Psychological Debriefing and First Responders:

A Meta-Analysis

By

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Dedicated in Memoriam

to

Elise Ann (Brandi) Foster, Psy.D.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

After almost thirty years of world-wide use, and becoming a multi-million dollar business, there is still an ongoing debate about the effectiveness of using a single session Psychological Debriefing (PD) intervention after a potentially traumatic experience to allay and/or prevent symptoms of Acute Stress Disorder, Posttraumatic Stress Disorder and/or other commonly experienced symptoms of psychological and physical distress, often referred to as trauma. Moreover, even though the use of PD is endemic in the First Responder (FR) culture, there has been no published quantitative analysis of PD effects on FRs after a potentially traumatic event. In this dissertation I examine the existing evidence on the effectiveness of PD as an intervention to lower psychological and physical distress experienced by FRs after they work at an event where they or others are at risk of harm (high-risk[1] event). FRs includes fire fighters[2], police, emergency medical technicians and paramedics, and other medical and rescue personnel. High-risk events are those experienced in the FRs professional capacity and may be either limited in scope (involves only a few people, does not affect entire civilian community) or large scope (natural or manmade disasters that affect entire communities).

In order to build or evaluate an intervention (such as PD), one must understand the phenomenon or outcome to be ameliorated or prevented. This understanding is crucial in order to identify a factor or factors that the intervention can target to accomplish the desired outcome. In

[1] I use the term "high-risk event" throughout this dissertation rather than traumatic event because what is and is not traumatic is far from being defined (Everly Jr. & Mitchell, 2012).
[2] Fire fighter is used both as one and two words by international and national fire fighter associations. I will use fire fighter per the International Association of Fire Fighters unless citing a direct quote.

this meta-analysis, the source studies report on the effects of PD to ameliorate or prevent Acute Stress Disorder (ASD), Posttraumatic Stress Disorder (PTSD) and/or levels of distress high enough to adversely affect daily life. All of these phenomena involve the constructs of trauma, stress, and distress. The next section distinguishes among these constructs and defines distress as used throughout this dissertation.

Trauma, Stress, Distress: The Outcome

In the literature, *trauma* and *stress* are sometimes used interchangeably in describing the emotional aftermath of a high-risk event. However, trauma and stress are, in fact, different. In order to avoid the specific definitions of and connotations associated with the terms trauma and stress, this dissertation uses the term *distress* (defined as the number and/or severity of psychological and/or physiological symptoms experienced by FRs following working at a high-risk event) to describe the outcome or dependent variable in the meta-analysis.

Trauma is defined in the *Diagnostic and Statistical Manual of Mental Disorders: 4th edition, text revision (DSM-IV-R)* (American Psychiatric Association (APA), 2009b), by the formal diagnostic criteria of ASD and PTSD and must be the result of experiencing a sudden all-consuming event where the individual involved believes his or her own or another's life and/or physical integrity is threatened. Current diagnostic criteria for ASD and PTSD are presented in Figures 1 and 2, respectively, and full descriptions of both disorders are presented in Appendix A (American Psychiatric Association (APA), 2009a). The Israel Center for the Treatment of Psychotrauma distinguishes between trauma and stress by defining trauma as a feeling of a total lack of control of either one's response or one's ability to put the trauma out of mind at will. Stress is a reaction to everyday events (e.g., First Responder interdepartmental issues during events or the intrusive presence of the media at a scene). However, the individual still feels in

control and can put the stress aside to enjoy hobbies, etc. (The Israel Center for the Treatment of Psychotrauma, 2009). While it is true that stress can build and lead to health problems, it should be clear that ameliorating distress from a high-risk event, not general stress, is the appropriate outcome measure construct.

Distress (referred to in the literature as traumas) comes in three forms: primary, multiple, and secondary. FRs are at risk for all three types of distress. Primary trauma/distress may occur when a person directly experiences the threat of death or serious physical harm to self or others (Zimering, Munroe, & Gulliver, 2003). When this experience is combined with a reaction of "intense fear, helplessness, or horror," it then satisfies the first criteria for the clinical diagnosis of ASD or PTSD. Currently, only primary trauma is included in the *DSM* as a prerequisite for ASD and PTSD (see Figures 1 and 2 for *DSM-IV-R* criteria for ASD and PTSD, respectively). There are two other types of trauma/distress, multiple and secondary, that may affect a First Responder. The upcoming *DSM-5* proposes to include both multiple and secondary trauma in the trauma diagnostic categories.

Multiple trauma/distress is defined as having participated in more than one high-risk event. This multiple exposure is more likely to occur in the work of a First Responder than most other occupations. Finally, witnessing or listening to harm experienced by others may result in what is known as secondary trauma. While FRs may witness this harm first hand, the current literature primarily focuses on secondary trauma suffered by mental health professionals through their work in listening to the experiences of survivors of trauma (e.g., Gentry, Baranowsky, & Dunning, 2002; McCammon & Allison, 1995; Meldrum, King, & Spooner, 2002; Munroe et al., 1995; Ortlepp, 1998; Pearlman & Saakvitne, 1995; Sawyer, 2000; Wynkoop, 2002). In 2004, Boscarino and colleagues published what they believed was the first study that tested the

secondary trauma concept (Boscarino, Figley, & Adams, 2004). They found increased levels of compassion fatigue in social workers who counseled victims and workers after the World Trade Center attacks on 9/11 compared to those who did not (see also Adams, Boscarino, & Figley, 2006; Adams, Figley, & Boscarino, 2008). In addition, there are discussions of secondary trauma effects for hospital workers (Huff, 2006); child welfare workers (Weuste, 2005); and correctional mental health staff (DePass, 2005). There is also literature on secondary trauma suffered by mental health workers providing care at disaster sites (Hodgkinson & Shepherd, 1994; Myers & Wee, 2002; Talbot, 1990; Talbot, Manton, & Dunn, 1992; Winget & Umbenhauer, 1982).

There is a smaller area of literature devoted to secondary trauma suffered by FRs, although this literature uses different nomenclature such as vicarious trauma (O'Flaherty, 2005), compassion fatigue (Figley, 1999; Gentry, et al., 2002), secondary survivor, cost of caring, and emotional contagion (Figley, 1999). Figley describes the symptoms of compassion fatigue in police as parallel to those of PTSD (Figley, 1999).

Diagnostic criteria for 308.3 Acute Stress Disorder

A. The person has been exposed to a traumatic event in which both of the following were present:
    1. the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others
    2. the person's response involved intense fear, helplessness, or horror
B. Either while experiencing or after experiencing the distressing event, the individual has three (or more) of the following dissociative symptoms:
    1. a subjective sense of numbing, detachment, or absence of emotional responsiveness
    2. a reduction in awareness of his or her surroundings (e.g., "being in a daze")
    3. derealization
    4. depersonalization
    5. dissociative amnesia (i.e., inability to recall an important aspect of the trauma)
C. The traumatic event is persistently reexperienced in at least one of the following ways: recurrent images, thoughts, dreams, illusions, flashback episodes, or a sense of reliving the experience; or distress on exposure to reminders of the traumatic event.
D. Marked avoidance of stimuli that arouse recollections of the trauma (e.g., thoughts, feelings, conversations, activities, places, people).
E. Marked symptoms of anxiety or increased arousal (e.g., difficulty sleeping, irritability, poor concentration, hypervigilance, exaggerated startle response, motor restlessness).
F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning or impairs the individual's ability to pursue some necessary task, such as obtaining necessary assistance or mobilizing personal resources by telling family members about the traumatic experience.
G. The disturbance lasts for a minimum of 2 days and a maximum of 4 weeks and occurs within 4 weeks of the traumatic event.
H. The disturbance is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition, is not better accounted for by Brief Psychotic Disorder, and is not merely an exacerbation of a preexisting Axis I or Axis II disorder.

