Posttraumatic Stress Disorder: Risk, Resilience and Growth

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By:

Elizabeth D. Goodchild

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Abstract

This literature review examines empirical studies regarding the effects of risk and resilience on the development of posttraumatic stress disorder following exposure to trauma, and also the phenomena of posttraumatic growth. In addition, several non-empirical articles and books are reviewed for background information on posttraumatic stress disorder. The research studies were conducted primarily on subjects who had already experienced traumatic events, ranging from combat, civilian exposure to war, earthquakes, fires, terrorist acts, kidnapping and sexual assault or abuse. In addition, several studies were conducted on randomly selected community samples to determine the general prevalence of trauma and posttraumatic stress disorder in the population. The literature reviewed, although non-exhaustive, strongly indicates that several factors influence both the risk of development of posttraumatic stress disorder and the severity of the disorder. Risk factors appear to be gender related, and include pre-trauma factors such as family of origin functioning, religious beliefs and sense of self-efficacy. In addition, post-trauma factors such as available support systems are shown to be important. It also appears that the type of trauma experienced has an impact on both development and severity of posttraumatic stress disorder. Threats of loss of life or physical harm are potent risks, as are low-level, long-term traumas such as residing in a combat zone. The factors of resilience and posttraumatic growth are also examined in detail. These findings have significant clinical and social implications, and prompt the development of additional research.
Posttraumatic Stress Disorder: Risk, Resilience and Growth

The headlines of today seem to shout that we are in an era of increasing disaster, war and interpersonal violence. Stories of terrorism, natural disaster, and war fill our daily news. In fact, the words “Oklahoma City”, “911”, “tsunami” and “Katrina” alone tell whole stories of suffering and despair. In addition, incidents of rape, murder, kidnapping and other forms of interpersonal violence appear to be on the rise. Research (Bonanno, Galea, Bucciarelli, & Vlahov, 2003) indicates that the majority of adults are exposed to at least one potentially traumatic experience in their lifetime. Thus, our culture is filled with people who could be seriously impacted by traumatic experiences. Many become victims, personally devastated by such events. Yet others, apparently exposed to the same events, persevere or even grow from their experiences. This paper explores these differences of experience, in a review of the literature regarding trauma exposure and the development and severity of posttraumatic stress disorder. In addition, this paper explores the constructs of resilience and posttraumatic growth. There arise profound clinical and social implications from these studies, including gender differences, personality traits of military and rescue personnel, and disaster relief efforts.

Little research was completed on posttraumatic stress disorder until Viet Nam veterans began to return home laden with serious emotional difficulties. In 1979, the Senate Veterans Affairs Committee authorized the Veterans Administration to treat PTSD among the Viet Nam vets.

As defined by the DSM-IV-TR (Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision, 2000), posttraumatic stress disorder is an anxiety disorder that is diagnosed following exposure to an extreme traumatic stressor. Additional criteria for diagnosis
include the re-experience of the stressor, avoidance of stimuli associated with the stressor, persistent symptoms of increased arousal, and significant distress or impairment in functioning that occurs for at least one month. The DSM-IV-TR establishes lifetime prevalence for posttraumatic stress disorder at approximately 8% of the general population of the United States. In addition, it estimates that certain high-risk populations, such as rape survivors and military combatants, experience prevalence rates as high as one third to one half of those exposed to the specific trauma.

There also appear to be gender differences in the prevalence of posttraumatic stress disorder. As cited in Resnick (Resnick, Kilpatrick, B.S., Saunders, & Best, 1993), a lifetime prevalence of exposure to traumatic events of any type was 69% for a random sample of women in the United States. This study also found the overall prevalence of posttraumatic stress disorder at 12.3% in the same sample. In addition, the prevalence of posttraumatic stress disorder was significantly higher among victims of crime versus non-crime (25.8% vs. 9.4%). In fact, as cited in Yehuda (Yehuda, 2004), rape was the trauma most often associated with posttraumatic stress disorder, with a 50% prevalence rate for both genders. In contrast, Yehuda cited only a 5% prevalence rate of PTSD for survivors of natural disasters.

Several terms are often utilized in the cited studies. For the purposes of this review, the definitions of these terms merit clarification. Resilience, as defined by Connor (Connor, 2006) can be described as the ability to cope with stress. Resilience is the stable personal coping quality that allows individuals, and even whole communities, to persevere and even grow stronger following situations of extreme adversity. Koposov (Koposov, Ruchkin, & Eisemann, 2003) also discusses resilience to stress, which is defined as the ability to withstand stress and to remain healthy. Hardiness, as described by Waysman (Waysman, Schwarzwald, & Solomon, 2001), is...
defined as another stable personality trait that consists of a combination of three elements: commitment, challenge and control. Commitment addresses the hardy person’s sense of the meaning of life; control addresses the belief in one’s ability to have power over the course of events in one’s life; and challenge addresses openness to change. Coping self-efficacy, as defined by Sumer (Sumer, Karanci, Berument, & Gunes, 2005), is a person’s self-perception of their own capability to cope with the demands that occur following a traumatic event.

In the book Aftershock (Slaby, 1989), Andrew Slaby, a psychiatrist and expert on the treatment of PTSD, discusses six characteristics that he believes comprise a traumatic event: expected versus unexpected, sudden shock, personal history, unfairness, control and blame. He states that all traumatic experiences have at least several of the above elements associated with them. He also maintains that the severity of the traumatic event has no bearing on the severity of the response, agreeing with Plato that one’s reality is based on one’s perception of it.

Risk Factors

Slaby (1989) suggests several general risk factors for posttraumatic stress disorder, or aftershock, as he terms it. He states that family factors such as heredity and family structure make persons inherently susceptible to anxiety disorders. He also suggests that the trait of perfectionism also creates risk.

Adlerian theorists (Strauch, 2001) recognize that it is the perception of the trauma that is important, and that many individuals have creative and varied responses to it. Many studies relate the level of trauma exposure to the amount of posttraumatic distress. Specialists (Barker & Hawes, 1999) trained in Eye Movement Desensitization and Reprocessing (EMDR), a treatment for PTSD, distinguish between two types of trauma: Big-T trauma occurs when an individual perceives a threat to the life of themselves or another person. Small-t trauma is composed of the
small negative events of daily life. Small-t trauma occurring in early childhood would contribute
to negative lifestyle beliefs.

One study (Laor et al., 2006) suggests that multiple risk factors for a person greatly
affects the severity of posttraumatic stress disorder symptoms. The authors found that having
five or more risk factors was associated with significantly more severe symptoms than having
two or less. In addition, there was a significant increase in moderate and severe symptoms with
each additional risk factor reported.

Many empirical studies have been done to assess the factors that put one at risk of
developing posttraumatic stress disorder. The following are some general factors that appear to
have an impact on risk:

**Gender.** Many of the studies indicate that gender appears to be a major risk factor for the
development of posttraumatic stress disorder. As cited in Stein (Stein, Walker, Hazen, & Forde,
1997a), the estimated prevalence of posttraumatic stress disorder in the general community
varies by gender. This study estimates the prevalence of full PTSD (meeting all DSM-IV
criteria) is 2.7% for women and only 1.2% for men. In addition, Stein examined the prevalence
of partial PTSD (meeting all DSM-IV criteria except the required number of avoidance/numbing
criteria (criterion C) and increased arousal criteria (criterion D). Persons with partial PTSD often
exhibit clinically significant impairment. Again, the prevalence rates for partial PTSD were
higher for women than for men. Stein reported partial PTSD prevalence for women at 3.4% and
for men at 0.3%. When the data for full and partial PTSD are combined, the gender differences
are even more striking, with a 6.0% prevalence rate in women compared to 1.5% in men.

As cited in Al-Naser (Al-Naser & Sandman, 2000), Kuwaiti men in general scored
significantly higher on the Ego Resiliency Scale than did Kuwaiti women. In addition, the
women who did have high scores tended to be independent, assertive and flexible, with a high level of personal satisfaction, which are not traditional characteristics of Kuwaiti women.

