping revealed that there were no significant differences in the extent to which participants with or without PTSD reported getting professional support to deal with their traumatic event or having prior training in dealing with traumatic events (see Table 4 for frequency counts). There were no differences found between groups on attribution of responsibility for the traumatic event. Those with and without PTSD were more likely to blame others for their traumatic event as opposed to blaming themselves. Those with PTSD were more likely to use emotion-oriented coping in dealing with stressful events than those without PTSD. This finding approached significance with  $\chi^2(2, N = 52) = 5.74$ ,  $p = .06$ . Significant differences were found between groups on whether or not someone was available to the participant to talk to about their trauma. Of those with PTSD, only 40.0% reported having someone available to talk to about their traumatic event as opposed to the 81.5% of those without PTSD,  $\chi^2(1, N = 52) = 9.44$ ,  $p < .01$ . The groups were consequently, found to differ on the extent to which they talked about their traumatic event with others. Those with PTSD on average, spoke less about their traumatic event with others than those without PTSD;  $M = 2.32$  ( $SD = 1.38$ ) and  $M = 3.33$  ( $SD = 1.14$ ), respectively. This finding was found to be statistically significant,  $t(50) = -2.90$ ,  $p < .01$ .

### Logistic Regression

A test of the difference between the constant-only model and the full model

indicated that the addition of the five predictor variables (gender, history of sexual abuse, whether or not someone to talk to was available, the extent to which one's life was in danger, and the intentionality of the trauma) to the model significantly reduced the amount of unexplained variance in predicting PTSD,  $\chi^2 (5, N = 52), p < .01$ . The goodness-of-fit chi-square revealed that there was no significant difference between observed and expected frequencies in group membership,  $\chi^2 (8, N = 52) = 7.52, p = .48$ , which suggests that the full model being tested was not reliably different from the perfect model. According to the Wald criterion, which is the beta coefficient divided by the standard error squared  $(B/SE)^2$ , gender and the extent to which participants felt their lives were in danger reliably predicted PTSD;  $z = 2.20, p < .05$  and  $z = 2.04, p < .05$  respectively. Females were 7.6 times more likely to have PTSD than males and a one-unit increase in the extent to which participants felt their life was in danger multiplied the odds of having PTSD 1.7 times. Using the default cut point of .5, prediction success was above chance with 72.0% of participants with PTSD correctly classified as having the disorder and 81.5% of participants without PTSD correctly classified as not having the disorder, for an overall success rate of 76.9%.

As the prevalence rate of PTSD varies depending on the type of trauma experienced, a separate analysis was conducted using a cut point of .17 which reflects the average prevalence rate for PTSD across several studies reported in the literature. Consistent with the previous results, this analysis also found that gender and the extent to which one felt their lives were in danger reliably predicted the presence or absence of PTSD;  $z = 2.20, p < .05$  and  $z = 2.04, p < .05$  respectively. However, using this cut-point

of .17, 96.0% of participants with PTSD were correctly classified as having the disorder and only 37.0% of participants without PTSD were correctly classified as not having the disorder, for an overall success rate of 65.4% which was lower than when using the cut-off was .5.

## DISCUSSION

### Logistic Regression Findings

The purpose of the present study was to explore risk and resiliency factors in the development of PTSD by implementing an appropriate control group by comparing those individuals who were exposed to a traumatic event and developed PTSD with a group of individuals similarly exposed to trauma who did not develop the disorder. Key findings of the logistic regression analysis were that being female significantly increased the risk of developing PTSD after exposure to a traumatic event and that the more one felt that their life was being threatened, the more likely they were to develop PTSD. Prediction success was above chance with 76.9% of traumatized individuals being correctly classified as to whether or not they had the disorder. Using base rate information, the overall prediction rate dropped to 65.4%. This low classification rate could be due in part to the less than perfect reliability of the predictors or the fact that some important predictors may have inadvertently been left out of the study. However, it is important to keep in mind that in using the base rate information, 96.0% of participants were correctly classified as having the disorder as opposed to the 81.5% which was found assuming equal probabilities.