Figure 1. DSM-IV-R Criteria for Acute Stress Disorder (American Psychiatric Association (APA), 2009a)

Diagnostic criteria for 309.81 Posttraumatic Stress Disorder

A. The person has been exposed to a traumatic event in which both of the following were present:
    1. the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others
    2. the person's response involved intense fear, helplessness, or horror. **Note:** In children, this may be expressed instead by disorganized or agitated behavior
B. The traumatic event is persistently reexperienced in one (or more) of the following ways:
    1. recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions. **Note:** In young children, repetitive play may occur in which themes or aspects of the trauma are expressed.
    2. recurrent distressing dreams of the event. **Note:** In children, there may be frightening dreams without recognizable content.
    3. acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated). **Note:** In young children, trauma-specific reenactment may occur.
    4. intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event
    5. physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event
C. Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three (or more) of the following:
    1. efforts to avoid thoughts, feelings, or conversations associated with the trauma
    2. efforts to avoid activities, places, or people that arouse recollections of the trauma
    3. inability to recall an important aspect of the trauma
    4. markedly diminished interest or participation in significant activities
    5. feeling of detachment or estrangement from others
    6. restricted range of affect (e.g., unable to have loving feelings)
    7. sense of a foreshortened future (e.g., does not expect to have a career, marriage, children, or a normal life span)
D. Persistent symptoms of increased arousal (not present before the trauma), as indicated by two (or more) of the following:
    1. difficulty falling or staying asleep
    2. irritability or outbursts of anger
    3. difficulty concentrating
    4. hypervigilance
    5. exaggerated startle response
E. Duration of the disturbance (symptoms in Criteria B, C, and D) is more than 1 month.
F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

Specify if: **Acute:** if duration of symptoms is less than 3 months

Chronic: if duration of symptoms is 3 months or more

Specify if: **With Delayed Onset:** if onset of symptoms is at least 6 months after the stressor

Figure 2. DSM-IV-R Criteria for Posttraumatic Stress Disorder (American Psychiatric Association (APA), 2009a)

Psychological Debriefing in Brief: The Intervention

The most widely used form of PD is Critical Incident Stress Debriefing (CISD) (Mitchell, 1984; Rose, Bisson, Churchill, & Wessely, 2009). CISD was first introduced nearly 30 years ago (Mitchell, 1984) specifically to help FRs after high-risk events and has steadily gained in popularity since then, particularly in the First Responder culture (Tanielian & Stein, 2006). Currently there are over 1,500 teams that have been trained in CISD under the auspices of the International Critical Incident Stress Foundation, Inc. (ICISF) and they are serving millions of people in 30 countries (International Critical Incident Stress Foundation Inc. (ICISF), 2012c). PD is a world-wide, multi-million dollar industry (Devilly & Cotton, 2003).

While FRs are commonly offered or required to attend a PD, a review of the evidence-based literature reveals little compelling support for, or against its use (see Tuckey, 2007). In addition, there is little guidance on the circumstances in which it is considered more or less effective (e.g., type of event or population) (see Tuckey, 2007). The debate rages on in the literature; for a review of proPD see DeWolf Bosek and colleagues (2011) and for antiPD, see Bartholomew & Muniratnam (2011). This debate is further complicated by the disagreement over the goal of PD—whether it is to ameliorate distress immediately in the days following a high-risk event, to prevent distress and/or PTSD a month or more after the high-risk event, or both. In a recent review, Agorastos and colleagues (2011) conclude that empirical evidence is lacking for any intervention delivered within hours after a high risk event, and there is only sparse evidence for interventions provided within the first weeks after a high-risk event. Moreover, despite the increased public attention highlighting the risks faced by FRs since the terrorist attacks of 9/11, there has been no rigorous review of the research on the effects of PD interventions specifically in FR populations. Therefore, this meta-analysis is the first quantitative

synthesis of the empirical evidence available on the effects of PD on psychological and/or physiological distress FRs may experience after experiencing a high-risk event. The research questions addressed in this dissertation are: did FRs who attended a PD intervention experience less distress compared to those who did not attend; what are potential moderators of PD effects; and what are the strengths and challenges of the research in this field.

Variables examined as potential moderators of the effect of PD on distress include but are not limited to: type of FR, and years on the job; PD characteristics (type of PD, if the format was group or individual, if the leader was a mental health professional or a peer FR, whether or not PD attendance was mandatory or voluntary, and if it was the department or the FRs themselves who decided the need for the PD); if the event was of large or limited scope; timing of both the PD and the assessment measured from the event; and whether or not the PD and comparison groups within each study were equivalent. Descriptive information is also presented for the studies used in this meta-analysis (e.g., publication year and type, whether or not PD was the focus of the study, event description) as well as for the participants in the studies (e.g., FR occupation type, gender, and past mental and/or physical health issues), and the PD intervention characteristics (e.g., PD leader training, protocol used, timing of delivery).

The second chapter of this dissertation is structured as if one were designing an intervention (a PD) to lower distress in FRs after a high-risk event. The first issue is understanding the definition of distress. Informally, the list of distress symptoms includes almost every psychological and physiological condition that is adversely affecting the FRs life. Formally, Posttraumatic Stress Disorder (PTSD) and Acute Stress Disorder (ASD) are the clinical definitions of distress per the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*) published by the American Psychiatric Association. Both the informal symptoms of

distress and the clinical definitions (see Figs. 1 and 2) are used as outcome measures in studies of PDs. These are the definitions of distress. Second, is knowing the predictors of distress. This serves a dual purpose by identifying risk factors that may be addressed in the intervention, as well as identifying those FRs most at risk for distress. Third, knowing the prevalence of distress among FRs aids in deciding if it is a wise use of resources to offer the intervention to all FRs. Therefore, Chapter II contains a brief history of the changing criteria for ASD and PTSD, predictors of distress, and the prevalence of clinical distress. Then, I describe the protocol of the most widely used type of PD and discuss theory and evidence regarding the timing of the delivery of the PD in relation to the high-risk event.

Chapter III contains an overview of traditional literature reviews on the effects of PDs on distress and describes the four most quoted articles in the literature, and provides a detailed account of two meta-analytic reviews that include some studies with FRs. Chapter IV contains a description of the methods I used to conduct this meta-analysis and the results are presented in Chapter V. Chapter VI contains the strengths and limitations of this meta-analysis and compares my results to two previous meta-analyses on PD. Finally, recommendations for future research based on information presented in this dissertation are presented in Chapter VII.

CHAPTER II

BACKGROUND: CLINICAL DIAGNOSES, PREDICTORS, PREVALENCE AND PSYCHOLOGICAL DEBRIEFING

In this chapter I describe a brief history of and criteria for the formal clinical diagnoses of Posttraumatic Stress Disorder (PTSD) and Acute Stress Disorder (ASD). Next, I briefly describe the predictors of distress, and then I describe what is known of the prevalence of clinical distress in FRs. Next, I describe Psychological Debriefing (PD) using Critical Incident Stress Debriefing (CISD) as the example, and provide the reader with a glimpse of the pervasiveness of PD in FR culture. I then discuss theory and evidence about the timing of the PD in relation to the high-risk event and the elicitation of feelings, the element of debriefing that makes it a PD. Finally, I make the point that there are two outcomes of PD that are not always clearly operationalized in PD research.

Distress from a High-Risk Event: Formal Classification

Because the symptoms of PTSD, and more recently ASD, have been used as outcome measures for the effects of PD, it is important to have some understanding of the fluidity with which the formal diagnoses of distress from high-risk events have evolved over time. The most commonly used form of PD (CISD) was first presented in 1983. The studies in this meta-analysis were published from 1988 through 2011, and the events precipitating the studies occurred from 1983 through 2006. As one can see in Figure 3, the studies and events in this meta-analysis span three different versions of formal trauma diagnostic categories in the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*). As definitions of

trauma/distress changed over time, so did the content of measures used to determine PD effectiveness. As will be seen in the source studies in this meta-analysis, the older studies were more likely to use measures of general distress, while newer studies focused on symptoms of PTSD.

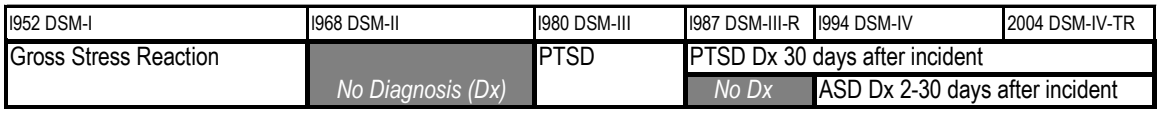

Figure 3. Timeline of DSM Diagnostic Categories of Distress after a Traumatic Event

Diagnostic Classification History

The first *DSM* (APA, 1952) featured a description of Gross Stress Reaction as a reaction to a severe trauma, usually resolved naturally (Marshall, Spitzer, & Liebowitz, 1999). This description followed closely the newly developed Veterans' Administration manual that brought together the military and psychiatric communities in the formal recognition of battle fatigue (Andreasen, 2004). In 1968, the *DSM-II* (APA, 1968) deleted Gross Stress Reaction, leaving no description or category for distress after a high-risk event (Andreasen, 2004).

The *DSM-III* (APA, 1980), written during the return of the Vietnam War veterans, introduced the diagnosis of Posttraumatic Stress Disorder (PTSD) in 1980 (Andreasen, 2004). When the *DSM-III* was revised in 1987, PTSD was no longer diagnosable immediately; a mandatory waiting period of at least 30 days after the high-risk event was added (Marshall, et al., 1999). Six years later, recognizing the need for a diagnosis (or reimbursable "ticket" to medical care) during the month after a high-risk event, the *DSM-IV* (APA, 1994), included the new diagnostic category of Acute Stress Disorder (ASD), diagnosable from 2 to 30 days after a high-risk event (Marshall, et al., 1999). ASD is now the formal diagnostic classification for distress experienced soon after the high-risk event. See Appendix A for complete descriptions of the

current *DSM-IV-TR* (American Psychiatric Association (APA), 2009a) diagnostic categories of PTSD and ASD.