Sattler (Sattler, 2003) also reported a higher risk of development of posttraumatic stress disorder for women after the terrorist attacks on America on September 11, 2001. In a study that sampled college students from four disparate geographical regions of the United States (the Northeast, Southeast, Midwest and Northwest), Sattler found that gender was a significant factor in all areas of the country, essentially independent of distance from the site of the attacks.

A study of 336 survivors of the 1999 earthquake in Turkey (Sumer et al., 2005) also showed a correlation between gender and distress. Female respondents reported higher levels of both general distress and intrusive thoughts than did their male counterparts. In addition, the levels of personal coping resources were higher for males than for females. In another study of 1000 survivors of the same earthquake (Basoglu, Salioglou, & Livanou, 2002), the researchers found that women had an estimated 53% prevalence of PTSD compared to men, with an estimated prevalence of 33%.

In a national sample of over 1600 Viet Nam war veterans, researchers (King, King, Foy, Keane & Fairbank, 1999) found gender differences in the direct associations between specific risk factors, such as early trauma history and perceived threat, and the development of PTSD. In addition, post-war variables such as lack of social support tended to account for more PTSD symptoms in women veterans than in men.

A study (Laor et al., 2006) of 1105 Israeli adolescents exposed to terrorism also found that females reported more symptoms of posttraumatic stress than do males. Another study (Shacham & Lahad, 2004) of 102 Israeli children who experienced shelling and evacuation from their homes also found female children to be more likely to report stress reactions than boys.
As cited in Benight (Benight & Harper, 2002), gender was a significant predictor for posttraumatic stress disorder symptoms, with women reporting more symptoms. However, this was only significant when measured at one year after the traumatic incident.

Only one of the studies reviewed (Kaplan, Matar, Kamin, Sadan, & Cohen, 2005) found no significant gender differences in the prevalence of posttraumatic stress disorder symptoms, in Israeli war-zone inhabitants.

*Pre-existing psychopathology.* One research group (Koenen et al., 2002) structured a study of male twins who concurrently served in active military duty during the Viet Nam war era. This very large sample (N=6744) of twin pairs was drawn from the Harvard Twin Study of Drug Abuse and Dependence, and the study was comprehensive in its collection of demographic, military and family psychopathology data. Approximately half of this sample served in Southeast Asia, whereas the other half did not share this combat experience. The researchers developed the study to examine both individual and familial risk factors for the development of posttraumatic stress disorder following exposure to combat. Of particular interest to the researchers was whether familial psychopathology increases the risk of PTSD. The twin pairs were assessed with the Mental Health Diagnostic Interview Schedule Version III, a structured psychiatric research interview tool leading to DSM-III-R diagnoses. Data from this questionnaire was then utilized to determine exposure to traumatic events, pre-existing psychopathology, familial psychopathology and combat exposure. The researchers found individual and familial risk factors that were positively correlated with the vulnerability of exposure to traumatic events, including age of entry into the military, parental depression and antisocial behavior, pre-existing conduct disorder and pre-existing substance dependence. However, pre-existing major depression was negatively correlated with trauma exposure. In particular, these research findings suggest that family
psychopathology functions to increase risk of PTSD by increasing opportunity for exposure to traumatic events.

Another study (Franklin, Young, & Zimmerman, 2002) compared psychiatric patients to general medical patients following the terrorist attacks on America on September 11, 2001. The study utilized a modified version of the Posttraumatic Diagnostic Scale, a standardized measurement instrument designed to assess PTSD symptoms according to DSM-IV criteria. The psychiatric patients appeared to be more psychologically vulnerable to posttraumatic stress symptoms than were their medical counterparts, particularly in regard to DSM-IV Criteria C (avoidance) and Criteria D (arousal) symptoms. Psychiatric patients were also more likely to seek help. In addition, the study found that exposure to similar traumatic events, pre-existing PTSD diagnoses, personal loss and method of learning about the attacks were not associated with the development of PTSD. However, the authors did acknowledge that the study was not able to address potential coping skill deficits prior to the attacks, which could impact the psychiatric patient sample in particular.

Another study (Emery, Emery, Shama, Quiana, & Jassani, 1991) was designed to examine antecedent stressors in early environments. The study compared Viet Nam veterans with diagnosed posttraumatic stress disorder to a similar size sample of Viet Nam veterans who did not meet the criteria for PTSD. The researchers found evidence that the veterans with PTSD experienced significantly higher levels of childhood stressors, particularly parental alcoholism and unemployment. In addition, there were differences in the way the two groups perceived their childhood stressors. Of the PTSD veterans, 90% perceived family system factors as being the chief stressor of their childhood. In contrast, only 20% of the non-PTSD veterans had the same
perceptions of childhood stressors, with half perceiving parental strictness or delegation of responsibility as the chief stressor.

Age. Several studies report a correlation between age at exposure to trauma and the development and/or severity of posttraumatic stress disorder. One study (Koenen et al., 2002) found that a younger age at entry into the military was associated with an increased risk of both exposure to trauma and developing PTSD. Another study (Sumer et al., 2005) found that age was positively correlated with coping traits such as self-efficacy and perceived control.

Another study (Maercker & Herrle, 2003), conducted on survivors of the bombings of Dresden during World War II, indicates that adolescents and persons of middle-age appear to be more at risk of developing posttraumatic stress symptoms than do persons in young adulthood.

The results of one study (Koposov et al., 2003) involving 159 juvenile delinquents in Russia suggest that the ability to make sense out of events in life develops over the first three decades of life, and therefore age should be a factor to be considered in the development of PTSD.

Adlerian theory (Strauch, 2001) proposes that trauma occurring during the lifestyle development phase of childhood would have great impact on the structure of mistaken belief systems, including distorted self-concept, sense of belonging and sense of self-efficacy. The older the age at exposure to trauma, the less likely the trauma is to become an endogenous factor of the lifestyle. The research appears to support this theory of lifestyle development.

Trauma exposure. In one study (Astin, Lawrence, & Foy, 1993), it was hypothesized that the level of trauma experienced by a sample of battered women would significantly influence the level of posttraumatic stress disorder symptoms. A sample of 53 women from Los Angeles area shelters was given two standardized measures of PTSD symptoms, the Impact of Event Scale
and the PTSD Checklist. The authors found that there were positive correlations between severity of exposure to violence and the level of PTSD intensity. In addition, PTSD intensity was positively correlated with the recency of the abuse. Astin also suggested that pre-trauma variables, such as developmental adjustments, could perhaps have greater impact on the development of PTSD in situations of low-level exposure to trauma.

Another research group (Bonanno et al., 2003) conducted a randomly sampled telephone survey six months after the attacks on the World Trade Center in 2001. The researchers interviewed adults from the New York City geographical area, including the commuter suburbs. The results showed that the highest proportions of posttraumatic stress symptoms were in the people who were in the World Trade Center at the time of the attacks, and/or physically injured as a result of the attacks.

Another study (Benight & Harper, 2002) showed the distress level at the time of the traumatic incident was the best predictor of posttraumatic stress symptoms at one year post-trauma. In addition, as cited in Koenan (Koenen et al., 2002), if more than one traumatic exposure was reported by a participant, posttraumatic stress disorder was almost always associated with the earliest trauma.

An important related finding was found in a study (Laor et al., 2006) conducted on 1105 adolescents heavily exposed to terrorism in Israel. The researchers found that the children who reported having frequent family discussions about issues related to terrorism had more severe symptoms. In addition, another study (Shacham & Lahad, 2004) on 102 Israeli children evacuated from their homes without their families during terrorist attacks had higher incidents of PTSD symptoms than did children who remained with their families in the attack zones.
Resilience Factors

According to a brochure published by the American Psychological Association, resilience is the process of adapting well in the face of adversity or significant stress. The authors suggest that resilience is common, but not innate. They describe it as a combination of thoughts and behaviors that can be learned, such as realistic planning, positive self-view, communication skills and the ability to manage emotions.

In a book that focuses on the topic of resilience, Flach (Flach, 1988) discusses what he calls the “resilient personality.” In his view, a particular set of attributes contribute to resilience, including a strong and flexible sense of self-esteem, independence, a well-established support system, personal discipline, insight, a sense of humor and a commitment to life.