The finding of a sex difference in the development of PTSD is supported by previous studies which have documented a higher prevalence of PTSD in females than

males (Breslau et al., 1991, 1997; Davidson et al., 1991; Helzer et al., 1987; Kessler et al., 1995). The inclusion of a control group in the present study fosters greater confidence in the conclusion that being female is a significant risk factor for the development of PTSD. To date, this finding has received little scientific attention. Several reports concluded that the higher prevalence of females reflects a greater vulnerability to the PTSD effects of traumatic events based on the findings that the sex difference remains when the type of trauma is controlled (Breslau et al., 1997; Kessler et al., 1995).

Although Kessler et al. (1995) found that women were more likely than men to experience a trauma associated with a high probability of PTSD such as rape, a higher proportion of women than men also met criteria for PTSD after exposure to those traumatic events which have a reduced probability of developing PTSD (i.e., witnessing injury). Breslau et al. (1999) found that the sex difference in PTSD was not due to females being more frequently exposed to rape as this accounts for only part of the sex difference. However, in contrast to the findings by Kessler et al. (1995), Breslau et al. (1999) concluded that the greater risk for PTSD in females is by no means a generalized vulnerability as no sex differences were found on the conditional risk for PTSD for those events which tend to be associated with a reduced risk of PTSD such as witnessing injury or being in a car accident. Thus, the increased risk for females was attributed to a vulnerability observed primarily with respect to the effects of assaultive violence.

As the research demonstrates, to date there is no consensus regarding an explanation for the higher rates of PTSD in women than in men. Much of the research on this topic seems to suggest a generalized vulnerability to the disorder. However, the

reasons behind this vulnerability remains unknown. Research continues to find higher prevalence rates of the disorder in women and suggests that being female is a strong predictor of developing PTSD. Perhaps women and men have different strategies or methods of coping with the aftermath of trauma. This area of study has not received much research attention and clearly, the sex differences in PTSD warrants further investigation, specifically in the area of attempting to uncover the reasons behind women's greater vulnerability to the disorder.

Severity of the traumatic event is thought to be one of the most salient predictors of PTSD (Yehuda, 1999). However, currently no standardized measure of trauma severity is available and, as such, Green (1990) highlighted eight generic stressor dimensions hypothesized to cut across different types of traumatic events. One of these stressor dimensions is threat to one's life or bodily integrity. The present study found support for this stressor dimension as those with PTSD felt that their life was in greater danger than those without PTSD. The present finding is supported by Green et al. (1990) who found that life-threatening combat experience was a significant predictor of PTSD in a group of Vietnam Veterans. However, as there was no control group in that study, the present results strengthen the finding of life-threat as a significant predictor for PTSD. Davidson and Smith (1990) also found that in their sample of psychiatric outpatients, the symptomatic group which consisted of participants with current and past PTSD as well as those who were sub-clinical for the disorder, was more likely to have felt that their life was endangered. The use of a target group with only current PTSD further supports this stressor dimension as a significant predictor of PTSD and as one of the possible indicators

to measure the severity of a trauma across different types of events.

The logistic regression analysis indicated that having a prior history of sexual abuse, whether or not someone to talk to about the traumatic event was available, and whether the traumatic event was the result of a deliberate act were not significant predictors of PTSD. The non-significant finding of sexual abuse is consistent with the findings of Nishith et al. (2000) who found that childhood sexual abuse alone was not a significant independent predictor of current posttrauma PTSD symptomatology. Despite the fact that PTSD has been found to be one of the most frequently cited disorders associated with histories of childhood abuse, the present finding from the logistic regression analysis, suggests that a history of sexual abuse was not a significant predictor of PTSD across different types of traumatic events. However, it is interesting to note that a chi-square test revealed that history of sexual abuse was a significant variable with 56.0% PTSD vs. 22.2% non-PTSD participants reporting a history of sexual abuse. As logistic regression demands large sample sizes (Tabachnick & Fidell, 2001), perhaps the present study lacked sufficient power to detect group differences on this particular variable. As regression coefficients represent the effects on the dependent measure after the effects of the previous variables in the equation have been partialled out, it is possible that the history of sexual abuse variable may have been highly correlated with one or more other variables in the analysis, in which case, it was no longer a significant predictor of PTSD. Further research is needed to clarify these results.