Changing Classifications and Outcome Measures

This history of the changing classifications for pathological or clinical reactions to trauma gives some insight into the evolving knowledge base regarding what constitutes abnormal reactions or distress to high-risk events. It is also apparent that increases in knowledge about, and diagnostic classification of PTSD, occur after major deployments of the United States military. Psychological debriefing (PD) was first used to deal with battle fatigue during World War I (Armstrong, Lund, McWright, & Tichenor, 1995) and was co-opted for use with FRs to decrease "stress" (Stuhlmiller & Dunning, 2000) in the late 1960s (Kirschman, Scrivner, Ellison, & Marcy, 1992).

With the multiple deployments and return of the U.S. military and National Guard veterans from Iraq and Afghanistan, there is again a renewed interest in PTSD. The next version of the *DSM* is due to be published in May of 2013, and proposed revisions have been posted at http://www.dsm5.org/Pages/Default.aspx (American Psychiatric Association, 2012a). The DSM-5 draft has a new category entitled Trauma- and Stressor-Related Disorders which includes PTSD in Preschool Children, ASD, PTSD, Other Specified Trauma, and Unspecified Trauma (American Psychiatric Association, 2012b). Both ASD and PTSD proposed definitions also include sexual violation as a precursor. PTSD would also include secondary trauma and multiple trauma as precursors (see (American Psychiatric Association, 2012b) for links to ASD and PTSD)).

It is clear, even from this brief history, that the diagnoses of *trauma* are far from being written in stone. These changing classifications introduce added difficulties in interpreting

historical literature, particularly in determining and reporting PTSD or ASD caseness (meeting diagnostic criteria). The difficulty of defining distress after a high-risk event leads to difficulty in determining the success or failure of an intervention, such as PD, to lower or prevent distress. This is surely part of the reason for the debate over the *effectiveness* of PD, in that some discussants focus on lowering immediate distress and others focus on the prevention of full-blown PTSD.

This fluidity of classifications of trauma also affects the literature on predictors and prevalence as publications span different versions of the *DSM*. Detecting PTSD symptoms from cross sectional surveys may suffer from under-reporting of ASD, PTSD, or other symptoms of distress as these symptoms may not always be manifest, but rather wax and wane (e.g., see Andrews, Brewin, Philpott, & Stewart, 2007).

Predictors of Psychological Distress in FRs

In any intervention, it is imperative to understand the phenomenon one is trying to prevent. Understanding the process involved in developing the condition (in this case distress) leads to identifying a step in that process in which to intervene. The etiology of distress is not clear. However, identifying predictors or risk factors may indicate ways to intervene. This knowledge may also aid in identifying FRs who are more likely to benefit from an intervention to ameliorate distress and reduce the chance of including others who may be retraumatized. Unfortunately, according to Hobfoll and colleagues, there is no empirical evidence for including specific elements in an immediate intervention (e.g., PD for distress from a high-risk event (Hobfoll et al., 2007). Watson and colleagues (2011) outline the increased evidence base in several areas of disaster response gleaned from the experience of 9/11, while noting that the evidence for designing an intervention is still insufficient. Moreover, consensus has not been

reached on which predictors are most likely to identify persons who may be most in need of intervention (Agorastos, et al., 2011). Despite the lack of knowledge in this area, the intervention of PD is being used world-wide, and has been for almost thirty years.

This lack of empirical evidence about the predictors for distress renders the examination of the effects of PD on FR distress an important endeavor as it may add to the evidence base. Also, examining whether or not the effects of PD differ depending on specific FR characteristics may add to existing knowledge on how to identify those at risk of distress after a high-risk event. Therefore, in this section, I present an overview of the literature on the predictors of distress in FRs after participation in a high-risk event. I then summarize whether these predictors have been shown to be protective or risk factors, as well as noting those factors that have been found to be either protective or risk factors depending on the study.

Associations with PTSD in fire fighters have included: proximity to death; severity of trauma; perceived threat to self; post-disaster-related events (e.g., loss of a loved one, home or business); peri-disaster events (e.g., rescue, firefighting, and body recovery); high level of hostility; and low level of self-efficacy (Benedek, Fullerton, & Ursano, 2007). Life threat to one's self was reported as a risk factor for physicians, nurses, and support personnel (not exposure to death and dying of patients) by Grieger and colleagues. This was a comparative study of hospital personnel deployed on a hospital ship during Operation Iraqi Freedom and their colleagues who remained at home at the hospital (Grieger, Fullerton, Ursano, & Reeves, 2003). In their cross-sectional survey, Bennett and colleagues analyzed 617 responses from EMT/paramedics regarding mental health stressors, both organizational and high-risk events. They found associations between PTSD symptomatology and organizational stress factors; frequency of high-risk events; longer length of service; experiencing dissociation during a high-

risk event, and severity of the high-risk event (e.g., seeing children hurt, risk of morbidity and mortality to self and/or others); experiencing anger, and low self-efficacy (Bennett et al., 2005). This study showed that the organizational stress scores were the only significant predictor of PTSD caseness (Bennett, et al., 2005). Perrin and colleagues (2007) studied risk factors for PTSD in rescue and recovery workers (N = 28,962; one-third of those eligible for enrollment in the World Trade Center Health Registry) two to three years after they worked at the World Trade Center collapse on and after September 11th. Respondents were assessed via telephone interview. Sustaining an injury was the only within-disaster experience to increase the risk of PTSD for all rescue and recovery worker groups studied (odds ratios ranging from 1.9 to 4.0), with the exception of police and construction/engineering workers. This study also found that the tasks with the strongest association to PTSD were those tasks not regularly performed by the FR (e.g., fire fighters doing light construction; and police and emergency workers doing firefighting). The risk of PTSD also was positively associated with a longer duration of work on site for all occupations except police. In smaller studies, longer duration of time at disaster site (Fullerton, Ursano, & Wang, 2004; North, Tivis, McMillen, Pfefferbaum, Cox, et al., 2002; Perrin, et al., 2007); a diagnosis of ASD (Fullerton, et al., 2004); trauma severity, emotional exhaustion during high-risk event, and lack of support (Carlier, Lamberts, & Gersons, 1997) have been reported to be associated with developing PTSD.

Attendance at Multiple High-Risk Events

The effect of experiencing multiple high-risk events over time has been shown to have inconsistent effects on the overall experience of distress from a single high-risk event (Ben-Ezra, Essar, & Saar, 2005; Bennett, et al., 2005; Dougall, Herberman, Delahanty, Inslicht, & Baum, 2000; Fullerton, et al., 2004). Bennett and colleagues found the frequency of prior trauma was

independently positively associated with PTSD symptoms, but not predictive of PTSD in EMTs and paramedics (Bennett, et al., 2005). Fullerton and colleagues also found previous disaster experience positively associated with PTSD in 9/11 disaster workers (Fullerton, et al., 2004). After a plane crash, which killed all 132 passengers and crew, Dougall and colleagues assessed distress in the 108 emergency workers (including both trained and untrained in emergency on-site work) who responded (Dougall, et al., 2000). They found that experiencing an earlier similar high-risk event (plane crash) was not associated with distress levels reported after working the current crash. However, earlier experience of dissimilar high-risk events was associated with higher distress reported after working the current crash (Dougall, et al., 2000). One explanation for no association of prior similar experience to higher levels of distress offered by Dougall and colleagues was that the prior experience may have served as an inoculating effect for some and as a sensitizing effect for others, thus cancelling out any observable difference (Dougall, et al., 2000). Ben-Ezra and colleagues found that prior similar experience was associated with lower distress than those without similar prior experience in rescue personnel from the Israeli Defense Forces. This high-risk event was the 2004 terrorist bombing of the Hilton Hotel in Sinai Egypt where 31 people were killed and dozens injured (Ben-Ezra, et al., 2005). As one can see from these data, the direction of the effect of experiencing prior traumas or multiple traumas on level of distress may act as an inoculating effect for some and increase the risk of distress for others. What is known is that FRs do experience multiple high-risk events in the course of their careers, and there is some evidence that this experience somehow affects the amount of distress experienced after yet another high-risk event.

Secondary Trauma

While secondary trauma may affect distress in FRs, refining the concept of secondary trauma is a fairly recent endeavor (Valent, 2002). Secondary trauma has been proposed as a precursor to PTSD in the *DSM-5*. There is evidence that for FRs, the risk of distress from secondary trauma increases if the trauma is directly experienced (Gentry, et al., 2002).

Gender

In the civilian population, being female is usually associated with a greater risk for distress (Staab, Grieger, Fullerton, & Ursano, 1996). In The National Comorbidity Study conducted in the early 1990s, women were twice as likely as men (10.4% vs. 5%; $p = .05$) to report a lifetime incidence of PTSD (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). More recent reviews (e.g., Olff, Langeland, Draijer, & Gersons, 2007; Tolin & Foa, 2006) and a newer study (e.g., Christiansen & Elklit, 2008) continue to confirm a higher incidence of PTSD for civilian women vs. men.