Many empirical studies have been conducted in an effort to scientifically examine the factors that contribute to resilience. These factors are discussed as follows:

*Resilience.* North (North et al., 2002) studied a sample of 181 firefighters after the 1995 bombing of the Murrah Building in Oklahoma City. Most of the participants were actively involved in traumatic duties such as body excavation or removal. Despite the horror of these job duties, 72% reported full personal recovery from the experience and 27% reported partial personal recovery. The researchers acknowledged that the firefighters could have had a tendency to project positive “masoch” images of themselves or to minimize and deny the effects of the trauma. However, the sample on the average still reported a heightened sense of job satisfaction after the event. Job satisfaction was one criterion used to measure coping skills. Another study (Tucker et al., 2002) conducted on 135 body handlers after the Oklahoma City bombing found similar results of general resilience.
A related study regarding the concept of resilience was conducted by Koposov (Koposov et al., 2003). The researchers examined a concept called sense of coherence, which was defined as a personality trait or disposition containing three facets: that life is comprehensible and structured, manageable and meaningful. The study revealed evidence that direct exposure to violence can be negatively correlated with a victim’s sense of coherence, or coping ability. Thus, sense of coherence was proposed to be negatively correlated with psychopathology, especially depression, anxiety and posttraumatic stress disorder. In other words, as coping skills decrease, traumatization and psychopathology increase. As cited in Sattler (Sattler, 2003), an active coping style appears to be effective in handling severe stressors. Active coping styles involve behavioral responses that include attempts to solve problems with direct action in order to reduce the negative consequences of a situation.

Emery (Emery et al., 1991) suggests that parental structuring, control and organization during primary socialization of childhood can be a protective factor influencing the development of PTSD in Viet Nam combat veterans. In contrast, it appears that unreliability in early environments and lack of control can predispose the veterans to the development of posttraumatic stress disorder symptoms.

_Coping self-efficacy_. A unique research approach to the study of posttraumatic stress disorder was conducted by Benight (Benight & Harper, 2002) in Colorado. The researchers designed a study to investigate an individual’s perceived (not actual) capacities for controlling the posttraumatic environment. This concept was defined as coping self-efficacy, and the authors hypothesized that the influence of the coping self-efficacy perceptions actually mediate between the acute stress response during trauma and the subsequent psychological distress. The study was conducted by administering several self-report measures to a sample of members of a wildfire
and flood-ravaged Colorado community. The authors argue that exposed individuals utilize self-evaluative mechanisms during trauma, which in turn generate their coping self-efficacy, or sense of control. Coping self-efficacy is therefore negatively correlated with emotional distress. The authors suggest that emotional distress in fact interferes with actual coping behaviors, thus causing a vicious cycle toward the development of PTSD.

**Hardiness.** One study (Waysman et al., 2001) was devised to compare two samples of combat veterans from the Yom Kippur War in Israel. One sample consisted of 164 prisoners of war, Israeli army personnel who were held as POWs in Syria and Egypt. The control group consisted of 184 veterans who fought on the Syrian and Egyptian fronts in the same war. The samples did not differ significantly except for military rank, with the POWs having slightly higher ranks. The participants were administered a Hebrew adaptation of the Personal Views Survey, a questionnaire measuring the construct of hardiness. From the scores, an overall hardiness score was obtained, including the subscales of commitment, challenge and control, as defined earlier. In addition, the amount of combat exposure was measured, including twenty-three different combat activities ranging from witnessing events to actual personal involvement. The researchers, utilizing a Hebrew adaptation of the Trait, Attitude and Behavioral Change Scale, calculated two indices. Index 1 indicated the amount of positive change experienced, stated as either increase in a desirable behavior or trait, or as a decrease in an undesirable behavior or trait. Index 2 indicated negative change, either a decrease in desirable behaviors or an increase in negative behaviors. The data indicated that the trait of hardiness has a stress moderating effect, with a significant positive correlation with positive changes for the POWs. In other words, the higher the hardiness score, the greater number of positive changes reported by the POW’s. Interestingly, hardiness was not correlated to positive change scores for the control
group, which had essentially a flat regression slope. In addition, hardiness scores were negatively correlated with negative changes for both the POW and the control groups. However, the association was again stronger for the POWs than for the controls. Thus, hardiness was found to be a protective factor, lowering vulnerability to stress and also a resource that promotes the ability to experience psychological growth following exposure to traumatic events.

*Social support.* Adlerian theorists (Strauch, 2001) propose that social embeddedness is a primary resilience factor, especially the structure of social support in terms of both degree and quality, after the experience of trauma. The research supports this proposition. As cited in Kaplan (Kaplan et al., 2005), communal support systems based on mutual commitment and responsibility influence the subjective experience of traumatic events. In addition, another study (Navia & Ossa, 2003) examined family coping after a kidnapping experience. The study showed no significant differences in posttraumatic stress disorder symptoms between the actual victim of the kidnapping and the family members. The researchers postulated that the family suffers because it is unable to reach out to the community for support, because of the distrust of the social system as a whole after the traumatic experience.

*Social acknowledgement.* Another research study (Maercker & Muller, 2004) examined the construct of social acknowledgement, which they defined as the expansion of social support from individuals to groups, or to the society as a whole. The researchers devised the Social Acknowledgement Questionnaire, a scale based on several standardized instruments, to measure trauma victims’ perceptions of the support they receive from their environment. The study compared two samples, political prisoners of East Germany and the victims of interpersonal crimes, such as robbery or assault. The findings indicate that self-perceived rejection by social
environments following trauma could have more impact on PTSD symptom development than even the self-perceived rejection by family.

*Religion/spirituality.* In 2005, Kaplan (Kaplan et al., 2005) studied three samples of the inhabitants of war-zone areas of Israel. The three samples were similar in most demographics, with the exception of religiousness. Although there were no apparent differences in the overall prevalence of posttraumatic stress disorder between the three samples, the study indicated that differences in the severity of symptoms did exist. Despite notably more exposure to extreme violence and terror, the deeply religious (Observant or Orthodox Jewish) sample from Gash-Katif, in the Gaza Strip, reported significantly less severe symptoms than did the other less religious groups. It was also noted that the suburban and least religious Tel-Aviv sample, which experienced the mildest exposure to the war trauma, had the highest level of severity of symptoms.

Astin (Astin et al., 1993), however, found contradictory results regarding the impact of religion on posttraumatic stress disorder. Intrinsic religiosity, or participation due to worldview, was negatively correlated with PTSD levels as measured by the Impact of Event Scale. However, when measured by the PTSD Symptom Checklist, intrinsic religiosity was positively correlated with PTSD severity levels. Another study (Maercker & Herrle, 2003) on 47 survivors of the Dresden bombings in Germany found that the combination of high religious beliefs in the afterlife and high traumatic exposure was associated with very high avoidance scores; avoidance is a major symptom of posttraumatic stress disorder. Further in-depth research is warranted to examine these discrepancies, because of the small sample sizes and the limits of the assessment tools.
In a study sampling highly functioning female survivors of childhood sexual abuse, the researchers (Valentine & Feinauer, 1993) also found that religion/spirituality was reported as a significant factor in overcoming the trauma. It should be noted that this particular sample was drawn from the residents of Utah, and the participants self-reported that they were highly spiritual, and were predominantly Latter-Day Saints.

Culture. As cited in Al-Naser (Al-Naser & Sandman, 2000), some evidence exists that cultures themselves can be resilient in the face of adversity. For example, Kuwaiti culture as a whole scores highly on the Ego Resiliency Scale, indicating that the culture itself is resilient.

Posttraumatic Growth Factors

In addition to the evidence that many people rebound to normal functioning after the experience of severe trauma, many also report that they have experienced positive growth as a result of the situation. As cited in Slaby (Slaby, 1989), philosophers and poets over the centuries have noted this phenomenon: “It was the best of times, it was the worst of times” (Dickens); “quae nocent, docent – that which hurts also teaches” (ancient Roman saying); and “What does not break makes one strong.” (Nietzsche). In addition, the Chinese character for crisis combines both the figure for danger and the figure for opportunity.

Some specialists (Barker & Hawes, 1999) of Eye Movement Desensitization and Reprocessing (EMDR), a treatment designed to reduce the negative symptoms of PTSD, propose that during the EMDR treatment process, positive beliefs or characteristics can become attached to what had once had a negative connotation.