The intentionality of the traumatic event is another of Green et al.'s (1990) stressor dimensions hypothesized to cut across different traumatic events that was explored in the

present study. On this stressor dimension, Green et al. (1990) proposes that events such as a natural disaster would be at the low end of the continuum, technological accidents where unintended harm was the result would be in the middle, and at the high end of deliberateness would be acts of intentional harm such as rape or torture. Although a t-test revealed that those with PTSD reported a higher mean score on the extent to which they felt their traumatic event was the result of a deliberate act, the logistic regression analysis failed to support this variable as a significant predictor of PTSD. It is possible that the present sample did not include enough participants who experienced acts of deliberate harm (26.9%) to detect significance. It is also possible that this dimension is not an important factor in predicting PTSD. Clearly, more research is needed to explore this hypothesized stressor dimension.

Finally, the logistic regression analysis failed to find support for whether or not someone was available to talk with about the traumatic event as a significant predictor of PTSD. This result is similar to Davidson and Smith's (1990) finding that participants with PTSD were not more likely than those without PTSD to have spoken to someone afterwards about the event. However, it is recognized that having someone available to talk to is different than choosing to speak to that person about the event. In contrast, Davidson et al. (1991) who used a standardized measure of perceived social support, found that PTSD was associated with significantly lower (i.e., more impaired) subjective social support scores than those without PTSD. Again, it is possible that the sample size was not large enough for the logistic regression analysis to detect significance of this variable. However, it is interesting to note that in the present study a significant chi-

square test indicated that 40.0% those with PTSD were less likely to report having someone available to talk with about the trauma than those without PTSD (81.5%), a finding that is supported by Davidson et al. (1991). Green et al. (1990) found that in their sample of veterans, people with PTSD had less current social support than those without PTSD which was predicted by war experiences suggesting that the highly stressed survivor continues to feel detached and may not be able to gain access to support. It is also possible that people with disruptive symptoms of PTSD that have likely been present for some time may have managed to alienate family and friends over time. These hypotheses are further supported by the finding in the present study which revealed that the extent to which those with PTSD talked with others about their trauma was significantly less than those without PTSD. This finding was further corroborated by Green et al. (1990) who found that soldiers who had experienced more extreme combat and exposure to grotesque death, were less likely to talk about their experiences with friends. In summary, most studies seem to suggest that social supports enhance recovery (Green et al., 1985; Green et al., 1990). Research suggests that the capacity to make use of available social support may depend on the nature and intensity of the traumatic experience and may be hampered by the negative consequences of PTSD symptomatology such as avoidance.

#### Relationship Between PTSD and Early Environment

The present study found no relationship between PTSD and having a history of previous trauma, physical abuse, family history of mental illness, personal history of mental illness, or being separated from parents during childhood. These non-significant results

are in conflict with findings from Breslau et al. (1991) who found that of those with PTSD, early separation from parents, having a preexisting anxiety or depressive disorder, and a family history of anxiety significantly increased the odds of having the disorder. Resnick et al. (1992) and Wilson and Raphael (1993) also found that their sample of trauma victims was more likely to have a history of previous psychopathology. However, it is important to note that these studies did not compare these risk factors with a control group of participants similarly exposed to trauma who did not develop the disorder. The present results suggest that these variables may not be risk factors for PTSD. With respect to previous trauma, both Breslau et al. (1999) and King et al. (1999) reported that experiencing previous trauma was a significant predictor of PTSD. However, once again, these studies did not include control groups of trauma-exposed participants without PTSD. Davidson et al. (1991) did include an appropriate control group and examined the association between PTSD and early environmental factors and found that those with PTSD were more likely to have a family history of mental illness and to be physically abused as children than those without PTSD. This finding challenges the present findings. However, it is important to note that although the small sample size ( $N = 52$ ) in the present study may have failed to detect group differences, by comparison, Davidson et al.'s (1991) sample size was extremely large ( $N = 2985$ ) and with very large sample sizes, almost any difference between models is likely to be statistically significant in logistic regression (Tabachnick & Fidell, 2001). Limited research using appropriate controls has been conducted and as such, more methodologically sound studies are needed to clarify which early environmental variables may truly be risk factors for PTSD.