For example, men were found to be more at risk of PTSD after witnessing death or injury (Breslau, Chilcoat, Kessler, Peterson, & Lucia, 1999; Breslau, Kessler, Chilcoat Schultz, Davis, & Andreski, 1998), whereas men and women showed similar rates of PTSD in response to accidents and natural disasters (Kessler, et al., 1995). Further evidence that females may not automatically be at higher risk than males after experiencing a mass trauma comes from Stuber and colleagues (2006). He found a higher lifetime prevalence of PTSD among females, but probable PTSD specifically related to 9/11 was not significantly different between men and women (6.5% vs. 5.4%, respectively). These findings were obtained from a random survey (conducted six to nine months after 9/11) of civilians (1,479 women and 1,273 men) in the New York City metropolitan area.

The following studies address female FRs and their PTSD risk as compared to civilian women male FRs. There is some uncertainty that female FRs are automatically more at risk than male FRs for distress from experiencing high-risk events in their professional capacity (Yehuda, 2002). FR women reported less distress related to high-risk events than civilian women, according to Lilly and colleagues (2009), who conducted a study comparing 157 female police officers and 124 civilian females. All of these women had experienced a traumatic or high-risk event. The officers reported less peritraumatic dissociation ($t(279) = 8.65$; $p < .001$; $r = -.46$); less peritraumatic emotional distress ($t(279) = 5.19$; $p < .001$; $r = -.34$); and less severe PTSD symptoms ($t(279) = 2.93$; $p < .01$; $r = -.17$) than the civilian females. This occurred despite the fact that the officers reported significantly more exposure to high-risk events ($t(279) = 6.76$; $p < .001$; $r = .38$). However, both groups reported the same current (at the time of the survey) somatization symptoms. Although random assignment was not used, group equivalence was assessed (Lilly, et al., 2009, p. 770).

Studies reporting by gender found women more (Bowler et al., 2010), less (Bennett, et al., 2005) or equal (Pole et al., 2001) to men in levels of distress. Female police officers identified through the World Trade Center Health Registry (9/11 FRs) (Perrin, et al., 2007) were surveyed two to three years after 9/11 and were found to have almost twice the prevalence of probable PTSD (13.9%; $n = 582$) of the male officers (7.4%; $n = 3,435$) (Bowler, et al., 2010). Bennett and colleagues (2005) found females reported less distress. They surveyed 91 female and 513 male EMTs and paramedics (emergency ambulance personnel). They found that a smaller percentage of the female EMTs (15%) met diagnostic criteria for PTSD than males (23%). In addition, a smaller percentage of the women (35%) than men (51%) reported having recurrent memories of a high-risk event(s) for at least 30 days. Pole and colleagues' (2001)

survey found no differences in the number of PTSD symptoms experienced among male (*n* = 598) and female (*n* = 149) New York and Bay Area police.

Contextual Factors

There are also contextual factors that should be considered (particularly so when the high-risk event is large scale—e.g., a natural disaster that disrupts functioning of infrastructure, destroys homes and places of employment) when looking at rates of PTSD, as well as assessing predictors. The FRs at 9/11 had homes to return to. The FRs at Hurricane Katrina most likely had their homes destroyed. In fact, while there have been calls in the literature to address context (e.g., age, timing, dose, environment available for recovery, and cultural considerations) (Marmar et al., 2006), it has rarely been done (see Hobfoll, Walter, & Horsey, 2008; Norris, Kaniasty, Conrad, Inman, & Murphy, 2002; Paton, Smith, & Stephens, 1998; Regel, Joseph, & Dyregrov, 2007). For example, the very low rate of PTSD reported by police 5 to 12 weeks after the Madrid bombing (Gabriel et al., 2007) may have been explainable, in part, due to context. These FRs had homes to return to, as well as special training for these high-risk event types.

Physiological

The physiological research into trauma distress is a fast growing field and may very well revolutionize the way we think about, prevent, and treat PTSD. For example, Ressler and colleagues (2011) found that both PTSD symptoms and diagnoses were significantly correlated with higher levels of pituitary adenylate cyclase-activating polypeptide (PACAP), specifically PACAP peptide containing 38 residues, in the blood plasma of females, but not in males.

Another area of this research focuses on hypothalamic-pituitary-adrenal axis (HPA) activity (the fight, flight, or freeze response) (Cieslak, Benight, Luszczynska, & Laudenslager,

2011). Cortisol is one indicator of the Hypothalamic Pituitary Adrenal Axis (HPA) activity. Marmar and colleagues ran a prospective study of police recruits by testing the difference in their cortisol levels (using self-administered cheek swabs) at awakening and 30 minutes later (cortisol awakening response or CAR). Recruits with greater CAR experienced greater peritraumatic dissociation and ASD symptoms during their first three years on the job (2011). Two studies have found that administration of morphine immediately after physical trauma has reduced the risk of PTSD, most likely by suppressing HPA activity (Marmar, et al., 2006).

Summary of Predictors for Distress

The above studies identified variables associated with distress in FRs before, during (peri), and after a high-risk event as listed in Figure 4. The risk factors identified are: organizational stress, innate cortisol function, low self-efficacy, more years of service as an FR, spending a longer time than others at a disaster site, emotional exhaustion, lack of emotional support, increased anger, personal loss, sustaining an injury, level of threat to others, and performing work without previous training or outside of normal duties. Five variables may be either risk or protective factors, depending on the circumstances: FR type, previous high-risk event experience, perceived threat to self, dissociation, proximity to death and gender. Lowering the HPA activity within hours may also be protective.

Risk, Mixed and Protective Factors for FR Distress After a High Risk Event

Pre-Event	Peri-Event	Post-Event
↑ Organizational stressors	↑ longer time at event site	↑ Lack of emotional support
↑ Low self-efficacy	↑ emotional exhaustion	↑ Loss of loved one, home or business
↑ More years as FR	↑ lack of emotional support	
↑ Cortisol rising in mornings	↑ increased anger	
↑ Estrogen effects*	↑ Loss of loved one, home or business	
↕ FR Type		
↕ Multiple events experience		
↕ Gender of FRs	Severity of trauma or incident related stress ↑ threat to others ↑ sustaining an injury ↑ performing work with no previous training or outside of normal duties ↕ perceived threat to self ↕ dissociation ↕ proximity to death	↓ Reduction of HPA activity within hours after rise due to distress

↑ usually a risk factor; ↕ can be either risk or protective factor; ↓ usually protective factor
*from studies on women in the general population

Figure 4. Risk, Mixed, and Protective Factors for First Responder Distress after a High-Risk Event Divided into Pre-, Peri-, and Post-Event Time Frames

Prevalence of Distress in FRs

Another issue in deciding whether or not an intervention should be used is the prevalence of the phenomenon one is trying to prevent. This also speaks to the proper allocation of resources; for example, is it wise to include every FR who has experienced a high-risk event, or will natural resilience carry the day. For example, requiring that all prospective parents in the U.S. be screened for the sickle cell anemia gene is not warranted since we have evidence that it is more common in African-Americans and Hispanics (Mayo Clinic Staff, 2011). In this section, I present a brief overview of the prevalence of clinical distress from a high-risk event.

PTSD Prevalence

The prevalence of PTSD among FRs is generally reported as ranging from 5 to 32 percent (Epstein, Fullerton, & Ursano, 1998; Fullerton, et al., 2004; Guo et al., 2004; North, Tivis, McMillen, Pfefferbaum, Spitznagel, et al., 2002; Ozen & Aytekin, 2004). However, these rates can vary widely depending on the type of FR, the context of the high-risk event, their training, and timing of the assessment after a high-risk event.

Rates of PTSD in fire fighters tend to range from 13 to 18 percent (Fullerton, et al., 2004; McFarlane & Papay, 1992; North, Tivis, McMillen, Pfefferbaum, Spitznagel, et al., 2002). Workers (N = 28,962)who responded to the terrorist attack on 9/11, and enrolled in the World Trade Center Health Registry, were surveyed two to three years after the event. Police reported half the rate of probable PTSD (6.2%; n = 3,925) as fire fighters (12.2%; n = 3,232) and other medical or emergency workers (11.6%; n = 1,741) (Perrin, et al., 2007). Perrin and colleagues (2007) postulate that the difference between fire fighters and police in this study may be attributed, in part, to the context of this event: fire fighters sustained six times the loss of comrades as the police. This finding of lower rates of PTSD in police was replicated in a nine year longitudinal survey of 9/11 rescue and recovery workers (Wisnivesky et al., 2011). The cumulative incidence of PTSD in police increased from 2.5% (n = 9,866) in years 1 and 2, to 9.3% in year 9 (n = 3,780) as participants dropped out. Cumulative incidence in other rescue and recovery workers was 12.5% (n = 16,054) in year one and increased to 31.9% (n = 4,342) in year nine. These were volunteers who enrolled in the World Trade Center Screening, Monitoring, and Treatment Program. This program provided an initial physical and mental health exam and offered follow-ups every 12 to 18 months (Wisnivesky, et al., 2011).