In the mid-1990’s, researchers began to study the phenomenon of posttraumatic growth, with the fleshing out of factors that appear to contribute to it. A major study (Laufner &
Solomon, 2006) examined Israeli youth who were exposed to terror, and found that although 41.1% of the youth showed PTSD symptoms, 74.4% reported feelings of posttraumatic growth. Many additional empirical studies have been conducted to examine the factors that appear to promote posttraumatic growth. These factors are discussed as follows:

**Independent construct.** Several studies indicate that positive change and negative change can occur simultaneously, or are positively correlated, thus indicating different domains rather than the extremes of a continuum. One study (Linley, Joseph, Cooper, Harris, & Meyer, 2003) explored the effects of vicarious exposure to the September 11 terrorist attacks on America. The authors found that positive and negative changes can co-exist following trauma. Another study (Salter & Stallard, 2004) showed that of the 42% of children who showed evidence of posttraumatic growth following a motor vehicle accident, 37% of those children also had PTSD.

Another study (Fontana & Rosenheck, 1998), completed on the data from the National Vietnam Veterans Readjustment Study, also found that psychological benefits and liabilities were independent variables and significantly positively correlated.

**Religion/spirituality/worldview.** Several studies indicate a correlation between religious beliefs or spirituality and posttraumatic growth. Calhoun (Calhoun, Cann, Tedeschi, & McMillen, 2000) found that openness to religious change predicted posttraumatic growth in traumatized college students. A study of Israeli youths (Laufner & Solomon, 2006) found that religiosity was positively correlated with posttraumatic growth. Another study (Linley, 2003) found that persons who felt that their values and beliefs had been attacked by terrorists were more likely to report positive changes.
A study (Cadell, Regehr, & Hemsworth, 2003) on 174 bereaved HIV/AIDS caregivers also showed a significant positive correlation between spirituality and reported posttraumatic growth.

**Cognitive processing/rumination.** Rumination is defined as recurrent event-related thinking, including attempts to make sense of the trauma, problem solving, reminiscence and even anticipation. Several studies indicate that the level of rumination, or cognitive processing, can be positively associated with posttraumatic growth. Calhoun (Calhoun et al., 2000) measured the correlation of self-reported rumination with posttraumatic growth. The authors found a significant positive correlation between event-related rumination and posttraumatic growth. However, they also found that when the ruminations were primarily intrusive, negative and continued for long periods, the subjects experienced both low levels of growth and high levels of distress. The authors also found that some subjects experienced growth without engagement in rumination.

**Trauma exposure/distress level.** Many studies have investigated the correlation between level of trauma/distress and posttraumatic growth. Frazier (Frazier, Conlon, & Glaser, 2001) conducted a longitudinal study to investigate the correlation between positive and negative life changes as a function of posttraumatic distress in female sexual assault survivors. The researchers found that both positive and negative changes are related to level of distress, although the negative changes were more highly correlated. However, the positive factors most highly correlated with level of distress were self and spirituality. Negative changes in relationships were the most highly correlated with distress, and changes in beliefs or world-view, were not correlated with level of distress.
Another study (Cobb, Tedeschi, Calhoun, & Cann, 2006) found that high levels of intimate partner violence were positively correlated with reports of greater appreciation for life in women. In another study by Tedeschi (Tedeschi & Calhoun, 1996), it was found that persons who have experienced traumatic events report more positive change than do persons who have not experienced traumatic events.

One study (McMillen, Smith, & Fisher, 1997) compared posttraumatic growth levels following three different types of disaster, including a tornado, a plane crash into a hotel and a mass public shooting. The researchers found that the site of disaster predicted the amount of benefit perceived; people who thought they were going to die were more likely to report personal growth than those who did not.

In a study (Maercker & Herrle, 2003) of 47 survivors of the Dresden, Germany bombings in World War II, the researchers also found that personal growth was positively associated with the level of traumatic exposure, referring to it as the “trauma dose” effect.

A study of Israeli youth exposed to terror incidents (Laufner & Solomon, 2006) found that greater objective and subjective exposure to terror was significantly correlated with posttraumatic growth.

In a study (Cadell et al., 2003) of 174 bereaved HIV/AIDS caregivers, the researchers also found that a high level of stressors had a significant, positive and direct affect on the level of perceived posttraumatic growth.

Timing. Frazier (Frazier et al., 2001) conducted a longitudinal study to investigate the timing and course of posttraumatic growth. The researchers assessed life changes in the areas of self, relationships, life philosophy/spirituality and empathy. The sample was also assessed for negative changes in schema, or world-view. Survivors reported significant positive changes as
soon as two weeks following the traumatic event, noting in particular increased empathy, improved relationships and greater appreciation of life. Some changes appeared to occur suddenly, such as empathy; others appeared to emerge more gradually, such as sense of purpose. In addition, the authors found that positive changes generally increased over time and negative changes decreased. The period of greatest change appeared to occur with two weeks and two months post-assault.

*Role modeling.* Several studies indicate that having a role model who has thrived after experiencing trauma has a positive impact on the experience of posttraumatic growth. One study (Cobb et al., 2006) found that the availability of a role model who had reported growth associated with the resolution of an abusive relationship was a significant predictor of overall posttraumatic growth and the individual dimensions of personal strength, new possibilities and relating to others.

*Social support.* Several studies indicate that strong support systems are positively correlated with posttraumatic growth. One study (Frazier et al., 2001) found that strong social support positively impacted perceptions of growth. This factor appeared to be mediated through the process of control over recovery.

In another study (Cadell et al., 2003) that involved 174 bereaved HIV/AIDS caregivers, the researchers also found that the amount of social support had a significant, positive and direct affect on the level of posttraumatic growth.

*Locus of control.* Frazier (Frazier, Tashiro, Berman, Steger, & Long, 2004) conducted a secondary analysis of a previous research study (Frazier et al., 2001), and found that for sexual assault survivors, the perception that they had control over their recovery process was positively correlated with perceptions of growth.
A study (Maercker & Herrle, 2003) of 47 survivors of the Dresden bombings during World War II also suggested that posttraumatic growth was associated with an internal, rather than an external or environmental, locus of control.

**Personality.** One study (Tedeschi & Calhoun, 1996) found that persons who reported posttraumatic growth also reported the personality traits of extraversion, optimism and openness to new experiences. The construct of hardiness (Waysman et al., 2001) as a personality factor also appears to contribute to positive change following traumatic exposures.

**Gender.** Several studies reported that females report higher levels of posttraumatic growth than males. For example, one study (Tedeschi & Calhoun, 1996) found that women reported more benefits than men, with the most differences existing in the ability to perceive spiritual and relationship change. A study of Israeli youths exposed to terror (Laufner & Solomon, 2006) also found that females reported more growth than did males. However, another study (Polatinsky & Esprey, 2000) found no relationship between the gender of bereaved parents and posttraumatic growth.

**Age.** Several studies show the impact of age on posttraumatic growth. One study (Polatinsky & Esprey, 2000) showed a small, but significant, negative correlation between age and evidence of posttraumatic growth. In other words, younger people tended to report more growth than did older people. Another study (Laufner & Solomon, 2006) also found that younger Israeli youth reported more growth than did their older counterparts.

Another study (Salter & Stallard, 2004) found that 42% of children involved in motor vehicle accidents showed some evidence of posttraumatic growth. These children noted an improved perception of self, improved interpersonal relationships and improved appreciation of life.
Methodological Considerations

The studies cited in this literature review used a wide variety of methodological approaches to research the various risk, resilience and growth factors associated with posttraumatic stress disorder. Sample sizes, demographics, measurement tools, types of trauma and length of time since exposure varied greatly between the studies, although many researchers attempted to control for these variables statistically. However, the differences in methodology must be considered if attempting to compare the research results. The similarities and differences in research design and implementation will be briefly reviewed.

Several studies were designed utilizing Viet Nam veterans as the sample base. In the King study (King, King, Keane, Foy, & Fairbank, 1999), the researchers drew their data from the National Vietnam Veterans Readjustment Study participant responses to the Mississippi Scale for Combat-Related PTSD. The sample included 432 female veterans and 1200 male veterans. This study statistically integrated the variables of pre-war risk factors, war-zone stressors, post-war resilience/recovery variables and posttraumatic stress disorder for both genders.