### PTSD and Severity of Trauma

No significant associations between PTSD and the occurrence of physically injuries or the need for hospitalization were found. This is in contrast to Davidson and Smith (1990) who found that those with PTSD (past or present) and PTSS (past or present) were more likely to have been physically injured and hospitalized after the traumatic event. However, as previously mentioned, Davidson and Smith's (1990) study was flawed as they included past cases of PTSD and PTSS as well as current cases of the disorder. Given this methodological flaw, the present results suggest that physical injuries and the need for hospitalization are not sufficient predictors of PTSD. Receipt of intentional injury is another of the stressor dimensions identified by Green (1990) thought to influence the severity of a trauma. Another possible explanation for the conflicting findings with Davidson and Smith's (1990) research may be the fact that their sample had higher occurrences of deliberate traumatic events that could result in intentional injury such as assaults. Perhaps the presence of physical injuries after trauma is a risk factor for PTSD only for those events in which the injuries were deliberately inflicted.

The stressor dimension of seeing another person severely injured or dead was not found to be significantly associated with PTSD. This is in contrast to the study of veterans by Green et al. (1990) who found that the strongest predictor of PTSD was exposure to grotesque death. Although an adequate control group was not utilized, one would suspect that exposure to the grotesque would be more frequent and possibly more distressing than what was experienced by the participants in the present study. Nevertheless, the present results suggest that for a community sample of traumatic events,

exposure to severe injury or death was not significantly related to PTSD. Perhaps this stressor dimension is only a significant predictor of PTSD for extreme, multiple exposures to the grotesque as is seen in combat situations.

In order to measure the degree of subjective stress at the time of the trauma, the S-Anxiety scale was administered to participants. The results indicated that there was no significant difference in the mean anxiety scores between those with and without PTSD. Although previous research has found that the higher the subjective ratings of the stressfulness of the trauma the higher the degree of symptomatology (Green et al., 1985), those with PTSD did not report being any more stressed or anxious during the traumatic event than those without PTSD, suggesting that the perception of the stressfulness of the trauma was equally distressing for both groups of participants.

Finally, those participants who directly experienced a traumatic event as opposed to witnessing a trauma were more likely to have PTSD. This finding is consistent with epidemiological studies which show that events involving interpersonal victimization such as sexual assault or torture are associated with the highest rates of chronic PTSD, whereas lower magnitude events such as death of a loved one or witnessing injury are associated with lower rates of PTSD (Helzer et al., 1987; Kessler et al., 1995).

### PTSD and Coping

The associations between PTSD and coping revealed that there was no significant difference between those with and without PTSD on the use of professional support after their traumatic event. Thus, these results suggest that obtaining professional support did not protect those with PTSD from developing the disorder. However, the time in which

professional help was sought might be an important factor in influencing outcome as a few participants in the present study indicated that they only sought professional help years after the traumatic event occurred. As data with regards to the time in which support was obtained was not gathered in the present study, it is not known if those with PTSD differed from those without PTSD in terms of when they sought treatment. Perhaps those without PTSD were more likely to seek treatment immediately after their traumatic event than those with the disorder.

It was also found that there was no difference with regards to attribution of responsibility for the traumatic event between groups. Both those with and without PTSD were more likely to blame someone else for their traumatic event. This finding is consistent with Hickling et al. (1999) and Feinstein (1993) who found that their MVA participants were more likely to blame others for their car accidents than themselves. However, Hickling et al. (1999) also found that 4 months after the MVAs, those with PTSD who blamed others were less likely to have remitted and experienced greater symptomatology than those who blamed themselves. It was concluded that those who accept the responsibility or blame for their trauma cope better with the aftermath than those with PTSD who blame someone else. This notion comes from the coping literature which suggests that behavioural self-blame as opposed to characterological self-blame which focuses on one's own behaviour, invokes beliefs about control and that behavioural self-blame is an adaptive attributional strategy (Janoff-Bulman, 1992). Although longitudinal analyses were not possible in the present study, the average amount of time since the trauma occurred was more than five years and no differences in attribution of

responsibility were found between groups. Thus, this suggests that the findings by Hickling et al. (1999) do not necessarily generalize to traumatic events other than MVAs. Perhaps blaming oneself for a traumatic event is only adaptive when one could have conceivably had control over the traumatic event. For example, a MVA victim whose accident was the result of speeding has control over this behaviour and the person can decide to reduce their driving speed in the future and regain a sense of control and safety. However, a victim of a sexual assault may feel more restricted in terms of what they can do to control the occurrence of such an event which may continue to leave them feeling vulnerable.