An assessment of fire fighters and police made two to three months after their involvement in Hurricane Katrina found the prevalence of PTSD was about 20 percent for both (Bernard & Driscoll, 2006). In contrast to the above rates, in a study done 5 to 12 weeks after 10 terrorist bombs exploded on commuter trains in Madrid in 2004, the PTSD prevalence rate for police was 1.3 percent (Gabriel, et al., 2007). These police were specially trained to respond to terrorist events.

Acute Stress Disorder (ASD) Prevalence

There is little published on the prevalence of ASD. However, two studies, one of law enforcement officers (solicited through the FBI Behavioral Science Unit) involved in shootings, and one of FRs responding to a disaster, found a lower rate of ASD among the officers involved in a shooting vs. those at the disaster response.

The retrospective study of officer-involved shootings, found that 81% of the 115 officers reported ASD symptoms, while only 6% met DSM-IV diagnostic criteria (Rivard, Dietz, Martell, & Widawski, 2002). Self-report of symptoms was obtained in this study by questionnaire asking about the first two weeks after the shooting, however, the mean time from the shooting to questionnaire completion was 9.26 years (*SD* = 6.69; range 1-29 years).

In a study of FRs responding to a disaster, 25 percent were identified as having ASD (Fullerton, et al., 2004). This study assessed 207 airport disaster and rescue response team members two months after the crash of a DC-10, which resulted in 112 deaths and 59 serious injuries. This assessment of ASD used retrospective self-report of symptoms during the first week after the disaster used "a previously validated measure" (Fullerton, et al., 2004, p. 1371) adapted to include questions about dissociative symptoms per Staab and colleagues (Staab, et al., 1996).

Summary of Prevalence of Clinical Levels of Distress in FRs

One of the ideals for using an intervention is being able to target the audience who has the most need, or is most likely to benefit. According to these reported prevalence rates, less than one-third of FRs suffer from clinical levels of distress, therefore it is questionable whether an intervention aimed at lowering distress should be delivered to all FRs after a high-risk event. Just as the etiology of ASD, PTSD, and even high levels of distress immediately following a high-risk event, and the ability to predict who is most at risk is still uncertain, so is the knowledge of the prevalence of these disorders. The difficulty in assessing long-term dysfunction due to the waxing and waning of PTSD symptoms, and the further inability to distinguish normal from clinical reactions of distress, particularly in the month after a high-risk event (ASD), leaves one with little confidence in these prevalence rates to indicate the percentage of FRs who are likely to suffer clinical distress. However, one must use what is available until better information is obtained.

Psychological Debriefing

What differentiates a Psychological Debriefing (PD) intervention from other debriefing intervention types is the fact that the protocol *includes the elicitation of feelings* about the high-risk event, (see Devilly & Cotton, 2003 for a review of PD definitions). If the PD is led by a mental health professional, there may also be an opportunity for the leader to recognize a group member who is in immediate distress and needs follow-up, which implies PD may serve a screening function. However, this screening function is not generally mentioned in PD descriptions or outcomes. There are other types of debriefings that are meant to educate participants about the psychological sequelae of trauma, however, they do not include the elicitation of feelings component, and are therefore not PDs, although PDs do present

educational material. This meta-analysis specifically focuses on one form of intervention, single-session Psychological Debriefing.

Initially PDs for FRs were done individually. However, for reasons of time and cost efficiency they morphed into group processes (Stuhlmiller & Dunning, 2000). By 1984, debriefing was accepted as a way to reduce stress, however no claims were made about preventing trauma or PTSD (Stuhlmiller & Dunning, 2000). It was at this point in time that J.T. Mitchell (an emergency medical technician working on his doctorate) introduced his own form of PD called Critical Incident Stress Debriefing (CISD) *specifically targeted to FRs* as a way to deal with distress from high-risk events (Mitchell, 1983).

The best way to explain PD is to describe Mitchell's CISD in detail because it is the most codified, widely used, and recognized form of PD to date (Mitchell, 1984; Rose, et al., 2009). Moreover, in those source studies in this meta-analysis that described the PD, all referenced the CISD protocol. Figure 5 describes the CISD protocol and Figure 6 the administration requirements. CISDs should be given to groups and should be led by a person trained under the auspices of the International Critical Incident Stress Foundation, Inc. (ICISF) (International Critical Incident Stress Foundation Inc. (ICISF), 2012c). These leaders can be CISD-trained mental health professionals and/or FR peers who have attended a 3-4 day training program (Robinson & Murdoch, 1998). The ICISF offers six certificates for completing their training programs, but states "…certificate does not indicate competence in the field…" (International Critical Incident Stress Foundation Inc. (ICISF), 2012a). While CISD was initially designed as a single-session, Mitchell has since adopted a system of care approach called Critical Incident Stress Management (CISM), which includes stress inoculation training sessions. Although CISD is still conducted as a stand-alone intervention, he strongly recommends against single sessions

of CISD (Mitchell, 2003). Below is a statement of the goal of CISD within the CISM system of care:

The primary goals of the crisis intervention program entitled CISM are to mitigate the impact of a critical incident and to accelerate recovery processes of normal people who are having normal reactions to abnormal events (Mitchell, 2004, p. 4). The seven stages shown in Figure 5 and standards for administering CISD are shown in Figure 6.

CISD Seven Stage Protocol [a]

1. Introduction: describe process, rules (i.e., confidentiality), and expectations;
2. Fact Phase: participants asked to introduce themselves and say what their role was in the event;
3. Thought Phase: participants asked to share first thoughts after the event;
4. Reaction Phase: explores personal reactions surrounding the event;
5. Symptom Phase: critical incident stress signs and symptoms are discussed and normalized;
6. Teaching Phase: participants are taught ways to deal with critical incident stress in their lives;
7. Reentry Phase: participants are encouraged to discuss any other issues and ask questions.

[a] excerpted from Malcolm, et al. (Malcolm, Seaton, Perera, Sheehan, & Van Hasselt, 2005)

Figure 5. Critical Incident Stress Debriefing Seven Stage Protocol

Standards for Administering a Critical Incident Stress Debriefing[a]

Participants should
- be homogeneous (e.g., emergency personnel, hospital staff, or employees).
- have roughly same exposure to the same event.
- be dealing with another person's trauma, not personal exposure.
- be dealing with someone else's traumatic events that are distressing to work with but which usually have little life altering effect on the FRs.

CISD should
- last one to three hours.
- wait until situation is complete or resolved.
- use clearly defined protocols and procedures.
- be led by a well-trained team with a mental health professional.
- always require a follow-up.
- be given within a comprehensive, systematic and multi-component approach to managing traumatic stress within an organization (clear strategy).

Goals
- Mitigate impact;
- Enhance normal recovery of normal people having normal reactions to abnormal events;
- Assess those who may need additional assistance and assure appropriate referrals.

[a]Adapted from (Malcolm, et al., 2005)

Figure 6. Protocol for Administering a Critical Incident Stress Debriefing

It is the *Reaction Phase: explores personal reactions surrounding the event* (see Figure 5), also known as eliciting feelings, that makes CISD a Psychological Debriefing. Mitchell makes clear that these feelings are to be about the victims and/or survivors and not the FRs' reactions about themselves (see Figure 6) (Mitchell, 2003). Unfortunately, as I discuss in Chapter VII Recommendations for Future Research, measures of implementation fidelity (whether or not the PD was administered as designed) were not routinely included in the studies in this meta-analysis. Therefore, it is not known if the PD leaders discouraged or were able to stop FRs from discussing their own reactions.

The Prevalence of Psychological Debriefing in First Responder Culture

The offering of Psychological Debriefing (PD) is endemic in the First Responder (FR) culture (National Association of State Mental Health Program Directors (NASMHPD) Medical Directors Council, 2004; Tanielian & Stein, 2006). In terms of police, the Police Psychological Services Section of the International Association of Chiefs of Police contains a description of critical incident debriefing/defusing to be used as a group intervention on their web site as of July 2009 (International Association of Chiefs of Police (IACP), 2009). According to an article on the International Fire Chiefs Association (IAFC) web site, the International Association of Fire Fighters (IAFF) had five PD teams in Baton Rouge on September 5, 2005, within seven days of landfall of Hurricane Katrina (International Association of Fire Chiefs (IAFC), 2005). Further, the International Association of Fire Fighters included the need for PD in their guide published about the recent flu pandemic (International Association of Fire Fighters (IAFF), 2007).