In a major research effort, Koenan (Koenen et al., 2002) studied 6744 twin pairs of male Viet Nam veterans, drawn from the national Viet Nam Era Twin Registry. The participants’ military histories were extracted from their military records. The Mental Health Diagnostic Interview Schedule III-R (DIS-III-R) was used to obtain diagnostic, co-twin and parental psychopathology and demographic data. The Combat Exposure Index was used to assess trauma exposure. This study was designed to examine both individual and familial risk factors for both trauma exposure and the development of posttraumatic stress disorder.

Several other studies utilized samples from populations exposed to wars in countries other than the United States. For example, Waysman (Waysman et al., 2001) designed a study
that compared two samples of veterans of the Yom Kippur War in Israel in 1973. One sample consisted of 164 POWs and the control sample consisted of 184 non-POW veterans who fought on the same front. The study was designed to test the effects of hardiness in high-stress versus low-stress combat situations. The participants were administered Hebrew adaptations of the Trait, Attitude and Behavioral Change scale and the Personal Views Survey. In addition, a scale to measure combat exposure and post-war life events were designed by the authors for this study.

Another study (Maercker & Herrle, 2003) was designed to assess the positive (salutogenic) and negative (pathogenic) effects of the World War II bombings on residents of Dresden, Germany. The researchers administered several measures of psychological functioning to 47 survivors, more than fifty years after the actual event. The instruments included German versions of the Impact of Event Scale – Revised, the Traumatic Exposure Checklist, both of which measure the level of traumatic exposure, and the Stress Related Growth Scale, with questions regarding perceived growth. In addition, the researchers utilized a German scale, which measures locus of control, and the German Fear of Death Questionnaire, which measures religious beliefs.

One study (Al-Naser & Sandman, 2000) was designed to identify resilience characteristics in college students of Kuwait University, following the Iraqi invasion of Kuwait in 1990. The Ego Resiliency Scale was administered to a sample of 495 male and female students. Demographic information was also gathered to assess the effect of these variables on their resilience scores.

Kaplan (Kaplan et al., 2005) compared 314 randomly sampled inhabitants of three different population centers in Israel, following three years of exposure to terrorist violence. The study was designed to assess the extent and severity of posttraumatic stress symptoms in these
samples, and also to assess factors of vulnerability and resilience. The samples varied in the level of exposure to trauma, ranging from the experience of daily exposure to the violent terrorist attacks in the Gaza Strip, to the mild and infrequent impact of terrorist violence in suburban Tel-Aviv. In addition, the three samples differed in religiousness, ranging from extremely religious in the Gaza Strip settlement to mostly secular in the Tel-Aviv suburb. The participants were assessed using a demographic and background questionnaire designed by the researchers. In addition, the participants were administered several more standardized instruments, including the Post Traumatic Stress Disorder Scale, Symptom Checklist-90 and the Stanford Acute Stress Reaction Questionnaire.

Several other studies were designed to measure the effects of exposure to terrorism on Israeli children. In a major study (Laufner & Solomon, 2006), the researchers studied 2,999 adolescents from grades seven through nine. The sample was divided into four groups with different levels of exposure to terror. The groups were then assessed for both subjective and objective exposure, and correlated with both posttraumatic stress symptoms and posttraumatic growth. The objective exposure to terror was measured with the Exposure to Terror Questionnaire. Subjective exposure to terror was measured using questions regarding level of fear experienced, utilizing a four-point Likert scale. The children were administered the Child Posttraumatic Stress Index, a twenty question self-report questionnaire that assesses the severity of the trauma-related symptoms of intrusion, avoidance and hyperarousal. The children were also administered the Posttraumatic Growth Inventory to assess posttraumatic growth.

Another study in Israel (Laor et al., 2006) examined the effects of continuous terror exposure on a group of 1105 adolescents of both genders and a mean age of 12.9 years. The subjects were administered the Traumatic Dissociation and Grief Scale, a 23-item questionnaire.
The children were also administered the Child Posttraumatic Stress Disorder Reaction Index and the Personal Resilience Scale, an eight item self-report measure of coping. In addition, the children were asked about previous trauma exposure, level of family discussion about the terrorism and willingness to make sacrifices for their country.

Another study (Shacham & Lahad, 2004) examined the coping resources of 102 children exposed to shelling and evacuation in Israel. This study utilized structured individual interviews consisting of open-ended questions.

Maercker (Maercker & Muller, 2004) designed a study that compared 178 non-treatment seeking political prisoners of East Germany to 151 victims of recent interpersonal crime. The study was developed to validate the resilience construct of social acknowledgement, utilizing primarily the Impact of Event Scale-Revised. In addition, the participants were administered a German language standardized questionnaire (SOZU) that measured perceived social support. The Disclosure of Trauma Questionnaire was also administered.

Several of the studies were developed to measure the impact of recent terrorist attacks on the United States. Sattler (Sattler, 2003) developed a study three weeks after the attacks on September 11, 2001. The researcher designed a questionnaire that was given to 1263 college students, who were divided into samples from different geographical areas of the United States. The questionnaire included questions about demographics, personal losses or gains due to the attacks, level of personal psychological distress, coping skills and social support.

A major study by Bonanno (Bonanno et al., 2003) utilized a large, computer- randomized sample of 2,752 inhabitants of New York City and the surrounding commuter communities. The sample represented the general population and also a diverse spectrum of exposure to the attacks on the World Trade Center on September 11, 2001. The sample was assessed utilizing the
National Women’s Study PTSD module, and was presented in several languages. The study was designed to examine the levels of posttraumatic stress disorder and resilience in a population exposed to a severely traumatic terrorist event.

A study in Britain (Linley et al., 2003) also assessed the positive and negative effects of vicarious exposure to the September 11 attack on the United States. The researchers postulated that the vicarious exposure to the event would cause psychological distress to inhabitants of Britain. A sample of 108 residents of the United Kingdom was selected, with a conscious attempt to provide a cross-representation of the British population. The sample consisted of both genders, ranged in age from 19 to 91, and included people with varied marital status, education and employment. The researchers administered the Posttraumatic Growth Inventory and the Changes in Outlook Questionnaire, a 26-item self-report measure of positive and negative changes following a traumatic event. In addition, the subjects were asked to indicate how many hours they had spent watching the television coverage of the attacks on the World Trade Center. A scale was devised to measure three broad perceptions of the event that were prevalent immediately after the event, including whether America deserved the attack, whether the attacks were the result of religious fanatics and whether the attacks were considered an attack on the participant’s own beliefs.

Several studies focused on the psychological effects of trauma on rescue personnel following the bombing of the Murrah Building in Oklahoma City. In one such study (North et al., 2002), the researchers administered the Diagnostic Interview Schedule and The Disaster Supplement to a volunteer sample of 181 firefighters who performed the primary rescue and body excavation efforts after the bombing. The study was designed to assess post-trauma psychosocial adjustment, level of functioning and coping behaviors of the firefighters.
In another study of the Oklahoma City bombing (Tucker et al., 2002), the researchers also attempted to assess predictors of posttraumatic stress, in addition to other symptoms. The sample consisted of 135 body handlers, including medical examiners, medical and dental residents, and students. The authors developed a 100-item self-report survey, which included demographics, previous personal and professional disaster experience, exposure to the bombing trauma, levels of social support, posttraumatic stress symptoms and depressive symptoms at the time of the body handling. In addition, the authors revisited the sample one year later, asking questions to assess changes in alcohol consumption, level of job satisfaction, life stressors and coping mechanisms.