No significant differences were found between groups on the utilization of coping strategy in dealing with stressful situations, although, those with PTSD tended to use emotion-oriented coping more than those without PTSD. This finding is supported by Fairbank et al. (1991) who found that there were no significant differences between veterans with and without PTSD in the type of coping strategy used to deal with daily hassles. In order to clearly determine if participants use the same coping strategy in dealing with daily stressors as they do with a specific traumatic event, coping measures assessing both trait-like coping and situation-specific coping need to be compared in tandem. Research suggests that some methods of coping are more effective for some people or for some situations, while others seem to work better for other settings or for other people (Collins, Baum, & Singer, 1983). Collins et al. (1983) found that those participants dealing with the Three Mile Island incident who reported greater use of emotion-oriented coping experienced fewer symptoms of emotional disturbance and stress

than those participants using problem-oriented coping and denial which is a form of avoidance. It was suggested by the authors that when dealing with a traumatic event that is chronic (and not easily changed) that emotion-oriented coping is more adaptive than the other two strategies and that denial is only adaptive if the threat is short-lived. Although not statistically significant, those with PTSD tended to use more emotion-oriented coping in dealing with stressors. If one assumes that coping is a stable trait-like quality, then perhaps those with PTSD experienced events that either were or were perceived to be events in which the person could not take direct action in coping with the aftermath of the trauma and thus relied on attempting to regulate their emotions. Research comparing traumatic events which differed on degree of controllability (i.e., natural disaster, MVA) as well as perceptions of controllability and type of coping strategy used may find that degree or perceptions of control influence the type of coping strategy utilized.

### Limitations

The use of self-report measures leaves the findings open to questions concerning the potential effects of retrospective bias. Clearly, a prospective, longitudinal study in which risk factors are measured before exposure to traumatic events is optimal. Again, data on family history of psychiatric disorders were gathered from the participants themselves which are subject to the limitations that characterize informant-based family history data. Finally, although it is a general “rule of thumb” that there should be a minimum of 10 participants for every variable examined in logistic regression, larger sample sizes are generally needed in order to detect group differences. As such, it is possible that the present study lacked sufficient power which resulted in less robust

findings.

### Conclusions

The purpose of this study was to determine if similar findings in the literature with regards to risk and resiliency factors would be obtained using a control group of participants exposed to trauma without PTSD. The results indicated that being female and threat to one's life were significant predictors of PTSD. Having a history of sexual abuse, talking to someone about the event and the intentionality of the trauma were not significant predictors of PTSD.

Many of the variables previously identified in the literature as predictors of PTSD were not supported in the present research. As most of these studies did not use appropriate control groups, this would imply that those variables are not significant predictors of PTSD. However, owing to the sample size in the present study, it was not possible to include all potential predictors into the logistic regression analysis. Therefore, more research using control groups of participants similarly exposed to trauma without PTSD is needed to clarify these results.

Nevertheless, the current findings have implications for mental health workers and those interested in prevention of PTSD. It is clear that women are at a significant risk for developing PTSD after exposure to trauma which suggests that careful monitoring of women after trauma exposure for the symptoms of PTSD and immediate treatment may serve to protect these women from developing the disorder. Also, assessing the extent to which a trauma victim felt that their life was in danger could highlight those participants who are at a higher risk of developing PTSD who then could also be monitored for

symptoms and hopefully offered treatment before the disorder develops.