Along with FR organizations, PD has been endorsed by several federal, independent, and international agencies, including the National Association of State Mental Health Program Directors, the Red Cross, and the United Nations (Armstrong, et al., 1995; Mitchell, 2004, 2007; National Association of State Mental Health Program Directors (NASMHPD) Medical Directors Council, 2004). Currently, there are over 1,500 teams that have been trained in CISD under the auspices of the ICISF and they are serving millions of people in 30 countries (International Critical Incident Stress Foundation Inc. (ICISF), 2012c).

On the other hand, what is the prevalence of FRs asking for PDs? Sailes (1997) conducted a retrospective study and found that 62 percent of the 63 FRs contacted refused CISD. Macnab conducted a prospective randomized controlled trial of CISD with members of the

British Columbia Ambulance Service and was unable to complete an analysis because, over a 26 month period, less than 1 per 10,000 response calls resulted in a request for critical incident stress help. This low response rate occurred during a period when the service answered approximately 650,000 calls, 250,000 of which were situations that immediately threatened life or limb. Of the 27 calls made by EMTs, 9 declined participation in the study, 18 enrolled and only 6 completed measures (Macnab, Sun, & Lowe, 2003). These studies may indicate a disconnection between what management perceives as necessary and what FRs want. There is also strong pressure from unions to keep the option of PD available (personal communication, U.S. Department of Transportation consultant, San Antonio, TX, 2010). One reason for this may be that it shows that management cares (personal communication, Fire Chief in Washington, D.C., 2011).

Theory and Evidence about PD Timing and Elicitation of Feelings

There are two major aspects of PD that are as yet unresolved in terms of their effectiveness in mitigating distress. The first is that, when the PD is delivered soon after the high-risk event, it may interfere with natural recovery or resilience (Zohar et al., 2011). The second is that the elicitation of feelings from PD attendees about the high-risk event may heighten their awareness of distress symptoms and/or exacerbate the distress they are experiencing or even retraumatize them.

PD Timing

Hobfoll and colleagues say that it is still not known when it may be best to intervene after a disaster (Hobfoll, et al., 2007). The proponents of the CISD recommend the PD be delivered within one to ten days (Everly Jr. & Mitchell, 2012). PD interventions delivered from one to ten

days may be both too early and too late to intervene to affect distress after a high-risk event. One reason for concern about delivering a PD too early is that the FR may not be "ready" to meet and talk about the event. Greenberg and colleagues argue that a PD that occurs too early may not provide "optimum distance" from the distress to allow for healing (Greenberg, Wortman, & Stone, 1996) according to catharsis theory (Scheff, 1979, p. 70). Uchino emphasizes that support received before a person is ready is more likely to have negative results (Uchino, 2009).

However, it must be noted that the recommended time frame for PD appears to change depending on the year and source cited. Van Emmerik and colleagues say CISD is usually done within one week (van Emmerik, Kamphuis, Hulsbosch, & Emmelkamp, 2002). Hawker and colleagues (2011) cite the *Critical Incident Stress Debriefing: An Operations Manual for the Prevention of Traumatic Stress Among Emergency Services and Disaster Workers (rev. 2nd ed.)* (Mitchell & Everly Jr., 1997) saying that--

> *People have to be ready for help before it becomes useful to them. Providing help too early usually sets the stage for the rejection of the help and failure of the effort . . . hold off on the formal debriefings (CISD) until things settle down a little.* (pp. 189–190)

In addition, the ICISF web site (http://www.icisf.org) accessed March 2012, recommends that CISD be delivered from one to ten days after the high-risk event. There are problems inherent in the standards held forth by CISD proponents. They advocate a specific window for CISD, purport that "people have to be ready for help", and expect the CISD to be done in a group of FRs who attended the same event. The idea that all participants in the event will be ready for help at the same time, within 1 to 10 days after the high-risk, event seems rather unrealistic.

A preclinical study (using animals) addressed the level of fear (distress) still present when the intervention occurred. Maren and Chang (2006), specifically set out to test the viability of a PD-type intervention in an animal model. They first used fear conditioning and then ran fear extinction trials minutes later. These immediate extinction trials suppressed fear acutely, but the fear was no longer suppressed the next day. When they waited a day to run extinction trials, the fear stayed suppressed. They also found that the level of fear present at the time of the extinction trial appeared to be more important than the timing of the extinction trial intervention (e.g., high fear levels rendered the intervention less successful). This study suggests that if the FR is still experiencing a high level of distress when he attends a PD, he may not be able to take advantage of any potential beneficial effects.

On the other hand, there are indications from recent physiological research that even one day may be too late to offer an intervention. The effect of distress from trauma increases the HPA activity (fight or flight, or freeze response) which increases cortisol levels (a stress hormone). High cortisol levels have been associated with distress (Cieslak, Benight, Luszczynska, & Laudenslager, 2011). Researchers are now discovering that when the body is in this excited state, memories may actually be encoded in a different way than normal (Henckens, Hermans, Pu, Joels, & Fernandez, 2009). This may, in turn, cause them to be encoded like snapshots or movie reels with all of the associated sensory input left intact (flashbacks), vs. normal memories that we process, reinterpret and/or simply forget. Another study that speaks to this was conducted by Holbrook and colleagues (2010). They examined medical records of 696 U.S. military personnel wounded in Iraq and found a positive association between receiving morphine quickly (thereby slowing the HPA activity) and a lowered risk of PTSD. Morphine

administration was shown to have a protective effect in terms of PTSD in Bryant and colleagues' study as well (Bryant, 2009).

This evidence about the timing of a PD intervention leaves one in doubt about the best time to intervene. I have coded the studies in this meta-analysis for the timing of the PD from the event to see if there is any detectable difference in the distress outcome measure. However, the timing of the outcome assessments ranged from three days to 2.5 years in the studies in this meta-analysis, further illustrating ambiguity in the field of when to assess PD outcomes.

Eliciting Feelings

The second aspect of eliciting feelings can result in catharsis, or cause distress through retraumatization. CISD protocol states FRs should "be dealing with another person's trauma, not personal exposure, and with someone else's traumatic events that are distressing to work with but which usually have little life altering effect on the FRs" (see Figures 5 and 6). However, without any implementation fidelity measures of what actually occurred in terms of *eliciting feelings*, it is difficult to know if this boundary was maintained. The field is divided about whether eliciting feelings of group members should be avoided or done in moderation (Curtis, 1995; Littrell, 2009).

There is some evidence that discussing feelings too early, or with the wrong audience, may be harmful and this is also noted by the APA (American Psychiatric Association (APA) & Committee on Psychiatric Dimensions of Disaster, 2004; Summerfield, 2005). Though there is not much data-driven literature on this topic, Kross and Ayduk found that one's perspective, when discussing their feelings about an event that was traumatic, made a difference (Kross & Ayduk, 2011). In their study, two groups of nonFR subjects were told to imagine their recent trauma. One group was told to imagine it as if they were there; the other group was told to

imagine it as if they were viewing it as a "fly on the wall." The first group re-experienced all the distress of being in the trauma the first time. The second group experienced "adaptive self reflection" rather than re-experiencing the original level of distress.

The perception of an event as somewhat or highly distressful may also affect a person's response to an intervention aimed at eliciting feelings. In a study on therapeutic, expressive writing, Boals measured the frequency of intrusive thoughts using the Impact of Events Scale (Horowitz, Wilner, & Alvarez, 1979) and asked how distressed the college student participants felt about the negative event they elected to write about pre- and post-writing (Boals, 2012). Two writing samples were analyzed for "meaning making" (loosely interpreted as making sense of the event). Those participants who wrote about very stressful events experienced lower distress as meaning making increased. However, participants writing about events they had reported as less stressful experienced more intrusive thoughts as meaning making increased. Boals proposes that asking persons to rethink an experience that was not initially perceived as overly distressful may lead to negative results and cites this as one reason CISD may have negative results (Boals, 2012). Further information is needed regarding how the elicitation of the feelings stage of the protocol should be managed.

Pender and Prichard conducted a survey of FRs (n = 8), peer CISD providers (n = 14), and CISD providers (e.g., mental health professionals, n = 16), by asking them to rank the therapeutic factors they viewed as contributing to a mechanism of change (Pender & Prichard, 2008). Both peer and mental health leaders had been trained by ICISF courses (International Critical Incident Stress Foundation Inc. (ICISF), 2012b). Rankings of themes are shown in Figure 7. Pender noted that the FRs did not endorse some of the therapeutic factors that would normally occur in psychotherapy groups. However, she cites three ICISF researchers who say

that catharsis and vicarious learning are important mechanisms of change for crisis resolution (Everly Jr. & Mitchell, 1999; Mitchell & Everly Jr., 1997; Raphael, 1986). This focus by CISD practitioners on mechanisms of change that include catharsis is contrary to the CISD protocol in that FRs are expected to discuss their feelings about not only the event, but how it affected them personally.