Several studies were designed to assess the impact of natural disasters on survivors. In one case (Sumer et al., 2005), the researchers designed a study to examine the predictive power of personal resources, severity of the traumatic experience and coping self-efficacy on posttraumatic symptoms following the 1999 Marmara earthquake in Turkey. In addition, the study investigated the mediating role of coping self-efficacy. The researchers collected data at two separate times, at four months following the earthquake and again two months later. The samples were randomly selected from four main districts of the city, with relatively equal gender representation. The first sample consisted of 231 respondents and the second consisted of 119 respondents. Several brief surveys were designed or adapted by the researchers, and were administered to the participants. These surveys assessed severity of trauma exposure, perceived control and coping self-efficacy. In addition, the Rosenberg Self-Esteem Inventory, the Symptom Checklist-Revised and a Turkish translation of the Impact of Events Scale were administered. The interviews were conducted in the homes of the participants.
A study by another research team (Basoglu et al., 2002) was also designed to assess the traumatic stress response of 1000 survivors of the Marmara earthquake in Turkey. The sample consisted of non-random samples of inhabitants from three survivor camps set up following the earthquake. The sample consisted mostly of women, since it was conducted during the day and most men were working at this time. The tests administered included the Survivor Information Form, which consisted of questions regarding demographics, personal and family history, trauma characteristics, and level of fear during the earthquake. The subjects also received the Traumatic Stress Symptom Checklist, a 23-item questionnaire.

Another study (Benight & Harper, 2002) was designed to assess the mediating effect of coping self-efficacy perceptions and psychological distress following natural disasters. A sample of 46 survivors of a wildfire and flash flood from a small mountain community in Colorado were assessed at approximately one month after the disasters and again at one year. The participants were administered several standard assessments, including the Stanford Acute Stress Reaction Questionnaire, the Brief Symptom Inventory and the Impact of Event Scale. In addition, the study utilized an adaptation of the Hurricane Coping Self-Efficacy Scale, which was designed by one of the authors, and also general demographic information.

One large research study (McMillen et al., 1997) was developed to assess and compare both perceived benefit and mental health after three different types of disasters. The authors compared results from 42 survivors of a tornado in Madison, Florida, 46 employees of a Ramada Inn that was destroyed by a plane crash in Indianapolis, and 136 persons who witnessed a mass shooting in a restaurant in Killeen, Texas. All subjects were interviewed within 4-6 weeks of the disaster, and then most were re-interviewed three years later. The authors asked yes/no questions regarding perceived benefit, and those with affirmative answers were asked further open-ended
questions about the types of benefit perceived. All subjects were administered portions of the Diagnostic Interview Schedule Disaster Supplement to assess mental health, focusing on the diagnoses of major depression, generalized anxiety disorder, alcohol abuse-dependence and posttraumatic stress disorder. The test was also used to assess life satisfaction and characteristics of the disaster. In addition, the subjects were asked questions regarding mental health service usage; however, these questions differed by site.

Another study in Britain (Salter & Stallard, 2004) assessed posttraumatic growth in 158 child survivors of automobile accidents. The children were randomly assigned to either an intervention or neutral interview group. They were administered the Clinician Administered PTSD Scale for Children. In addition, the Impact of Events Scale, the Revised Manifest Anxiety Scale, the Birleson Depression Inventory and the Strengths and Difficulties Questionnaire were administered.

Several studies focused on the impact of traumatic experiences on populations with pre-existing psychopathology and/or childhood stressors. One study (Emery et al., 1991) examined perceptions of childhood stressors in 40 male Viet Nam veterans. Half of the veterans were diagnosed with posttraumatic stress disorder and were currently seeking treatment. The other half did not have the diagnosis, and were selected from local chapters of a Viet Nam veterans’ organization. The samples were essentially equivalent with respect to military experience, including rank, discharge and combat exposure. The Emery Questionnaire for Predisposing Variables, designed by the authors to collect data from early developmental experiences, was administered to all participants.

Another study (Franklin et al., 2002) investigated reactions of both psychiatric and general medical patients after the 9/11 terrorist attacks. The study was designed to examine the
prevalence of posttraumatic stress symptoms among patients who were not directly exposed to the attacks. In addition, the study examined the psychological vulnerability of 221 current psychiatric patients, especially those with pre-existing diagnoses of PTSD, compared to that of 87 general medical patients. Psychiatric diagnoses were extracted from the medical charts of the psychiatric patients. In addition, all participants were given a background questionnaire that assessed demographics, psychiatric treatment histories, exposure to the 9/11 attacks and health services utilization related to the attacks. The participants were also administered a modified version of the Posttraumatic Diagnostic Scale.

Several studies reviewed focused on the psychological effects of interpersonal violence. One such study (Astin et al., 1993) investigated the impact of the level of trauma among battered women on posttraumatic stress symptom severity. The researchers administered the Impact of Event Scale and the PTSD Symptom Checklist to 53 female clients of Los Angeles area shelters and counseling centers. In addition, the women completed questionnaires that assessed demographics, current life events and levels of social support.

Another study (Valentine & Feinauer, 1993) was designed to assess the resiliency factors in a volunteer sample of 22 women who were self-reported survivors of childhood sexual abuse. A sample of 57 women was sent a demographic questionnaire, a short battery of assessment instruments and an invitation to participate in a face-to-face interview. Of that sample, 22 women were actually interviewed to elicit potential resilience factors.

Two studies assessed the impact of sexual assault on survivors. The first study (Frazier et al., 2001) addressed the positive and negative life changes experienced by 171 sexual assault survivors who had evidentiary exams done in local emergency rooms. Recruitment was accomplished utilizing the Sexual Assault Resource Service, an agency that provides the
evidentiary exams in several hospitals of a large Midwestern urban area. The subjects were administered a 17-item questionnaire designed to measure life change after the assault. In addition, the subjects were given the 6-item Depression Subscale of the Brief Symptom Inventory. The researchers re-examined the same sample three years later in another study (Frazier et al., 2004). The sample was given questions to assess their level of prior victimization and social support. In addition, the subjects were administered the Coping Strategies Inventory, a measure with eight 9-item subscales to measure various forms of approach and avoidance coping strategies. Religious coping was measured by administration of the Religious Coping Activities Scale, the Religious Problem-Solving Scale, and the Religious Coping subscale from the Coping Orientations to Problems Experienced Scale. The subjects were also given the Rape Attribution Questionnaire, which was designed to measure the extent to which survivors attributed the assault to past behaviors, felt control over the recovery process and reported engagement in behaviors to prevent future assaults. In addition, the subjects were re-administered the 17-item life change scale given during the first study.

Another study (Cobb et al., 2006) assessed posttraumatic growth in 60 women who were survivors of intimate partner violence. The sample consisted of women utilizing domestic violence shelter services in both a rural and urban area. The subjects were administered the Index of Spouse Abuse, a 30-item self-report questionnaire that measures the severity of physical and non-physical abuse perpetrated by a partner. In addition, the subjects received the Center for Epidemiologic Studies Depression Scale, a 20-item self-report measure for depressive symptoms, and the Posttraumatic Growth Inventory.

One study (Navia & Ossa, 2003) examined the psychological impact on victims of kidnapping in Columbia. As cited in this study, the number of reported kidnappings in Columbia
has increased over 1,600% in the past two decades. The researchers assessed the prevalence of posttraumatic stress symptoms in 55 kidnapped individuals and 158 family members, both during the kidnapping period and after the release of the victim. The participants were administered validated Spanish versions of the Family Assessment Device, the Family Crisis Oriented Personal Evaluation Scale, the SCL90-R, the Global Severity Index and the CAPS-DX. In addition, the families were given a semi-structured family interview.

Several studies addressed the impact of illness and bereavement on families and caregivers. One study (Cadell et al., 2003) examined the factors that contributed to posttraumatic growth on 174 bereaved HIV/AIDS caregivers. The subjects were given the Spiritual Involvement and Beliefs Scale and the Social Support Questionnaire. The subjects were also given the Impact of Events Scale, the Beck Depression Inventory, the Posttraumatic Growth Inventory and the Stress-Related Growth Scale.

Another study (Weiss, 2002) assessed intersubjective validity on reports of posttraumatic growth in 41 women with breast cancer and their husbands. The subjects (wives and husbands) were given questionnaires that included socio-demographic information, ratings of the degree of stress caused by the cancer and whether it was considered a traumatic event, and assessments of posttraumatic growth in both self and spouse. Ratings were measured using a 7-point Likert scale. In addition, the women and their husbands were given the Posttraumatic Growth Inventory.