### Future Research

Given the absence of control groups in many of the studies examining risk and resiliency factors, future research employing appropriate control groups is warranted in order to have greater confidence in the findings of the current literature. The gender difference in PTSD is strongly supported in the literature. In order to potentially offset the higher conditional risk for PTSD in women, future research should focus on attempting to understand the reason behind this heightened vulnerability seen in trauma exposed women. Finally, severity of the trauma is thought to be the most significant predictor of PTSD (Yehuda, 1999). However, given the findings that trauma severity alone is not a sufficient predictor of PTSD, future research should focus on the development of a standardized measure to objectively quantify the severity of the trauma across different events as this would be a valuable tool when attempting to control for trauma severity in future studies of risk and resiliency for PTSD.

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## Appendix A

**Traumatic Events Study**

- We are conducting a study on individuals who have been exposed to various types of traumatic events such as sexual or physical assault, serious accident (car, fire), torture, observation of serious injury or unnatural death, and/or natural disaster.
- We are interested in exploring why some people exposed to a traumatic event go on to develop Post Traumatic Stress Disorder (a condition that some individuals get after exposure to a traumatic event which may involve symptoms such as recurrent recollections of the event, distressing dreams of the event, efforts to avoid thoughts or feelings about the event, difficulty sleeping, concentrating, and irritability) and why others do not.
- In order to examine this issue, we need both men and women who have been exposed to at least one traumatic event. We need two groups of people to take part in this study; one group of individuals who have been exposed to trauma who have developed PTSD and another group of individuals who have also been exposed to trauma but have not gone on to develop PTSD.
- People who agree to take part in this study will be given four short questionnaires to fill out. It is estimated that it will take about 20 minutes to complete the questionnaires. Participants will be reimbursed \$10 for their time.
- We are hoping that the results of this study will provide information on how PTSD may be prevented. **Please note that all information gathered from the questionnaires are completely confidential**
- If you would like to participate in this study and/or would like more information, please call Marcia at 282-2050 or e-mail me at: [mavoges@ucalgary.ca](mailto:mavoges@ucalgary.ca)

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Professor of Clinical Psychology  
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## Appendix B

### Consent Form

**RESEARCH PROJECT:** Posttraumatic Stress Disorder Across Traumatic Events: A Controlled study of Vulnerability and Resiliency Factors

**INVESTIGATORS:** M. Voges and Dr. D. Romney, Ph.D.

**SPONSOR:** The University of Calgary Research Grant

This consent form, a copy of which has been given to you, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

#### 1. PURPOSE OF THE RESEARCH:

The purpose of this study is to explore why some people who are exposed to a traumatic event go on to develop Posttraumatic Stress Disorder (PTSD) and why others do not. In so doing, we hope to identify factors that might place an individual at risk for developing this condition. We also hope to discover resiliency traits, or factors that help protect the individual from developing PTSD.

#### 2. PROCEDURES:

If you agree to participate in this study, you will be asked to complete 4 short questionnaires which will take about 15 to 20 minutes to complete.

#### 3. DESIGN OF THE STUDY:

This study is a controlled cross-sectional differential research design. Differential research means that we observe two or more groups that are differentiated on the basis of some preexisting variable. No experiments are being conducted on you. Controlled means that there is a control group that is used to see if the results only apply to the group being tested. Cross-sectional means that participants of different ages are being compared on a set of variables.

#### 4. RISKS:

There are minimal risks to participating in this study. A few people may become upset or agitated when thinking about their traumatic experience which might trigger some strong feelings for them. If you sense that this is the case, and you would prefer not to confront such feelings right now, please feel free to decline participation at any time. We will fully understand your decision if you wish to withdraw and encourage you to do so if you feel it will be too upsetting.

#### 5. PARTICIPANT INVOLVEMENT:

If you have been identified as a possible participant in this project, you will be invited to discuss the study in detail and to sign a consent form to participate. If you agree to participate, you will be asked to complete four questionnaires that will include information about your traumatic event, how you cope with stressful situations in general, your appraisal of the trauma, and some questions surrounding social supports and personal background information such as education level and marital status.

Participation in this study is voluntary. You may refuse to participate or withdraw from the study at any time. Your refusal to participate or wish to withdraw before completion of the study will not influence your current or future health care.