It is interesting that both leader types endorsed self-disclosure since 1) they were trained by ICISF and self-disclosure is not supposed to be a part of the eliciting feelings step in the CISD protocol; and 2) self-disclosure is one of the goals of on-going psychotherapy groups. However, PD is not meant to be an on-going therapy group. PDs are most often attended only once after a high-risk event as is the case in this meta-analysis (14 of the 16 studies; and even when two or more PDs were attended, the average number of PDs attended for each FR was closer to one than two or more in both studies).

As one observes from Figure 7, FRs differed from both types of the CISD leaders in their ranking of therapeutic factors. FRs endorsed vicarious learning and catharsis, which are therapeutic factors commonly seen in affective or cognitive insight groups, per Pender. However, both leader groups did not, but instead listed self-disclosure. According to Pender, catharsis and self-disclosure arise from two distinct theoretical classes per Bloch et al., with catharsis belonging to affective "emotional expression," while self-disclosure is in the behavioral, or "learning from doing," class (Bloch, Reibstein, Holroyd, & Themen, 1979).

While this dissertation is not an exploration of group process, it is noteworthy that the FRs did not include self-disclosure in their ranking. This lends further credence to the general recognition that FRs do not "self-disclose" easily. There appears to be a disconnection in expectations of PD from these participants and leaders.

Ranking of CISD Therapeutic Factors[a]

FRs	Peer Leaders	Mental Health Leaders
1. Vicarious Learning	1. Self-Disclosure	1. Instillation of Hope
2. Catharsis	2. Altruism	2. Self-Disclosure
3. Guidance & Universality (tied)	3. Acceptance & Universality (tied)	3. Acceptance
4. Imparting information	4. Vicarious Learning	4. Universality

[a]Adapted from (Pender & Prichard, 2008)

Figure 7. Ranking of Therapeutic Factors of CISD from Three Perspectives

Pender and Prichard also had subjects rank important therapeutic factors for different types of high-risk events (see Figure 8) (Pender & Prichard, 2008). Unfortunately, they have combined FR rankings with the rankings of both types of leaders and, as we have seen in Figure 7, the overall ranking was much influenced away from that of FRs by the two groups of leaders. Nonetheless, the fact that differences were found by the scope of the event, is worthy of mention in light of the fact that survey studies of PD do not always differentiate between large- and limited-scope events. Pender and colleagues concluded that "CISD does reduce social isolation and promote adaptation to the demands of Emergency Services Responder work" (Pender & Prichard, 2008, p. 46).

CISD Therapeutic Factors Ranked by Type of Event[a]

Event Type	Top Ranked Therapeutic Factors		
	1st	**2nd**	**3rd**
Mass Casualty	Self-Disclosure	Acceptance	Altruism
Graphic Death	Hope	Altruism	Acceptance
Malicious Harm	Universality	Guidance	Hope
Line of Duty Death/Injury	Acceptance	Self-Disclosure	Guidance
Known Victim	Universality	Catharsis	Self-Disclosure
Officer Suicide	Impart Information	Family Norms	Catharsis

[a]Adapted from (Pender & Prichard, 2008)

Figure 8. CISD Therapeutic Factors Ranked by Type of Event

Psychological Debriefing Effectiveness Outcomes—Short- or Long-Term

Originally PD was introduced as an intervention for stress from trauma. However, in 1980, when Posttraumatic Stress Disorder (PTSD) was first introduced as a clinical diagnosis, the terminology began to blur between stress and PTSD. In fact, in a 1993 study of CISD, the introduction talks about PTSD, but the report goes on to say that the goal of PD with FRs is to "lessen the impact of trauma on them and to help them return to routine functioning," (Robinson & Mitchell, 1993, p. 368) which indicates a short-term outcome. Five years later, Robinson (who trained the first CISD teams in Australia in 1987), concedes that the use of PD as an intervention for PTSD has not been established experimentally, but that "clinical wisdom" says PD "may assist many in a variety of ways" (Robinson & Murdoch, 1998, p. 2). Robinson's conclusions may be based, in part, on the results of the researchers (primarily proponents of CISD) who have relied primarily on measures of participant satisfaction with PD that show the majority of participants were satisfied and would recommend PD to others (e.g., Gist, Woodall, & Magenheimer, 1999). I discuss this in further detail in the Chapter III Literature.

As reported in the next literature review, there is much less consensus on the effectiveness of PD when researchers used caseness (meeting the criteria—yes, no--for a PTSD or ASD diagnosis[3]) or continuous measures of distress (Deahl, Srinivasan, Jones, Neblett, & Jolly, 2001; Rose, et al., 2009; Stein et al., 2009; Zohar, Sonnino, Juven-Wetzler, & Cohen, 2009). In this meta-analysis, effect size data is based on continuous measures.

The theoretical underpinning of the PD intervention has not been established. In other words, the chain of events leading to the development of distress is unclear from the predictor literature. This, in turn, makes it difficult to determine a link in the causal chain that, if broken by attending PD, would be beneficial to FRs. Another issue is whether or not PDs should be used with all FRs since the prevalence literature reports that the majority of FRs are not suffering from short- and/or long-term distress. Finally, there is uncertainty surrounding the desired outcome of PD (distress in the short- or long-term), the best time to administer a PD, and when to measure the PD effects. While these short-comings in the literature suggest that it is not yet possible to design an evidence-based intervention for distress from high-risk events, PD is being used. In fact, it has been used for almost 30 years, world-wide, by FRs, the military (combat and peacekeeping), the Red Cross, the United Nations and others for ameliorating short- and/or long-term distress. PD is a multi-million dollar industry (Devilly & Cotton, 2003). Therefore, it is incumbent upon researchers to use what data are available to examine the effects of PD. This is particularly needed for FRs for whom CISD PDs were originally designed, and have become endemic in the culture. In the next chapter, the overview of the literature will reflect these uncertainties in the field.

[3] The complete diagnostic category descriptions of PTSD and ASD from the current *DSM-IV-R* are available in Appendix A.

CHAPTER III

LITERATURE REVIEWS OF PD STUDIES

In this chapter, the findings of the review literature on the effects of Psychological Debriefing (PD) interventions on distress as reported by First Responders (FRs) after a high risk event are highlighted. This chapter begins with an overview of the pro- and anti-PD literature reviews including all populations. Then the three randomized controlled trials (RCTs)and an ongoing review that are cited most often in reviews both pro- and anti-PD are described. Finally, I present in detail two meta-analyses (or quantitative reviews) of PD that include FRs.

To date, no reviews of PD studies that included only FRs as subjects have been located. Therefore, this section presents findings of both the traditional and quantitative review literature on PD for various populations and types of high-risk events. Almost every review of PD mentions these three RCTs of PD administered to individuals (Bisson, Jenkins, Alexander, & Bannister, 1997; Hobbs, Mayou, Harrison, & Worlock, 1996; Mayou, Ehlers, & Hobbs, 2000; Sijbrandij, Olff, Reitsma, Carlier, & Gersons, 2006)[4] and the ongoing review in the Cochrane Database of Systematic Reviews of RCTs of PD by Rose and colleagues (Rose, et al., 2009). The Bisson and colleagues and Hobbs/Mayou and colleagues (Bisson, et al., 1997; Hobbs, et al., 1996; Mayou, et al., 2000) studies are used as arguments both for and against the use of PD. It must be noted that all of these studies use PDs administered to individuals rather than in groups like FRs tend to do. These oft quoted studies are described in detail after the pro-, mixed-, and anti-reviews of PD are discussed.

[4] The Hobbs and Mayou articles are reports on the same RCT.

Pro PD

Two reviews (Hawker, et al., 2011; Regel, 2007) mount a defense of the CISD PD by explaining in detail the reasons for negative (or harmful) effects found in two RCT studies (Bisson, et al., 1997; Hobbs, et al., 1996) with burn victims and victims of road traffic accidents as subjects, respectively (see descriptions of studies below). Reasons for the negative findings include: CISD protocol was not followed; and, when other variables were controlled, the study results were no longer significant.

In general, the current literature that supports PD comes from practitioners of CISD. Pender[5] and Prichard write in defense of CISD using a qualitative group process approach that indicates it is consistent with appropriate therapeutic factors and mechanisms of change (Pender & Prichard, 2008). Robinson[6] (2008) has written a defense of the field in terms of the use of CISM.