One study (Polatinsky & Esprey, 2000) was designed to assess gender differences in the perception of benefit resulting from the loss of a child. The sample consisted of 41 bereaved adult parents who were administered the Posttraumatic Growth Inventory, in addition to collection of demographic data and length of time since the loss of the child.
One study (Koposov et al., 2003) was designed to investigate the mediating role of a sense of coherence in 159 Russian male juvenile delinquents. The voluntary sample was drawn from a larger study designed to assess the psychopathology of incarcerated juvenile delinquents in northern Russia. In general, the subjects came from impoverished and low educational backgrounds. A battery of assessment instruments was administered after translation into Russian, including the Social and Health Assessment, the Screening Survey of Exposure to Community Violence, the Child PTSD Reaction Index, the Beck Depression Inventory and the Sense of Coherence Scale. In addition, a scale was developed to assess the conduct problems of the juveniles.

Stein (Stein, Walker, Hazen, & Forde, 1997b) developed a study to determine prevalence of full (meets all DSM-IV criteria) and partial (meets most DSM-IV criteria) posttraumatic stress disorder. In addition, the study investigated the extent to which the two manifestations of PTSD correlate with functional impairment. The study was conducted on a random sample of 1002 male and female inhabitants of Winnipeg, Canada. The researchers modified and administered the Modified PTSD Symptom Scale (27), utilizing only female interviewers. In addition, socio-demographic information was collected.

One study (Calhoun et al., 2000) was designed to test the relationship between posttraumatic growth, religion and cognitive processing. The sample consisted of 54 university students who had experienced a major traumatic event within the past three years. The students were administered the Traumatic Stress Schedule, a trauma screening device, and the Posttraumatic Growth Inventory. In addition, the subjects were given the Quest Scale, a device designed to assess cognitive religious responses. The authors also designed a 14-item questionnaire to measure rumination.
Tedeschi (Tedeschi & Calhoun, 1996) developed the Posttraumatic Growth Inventory. The authors thoroughly reviewed the relevant research, and generated 34 items that corresponded to frequently cited growth areas. These areas included perceived changes in self, relationships with others and philosophy of life. The questions were structured using a 6-point Likert scale. The 34 items and a demographic survey were administered to 604 undergraduate psychology students at a large Southwestern university. All of the respondents had stated that they had experienced a significant life event during the last five years. The results were then validated against well-documented psychometrics, including the NEO Personality Inventory.

A study (Smith & Cook, 2004) was designed to assess positivistic bias in reports of growth following exposure to traumatic events. The authors administered the Posttraumatic Growth Inventory to 276 participants. The subjects consisted of students from an urban university and a superior court jury pool, and were randomly assigned to one of two methodological groups. In one group, the PTGI was to be related to a specific stressor; in the other group, the PTGI was not related to a specific event.

Limitations

Many limitations exist in the studies examined in this review. One obvious limitation is that the studies were based almost exclusively on self-report data, including several studies that were on a volunteer basis. This raises the question of whether a person who volunteers for a study may in fact be more psychologically healthy than the population as a whole. In addition, these reports were gathered following emotionally charged traumatic experiences. Lapses of memory, distorted perceptions, inability to verbalize the experience and the desire to present oneself in a particular way are all inherent liabilities with self-report data. In addition, the very
environments in question have often changed since the traumatic event, such as after the earthquake in Turkey.

Many of the samples in the studies were small, which limits the statistical validity of the results. The samples were also often very narrow demographically, primarily due to the actual nature of the traumatic event. Some studies focused on inhabitants of a particular country, several samples were heavily populated with members of a particular religion, and several assessed only college students. Several studies sampled only one gender, such as male veterans or firefighters, or female sexual abuse victims. Even in studies with samples consisting of both genders, there may be differences in reporting styles between genders, due to social effects. The studies also varied in age of the subjects from children to elderly persons. Different age groups also may have different reporting styles. All of these issues limit the ability to generalize the results to the population as a whole.

Very few of the studies utilized random sampling or had control groups for comparison of data. Another related limitation was due to the often unique and random nature of the traumatic events themselves. This inherently implies questionable reliability, since the studies would often not be able to be reproduced by independent researchers. In addition, few of the studies included the impact of vicarious exposure to trauma, due to media coverage or continued discussion of the event.

One limitation is that many studies utilized different data collection methods within the same study. For example, one study (Waysman et al., 2001) gave participants the choice between completing questionnaires at home with a trained assistant, or at a medical center. Despite claims that no demographic differences existed between the two groups, environmental impacts could not be controlled in the home completion group. Another study (Kaplan et al., 2005) utilized
different interviewers to obtain the data. In addition, several studies had significant lengths of
time elapse between the traumatic event and the data collection.

One obvious major limitation is the mass of different assessment tools used in similar
studies. In the studies cited, over 50 different tools were utilized, thus making comparison
between the studies difficult. In addition, many research groups designed or modified their
assessment instruments, in order to measure particular variables, without obtaining independent
validation of these instruments. Several studies utilized questionnaires that were translated into
other languages. Although some of the instruments were actually validated in those languages,
comparisons between studies done in two different languages could be problematic due to
cultural and idiomatic differences. Other studies simply used individual interviews with open-
ended and yes/no questions.

Many studies made assumptions about the validity and stability of the constructs being
measured, such as resilience, hardiness and posttraumatic growth. In addition, definitions of
exposure to trauma varied, as did the definitions of distress and resilience. Many studies implied
that the risk factors were specific to posttraumatic stress disorder (Koenen et al., 2002), as well
as focusing on PTSD without regard to co-morbidity with other disorders.

Finally, it is important to recognize that the conclusions drawn in the studies are based
only on statistical manipulations of data, and therefore must be interpreted as correlative and not
causal.

Clinical Implications

The research strongly indicates that gender is a risk factor for development of
posttraumatic stress disorder. This finding has impact on disaster relief organizations such as the
Red Cross and FEMA, both in terms of recruitment of personnel and the provision of assistance
after the traumatic events. In addition, the findings of Koenan (Koenen et al., 2002) indicate that age of exposure to trauma and family psychological history are significant risks for development of posttraumatic stress disorder. These findings obviously have impact upon policies regarding recruitment of Armed Services and emergency personnel; careful recruitment and training could help avoid the costly ramifications of posttraumatic stress disorder that exist in our veterans today.

One clinical implication that arose several times in the studies was the relatively high rates of alcohol use disorder in exposed persons. One study (North et al., 2002) indicated that alcohol use was the second most frequent method of coping after exposure to trauma, second only to seeking of interpersonal support. These findings have significant implications for substance abuse programs, particularly in areas recently affected by disaster.

One study (Waysman et al., 2001) indicated that clinical treatment efforts, in addition to focusing on posttraumatic stress disorder symptoms directly through psychopharmacology or behavioral interventions, could also involve the development and nurturance of hardiness traits in clients. In addition, escalation of the use of group therapy as a treatment option is indicated by the evidence of the impact of social support on recovery from PTSD. Also, the recognition of the constructs of rumination and the meaning of life could also directly impact clinical interventions.

One major finding with clinical implications is that of the prevalence of partial PTSD, as cited in Stein (Stein et al., 1997b). According to this study, a significant proportion of exposed populations meets the criteria for partial PTSD, but is not considered in the prevalence data for PTSD as a whole. Inclusion would increase the proportion of people whose functioning is severely impaired by exposure to traumatic events, and would increase the need for trained clinicians and social services.
A major clinical implication is the strong evidence that posttraumatic symptoms and posttraumatic growth appear to exist simultaneously. Recognition and encouragement of growth in traumatized clients would change the clinical treatment planning, and possibly have a huge impact on eventual life satisfaction.

**Measurement scales development.** Within the past decade, several researchers have undertaken the development of well-validated measurement instruments for posttraumatic stress disorder and related constructs. This appears to be important work, due to the diversity of scales used in the research to this date.