#### 6. BENEFITS:

There are no expected direct benefits to you from your participation in this project. Some people derive satisfaction from contributing to research projects. It is also possible that the results of this study may be helpful in the development of a new understanding about individuals like yourself.

#### 7. ALTERNATIVES:

You may choose not to participate in this research. If you do not participate, you will remain eligible for all the health care resources usually available to you.

#### 8. ACCESS TO INFORMATION:

Your name and the information obtained from the research will be kept confidential to the extent allowed by law. This will be ensured by a number of safeguards.

- a. Your records will be identified only by a number not by your name
- b. Your records will be kept in a locked file cupboard in a locked office.
- c. No information concerning your identity will be used in any published reports.

#### 9. NEW INFORMATION:

You will be told of any changes in the way the study will be done and of any new information, which may affect your willingness to continue to participate in this study. However, it is not expected that the procedure or your involvement in this study will change in any way.

#### 10. COSTS:

There are no costs to you to participate in this study. You will be reimbursed \$10.00 for your time and transportation if required.

#### 11. COMPENSATION:

In the event that you suffer injury as a result of participating in this research, no compensation will be provided for you by the University of Calgary, Calgary Regional Health Authority or the Investigators for any treatment for services your doctors recommend that is not covered by health care insurance (Alberta Health Care). You still have all your legal rights. Nothing said here about treatment or compensation in any way alters your right to recover damages.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time without jeopardizing your health care. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation. If you have further questions concerning matters related to this research, please contact:

Marcia Voges: Graduate Student, Department of Psychology, University of Calgary,  
282-2050

OR

Dr. D. Romney: Professor of Clinical Psychology, University of Calgary, 220-2475

If you have any questions concerning your rights as a possible participant in this research, please contact Pat Evans, Associate Director, Internal Awards, Research Services, University of Calgary, at 220-3782.

If you would like a copy of the results mailed to you, please provide your address in the space below.

\_\_\_\_\_  
Participant's Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Investigators and/or Delegate's Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Witness' Signature

\_\_\_\_\_  
Date

## Appendix C

# \_\_\_\_\_

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Place a check mark in the appropriate box, or fill in the blank where appropriate.

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1. Male  Female 

2. Age \_\_\_\_\_

3. Single  Married/common law 

4. Please indicate the highest level of education you have obtained:

Less than grade 9 Some high school High school diploma Some college College degree Trade certificate Post-graduate degree/professional 

5. Have you experienced any other traumatic event in your lifetime?

Yes  (please describe, if yes) \_\_\_\_\_No 

6. Have you ever been sexually abused as a child?

Yes  No 

7. Have you ever been physically abused as a child?

Yes  No

8. Is there a history of psychological problems in your family (i.e., parents, siblings, grandparents?) Check all that apply and please indicate the problem (i.e., depression, anxiety, substance abuse, etc.):

Mother	Yes <input type="checkbox"/>	_____	No <input type="checkbox"/>
Father	Yes <input type="checkbox"/>	_____	No <input type="checkbox"/>
Sister	Yes <input type="checkbox"/>	_____	No <input type="checkbox"/>
Brother	Yes <input type="checkbox"/>	_____	No <input type="checkbox"/>
Grandfather	Yes <input type="checkbox"/>	_____	No <input type="checkbox"/>
Grandmother	Yes <input type="checkbox"/>	_____	No <input type="checkbox"/>

9. Did you have a history of psychological problems before your traumatic event occurred?

Yes  (please indicate the problem, if yes) \_\_\_\_\_  
 No

10. Were you ever brought up by someone other than your parents for a period of 4 months or more before the age of 16?

Yes       No

11. How much responsibility from **100% to 0%** do you feel you had for the traumatic event occurring?

I feel \_\_\_\_\_% responsible for the event.

12. How much responsibility from **100% to 0%** do you feel someone else had for the traumatic event occurring?

I feel that someone else was \_\_\_\_\_% responsible for the traumatic event.