Several researchers have recently developed scales to measure the proposed personality traits of resilience or hardiness. Many measurement tools exist to measure the morbidity of posttraumatic stress disorder, such as the PTSD Symptom Checklist and the Impact of Event Scale, in addition to standard measurements such as the MMPI. Connor and Davidson (Connor & Davidson, 2003) devised the Connor-Davidson Resilience Scale (CD-RISC) to measure resilience. The study compared five samples, including a randomly selected sample from the general population, a sample of primary-care medical outpatients, a sample of psychiatric outpatients, a sample of participants in a study for generalized anxiety disorder and subjects from two PTSD clinical trials. A questionnaire with twenty-five items relating to resilience was administered, utilizing a 0-4 Likert scale. The CD-RISC was tested for validity and reliability. Factor analysis revealed five factors: Factor 1 was related to personal competence, tenacity and the level of personal standards. Factor 2 was related to the willingness to trust one’s instincts, to have tolerance of negative affect and the strengthening effect of stress. Factor 3 was related to acceptance of change and having secure relationships. Factor 4 was related to control and Factor 5 was related to spirituality.
In 1996, Tedeschi (Tedeschi & Calhoun, 1996) developed a scale to measure posttraumatic growth. The Post Traumatic Growth Inventory (PTGI) is a 21-item scale that includes factors such as New Possibilities, Relating to Others, Personal Strength, Spiritual Change, and Appreciation of Life.

Another study (Smith & Cook, 2004) was undertaken to re-assess the validity of the PTGI. These researchers found that the PTGI perhaps underestimates posttraumatic growth to a small, but significant, degree.

One study (Weiss, 2002) was devised to validate self-reporting of posttraumatic growth by women with breast cancer. The study assessed both the women and husband gave evaluations of posttraumatic growth, and the results indicated that the reports of growth by the cancer patients were corroborated by their husbands.

Social Implications

The research indicates a significant potential for gender and age bias, in a culture that already has many such biases already in place. These results are particularly important because young males are more likely to be exposed to extreme trauma, particularly in law enforcement and military duties; this changes the perspective on the number of people who could develop PTSD. Thus, recruitment and employment policies for emergency and military personnel could be impacted, as well as other social rights and obligations. In addition, since women appear more likely to develop PTSD, there is an inherent conflict between the rights of women and issues such as front-line duty in the military.

Another social implication is the evidence that religion and spirituality have an impact on the development and severity of posttraumatic stress disorder, as does the structure of family. As cited in Al-Naser (Al-Naser & Sandman, 2000), families in many parts of the world are changing
as their societies become more industrialized. Many are moving from extended family, or tribal, societies to more isolated nuclear families. In addition, many organized religions struggle to maintain significance as cultures become more technologically advanced. Thus, many cultures are in danger of losing some of the inherent support that appears to be a resilience factor against developing PTSD.

The importance of the impact of the media also merits consideration. The media often reports inaccurate or biased information, in an attempt to be as timely and graphic as possible. It is now commonplace to witness live coverage of a war or hurricane, and the media often shows these images continuously. As cited in studies such as Bonanno (Bonanno et al., 2003) and Sattler (Sattler, 2003), many people have experienced trauma vicariously through the media. Another impact of the media is that it can control the resilience factor of social acknowledgement to a large degree, imparting judgment and blame seemingly at will.

The studies also suggest review of public policy issues for world relief organizations, such as Unicef and the Red Cross. For example, the research evidence raises questions about efficacy of evacuation of children without their families.

The impact of secondary stressors (Sattler, 2003) is an important social consideration. In addition to the primary stressors, such as 9/11 or Katrina, the secondary stressors can cause additional hardships for already traumatized populations. Financial difficulties for companies, such as occurred with the airlines after 9/11, can cause employment problems and other forms of distress. In addition, political ramifications such as the war in Iraq, or the issues with FEMA following Katrina, are also stressors in an already potentially discouraged society.
Future Research

One obvious and important area of future research opportunity is to develop studies that do not rely solely on self-report measures. The exciting advances in neuropsychology can perhaps offer methods in the future to measure the neurochemical changes that occur during and after trauma exposure.

Most studies are focused on the morbidity of posttraumatic stress disorder, and the mechanisms that make a person vulnerable to it. A related area of research would be to further assess the processes that are involved in the functioning of resilient trauma victims or the persons who experience posttraumatic growth. In particular, the positive correlation between posttraumatic symptoms and personal growth offers a very interesting arena for further research. A related potential focus for additional research would be to further study personality factors as correlated with both PTSD and growth.

Longitudinal studies are necessary in many areas of the field to determine the long-term effects of both discrete-event and chronic exposure to trauma. Most current research studies one or two moments in time, and there is little data regarding the impact years after the trauma exposure. Research is beginning to be done on the impact of the Viet Nam war on combat veterans, but little is known about the processes that have occurred during the interim.

Another valuable opportunity is to develop standardized and universal measurements of trauma exposure and posttraumatic symptoms. The current research abounds with different scales, which make it even more difficult to compare the studies. A related opportunity would then be to perform a meta-analysis of the data, to compare the impact of one type of trauma to another. Further assessment of the prevalence and severity of partial PTSD is also necessary, due to the potentially huge impact on health care and other forms of assistance.
Research on the impact of secondary stressors (Sattler, 2003) is also important, to assess the impact of financial difficulties, political issues and military involvement on a population that has already been exposed to significant trauma. In addition, continued research on the impact of media exposure is very relevant.

An interesting opportunity for further research could be developed from the results of several studies that indicate a correlation between fields of scholastic study and posttraumatic stress disorder. In one study (Al-Naser & Sandman, 2000), students enrolled in the College of Science at the University of Kuwait had higher resilience scores than students enrolled in the College of Arts. Similarly, as cited in Emery (Emery et al., 1991), there existed a correlation between History/Social Studies as a favorite high school subject and the development of posttraumatic stress disorder in Viet Nam veterans. Correlations such as these, although possibly influenced by confounding variables, warrant a further look. Perhaps recruitment for military and law enforcement personnel could then be further focused to help identify appropriate candidates.

One intriguing possibility for further research arises over the seemingly complex impact of religiosity on posttraumatic stress disorder. It appears that strong religious beliefs can be a protective factor reducing the symptoms of PTSD after exposure to trauma. In addition, it also appears that religious beliefs also contribute to posttraumatic growth. Since posttraumatic growth appears to also be a function of negative factors from trauma, additional research could be done to tease out exactly how religiosity positively impacts persons who have been exposed to trauma.

In addition, the cultural impact on development of posttraumatic stress disorder, resilience and growth needs to be explored. As world relief organizations make decisions, this information could prove to be invaluable. Other related future research studies could address the impacts of rescue, evacuation and relocation on both trauma survivors and rescue teams.
Although these appear to be superficially beneficial actions, the current studies show that they can be additional sources of trauma.

**Conclusion**

Due to increasing levels of traumatic experiences throughout the world, the research regarding posttraumatic stress disorder becomes correspondingly important. There is already a vast amount of literature available regarding the risk factors, the factors that either prevent or minimize the effects of exposure to trauma and the phenomena of posttraumatic growth.

Although this literature review is by no means exhaustive, certain factors tend to surface repeatedly throughout the research. Risk factors such as gender and pre-existing psychopathology have significant social and clinical implications. In addition, the protective factors such as the proposed personality traits of resilience and hardiness warrant continued research to determine how to develop and refine these traits, to help render rescue and military personnel, and unfortunately the general population, less vulnerable to PTSD.

As cited in King et al. (King et al., 1999), responses to highly traumatic events may be derived from complex interactions between factors that stretch both backward and forward in time from the moment of the event. Thus, there appears to be no simple answer to the problem of posttraumatic stress disorder.

Bonanno (Bonanno et al., 2003) delivers some heartening news, however. In their random sample of residents of New York City and the surrounding communities following 9/11, they found that resilience (one or no PTSD symptoms) was observed in 65.1% of the sample. In fact, despite either personally witnessing the event, or losing a friend or family member in the attack, the prevalence of resilience was more than 50% of the sample. A resilience prevalence rate of 32.8% was found for participants who were in the World Trade Center at the time of the
attacks, and 26.1% for those who were injured as a result of the attacks. The American Psychological Association (Comaz-Diaz et al.) suggests that the trait of resilience can be developed and nurtured in individuals.

The apparent phenomena that personal growth can often occur simultaneously with great posttraumatic distress should be encouraging news for mental health providers, humanitarian/relief organizations and the general public, alike. In addition, the reports of this growth seem to often be underreported. So although trauma appears to be an unavoidable part of the world today, there does appear to be a silver lining.
References