13. To what extent did you feel your life was in danger?

1	2	3	4	5
Not at all	To a little extent	To some extent	To a great extent	To a very great extent

14. Did you receive any physical injuries?

Yes  What injuries did you have? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

No  **If you did not receive any injuries please go to question #18**

15. Please indicate the severity or seriousness of the injuries you received:

1	2	3	4
Mildly serious (i.e., bruises, injuries) scrapes)	Moderately serious	Serious	Very serious (i.e., life threatening)

16. Were you hospitalized as a result of your trauma?

Yes  (for how long if yes?) \_\_\_\_\_  
 No

17. Please indicate the extent to which your traumatic event was the result of a deliberate or intentional act:

1	2	3	4	5
Not at all deliberate	To a little extent deliberate	To some extent deliberate	To a great extent deliberate	To a very great extent deliberate

18. Did your traumatic event involve seeing another person die or being severely injured?

Yes  What was your relationship to this person? (i.e., stranger, friend,  
family member?) \_\_\_\_\_  
 No

19. Was someone available for you to talk to after your traumatic event? Yes  No

20. To what extent did you talk with others about your traumatic event?

1	2	3	4	5
Not at all	To a little extent	To some extent	To a great extent	To a very great extent

21. Did you receive any professional help or support after your trauma? (i.e., counseling, attending support groups)

Yes  (type of support you received, if yes) \_\_\_\_\_  
No

22. Did you receive any training in dealing with traumatic events?

Yes       No

23. Please tell us if we have missed anything that is important for us to know about your specific situation and/or about this topic.

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Table 1  
Associations Between PTSD and Demographic Factors

	Total	PTSD ( <u>n</u> = 25)	No PTSD ( <u>n</u> = 27)
<b>Sex</b>			
Male	21 (40.4%)	6 (24.0%)	15 (55.6%)
Female	31 (59.6%)	19 (76.0%)	12 (44.4%)
<b>Marital Status</b>			
Married	30 (57.7%)	11 (44.0%)	14 (51.9%)
Not Married	22 (42.3%)	14 (56.0%)	8 (29.6%)
<b>Education</b>			
Some high school	6 (11.5%)	5 (20.0%)	1 (3.7%)
High school diploma	6 (11.5%)	3 (12.0%)	3 (11.1%)
Some college	12 (23.1%)	5 (20.0%)	7 (25.9%)
College degree	12 (23.1%)	4 (16.0%)	8 (29.6%)
Trade certificate	8 (15.4%)	5 (20.0%)	3 (11.1%)
Post-Graduate degree/Professional	8 (15.4%)	3 (12.0%)	5 (18.5%)

Table 2

Associations Between PTSD and Early Environmental Factors

	PTSD ( <u>n</u> = 25)	No PTSD ( <u>n</u> = 27)
History of previous trauma	22 (88.0%)	24 (88.9%)
History of sexual abuse*	14 (56.0%)	6 (22.2%)
History of physical abuse	10 (40.0%)	5 (18.5%)
Family history of mental illness	18 (72.0%)	15 (55.5%)
Personal history of mental illness	8 (32.0%)	5 (18.5%)
Child separation from parents	7 (28.0%)	7 (25.9%)

\* $p < .05$

Table 3

Associations Between PTSD and Severity of the Trauma

	PTSD ( $n = 25$ )	No PTSD ( $n = 27$ )
Physical injuries	16 (64.0%)	10 (37.0%)
Hospitalization required	9 (36.0%)	6 (22.0%)
Witness death or severe injury	9 (36.0%)	16 (59.3%)
Direct experience of trauma*	21 (84.0%)	12 (44.4%)

\* $p < .01$

Table 4

Associations Between PTSD, Social Support and Coping

	PTSD ( <u>n</u> = 25)	No PTSD ( <u>n</u> = 27)
Persons available to talk about trauma*	10 (40.0%)	22 (81.5%)
Professional support	13 (52.0%)	14 (51.9%)
Training in dealing with trauma	2 (8.0%)	6 (22.2%)
Self blame for trauma	0 (0.0%)	1 (3.1%)
Blame others for trauma	14 (43.8%)	17 (53.1%)
Task oriented coping	3 (12.0%)	9 (33.0%)
Emotion oriented coping	14 (56.0%)	7 (25.9%)
Avoidance oriented coping	8 (32.0%)	11 (40.7%)

\* $p < .01$