Studies of CISD conducted by Mitchell and his colleagues depend solely on measures of satisfaction. There are usually two questions. Was the debriefing helpful to you? Would you recommend attending a debriefing to others? These limited assessments prompted one of Mitchell's most vocal critics (Gist, et al., 1999) to list several attempts by researchers to Mitchell to publish more data (other than satisfaction survey results). No additional data from Mitchell have been found in the literature to date. The most colorful characterization of the futility of these requests comes from Brown (1996), who reported that Mitchell's response was tantamount to "the dog ate my homework" (Brown, 1996, p. 10) Mitchell's main reasons for negative findings about the effects of PD are two-fold: 1) results from non CISD debriefings, or CISD-

[5] At the time of publication, Pender was clinical director of the Southern IL Critical Incident Stress Management team—an extension of CISD

[6] At the time of publication, Robinson was active in providing CISD in Australia)

like, debriefings with peer leaders not trained by the ICISF are reported as if they were CISD, and 2) CISD does not prevent PTSD, nor is it meant to do so (Mitchell, 2004). It must be noted that in this same paper Mitchell does discuss PTSD and indicated that CISD is important in helping to alleviate at least some of the symptoms, but should not be expected to completely prevent PTSD. Mitchell has written several articles in defense of CISD/CISM, most notably his Crisis Intervention & CISM: A Research Summary (Mitchell, 2003).

Anti PD

Most of the more recent reviewers have recommended against the use of single-session PDs and some go even further and state that PD is harmful. These reviewers tend to use the same three RCT studies of PDs administered to individuals rather than groups (Bisson, et al., 1997; Hobbs, et al., 1996; Mayou, et al., 2000[7]; Sijbrandij, et al., 2006) and the same ongoing review ((Rose, et al., 2009) first published in the Cochrane Database in 2001) as the basis of their argument against PD. These three RCTs have been cited over 500 times (per Web of Science) in the literature to date both as evidence for (as mentioned in the ProPD section above) and against the use of PD. The take home message of all three of these RCT studies is that the initial level of distress was more predictive of later distress than membership in the PD group. These RCTs and the ongoing review are described in detail below.

The most recent review of early interventions for PTSD (Kearns, Ressler, Zatzick, & Rothbaum, 2012) relies solely on the three RCTs and the ongoing review and concludes by quoting the ongoing review, "Compulsory debriefing of victims of trauma should cease," Rose, et al., 2002, p. 1). Mansdorf, in his review of interventions following terrorist attacks, relies

[7] This article is a follow-up report on Hobbs and colleagues original RCT.

heavily on the ongoing review (Rose, et al., 2002) as well as Sijbrandij and colleagues' (2006) RCT, and concludes PD may be harmful (Mansdorf, 2008). Bryant (Bryant, 2007) also uses the negative findings from the three RCTs, the ongoing review (Rose, et al., 2001), and van Emmerik's meta-analysis (van Emmerik, et al., 2002) as the basis for saying that PD may impede natural recovery. Bryant does mention three other RCTs as evidence against the use of PD. The first is Rose and colleagues' RCT of PD for victims of violent crime (Rose, Brewin, Andrews, & Kirk, 1999) which reported no difference in improvement between the PD and control group. The second two RCTs also reported no difference for mothers with maternal depression after a c-section (Small, Lumley, Donohue, Potter, & Walderstrom, 2000), and for road traffic accident victims (Conlon, Fahy, & Conroy, 1999).

The RCTs and Rose and Colleagues

Bisson and colleagues (Bisson, et al., 1997) found that symptoms were worse at the 13 month follow-up for the PD participants. Hobbs & Mayou (Hobbs, et al., 1996; Mayou, et al., 2000) and Sijbrandij and colleagues (2006) found no difference in effects on PTSD-specific and general measures of distress between PD and control groups after controlling for differences between the experimental groups. However, in both of these latter studies, when only those participants who reported higher baseline levels of distress were included in the analysis, they fared worse if they were in the PD group. Bisson and colleagues found that higher initial levels of distress were more strongly associated with worse outcomes than membership in the PD group. Details of these studies follow.

The Bisson RCT. Bisson and colleagues (1997) conducted an RCT of the effects of PD (n = 57) vs. control (n = 46) on distress with 110 hospitalized burn victims. The PDs were administered either to individuals or couples, and were led by a mental health professional

trained in CISD. Scores for anxiety, depression using the HADS[8], and PTSD using the IES[9] were significantly worse in the PD group vs. control at 13 months, controlling for initial levels reported at three months after the burn trauma. However, a higher initial IES score was more strongly associated with higher levels of distress at 13 months than membership in the PD group or the percentage of body burned. Finally, the closer in time the PD was to the burn event, the worse the outcome. This study has been cited in 189 documents, 8 of them published in 2012 (see Web of Science citations).

The Hobbs/Mayou RCT. Hobbs and Mayou and colleagues collaborated on an RCT of the effects of individual, single-session PD on 106 victims of road traffic accidents admitted to hospital (Hobbs, et al., 1996) and published follow-up data at three years (N = 61) after the accidents (Mayou, et al., 2000). Baseline assessment and then the PD were administered within 24-48 hours after the accident. Those with no psychological symptoms were excluded. The experimental groups were equivalent on baseline distress symptoms. Neither group reported a significant reduction in distress symptoms at four months (Mayou, et al., 2000). However, the PD group (n = 54) reported significantly worse outcome (baseline to follow-up at four months) on two subscales (name of scales not reported) of the BSI[10] (Hobbs, et al., 1996). At the three year follow-up, there was no significant effect of PD on IES scores controlling for baseline scores (N = 61, found to be representative of the initial group) (Mayou, et al., 2000). The authors conducted further analysis on the interactions between experimental group and level of distress (high or low IES score) reported at baseline. At four months and at three years, there was no difference in outcomes for the low score participants. The high score subjects that participated in

[8] The Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983).
[9] Impact of Events Scale (IES) (Horowitz, Wilner, & Alvarez, 1979; Weiss & Marmar, 1996; Zilberg, Weiss, & Horowitz, 1982)
[10] Brief Symptom Inventory (BSI) (Conoley & Kramer, 1989; Derogatis & Melisaratos, 1983

the PD had significantly worse outcomes than those in the control group. However, controlling for injuries and hospital length of stay, the PD showed only a "marginally significant (all $P<0.07$)" (Mayou, et al., 2000, p. 591) worse outcome than the controls for the high level of distress participants. Results of the more global distress symptoms (BSI) showed no overall improvement from baseline to three years, and the PD group reported significantly more severe emotional symptoms than the control group. However, as with the IES, when injury and hospital stay were controlled, the difference between the PD and control groups was no longer significant. The Hobbs and colleagues' article (1996) has been cited in 110 documents, 3 of them published in 2012 (see Web of Science citations). The Mayou and colleagues' study (Mayou, et al., 2000) has been cited in 166 documents, 7 of them published in 2012 (see Web of Science).

The Sijbrandij RCT. The Sijbrandij and colleagues' RCT found no differences in effect on PTSD, anxiety, or depression among three conditions of individual, single-session debriefing: psychological/emotive CISD minus the educational step; educational CISD minus the psychological/emotive step; and no debriefing (Sijbrandij, et al., 2006). The participants were 236 adult civilians who had been referred to a clinic for trauma treatment after either an assault or an accident. However, this study did find that participants with two symptoms of hyperarousal at the baseline assessment (after event, before the debriefing) who attended the PD had significantly higher (worse) PTSD scores than the control group at six weeks after the debriefing intervention. This finding was based on 59 participants. Author conclusions are that individual debriefing is not effective and may be harmful for those experiencing hyperarousal (Sijbrandij, et al., 2006). This study has been cited in 34 documents, 6 of them published in 2012 (see Web of Science).

The Rose Ongoing Review. The ongoing review of PD by Rose and colleagues (Rose, et al., 2009) looked at 15 RCTs and used meta-analytic techniques on nine. They report that the two studies (Bisson, et al., 1997; Hobbs, et al., 1996) with the longest follow-up time (three years and 13 months, respectively) found that those who attended a PD were more distressed than the control group. All other studies showed no effect of PD. They do not recommend using PD in one session with an individual, and did not have enough data to assess PD in group format. In addition, they state that measures of satisfaction with the PD should not be accepted as proof of efficacy and/or a replacement for evidence-based research.

The pro PD reviews are generally written by defenders of CISD. They tend to rely on studies where the only measure is whether or not PD attendees were satisfied with the PD. Negative or equivocal studies are countered by saying they have not followed the appropriate CISD protocol, leaders were not trained, or some other tenet of CISD was not followed appropriately. Those reviews that recommend against PD focus on studies that find any sort of exacerbation of initial distress after participation in a PD. The three RCT studies that are most often cited in reviews have been interpreted as both pro and anti PD. The number of subjects upon which the negative findings are based in the three RCT studies is easily less than 200 as the negative findings were based on those who had the highest initial levels of distress, not the entire subject pool. Dual interpretation of the findings of these three most often cited RCTs makes it difficult to come to an evidence-based conclusion from these reviews. Next I present two quantitative reviews of PD.

Meta-Analytic Reviews that Include FRs

There have been two quantitative reviews of Psychological Debriefing identified in the literature to date. Everly, Jr. and colleagues found evidence supporting the use of PD (Everly Jr.,

Boyle, & Lating, 1999) and van Emmerik and colleagues determined that PD can be harmful (van Emmerik, et al., 2002). Both of these meta-analyses included studies of FRs, but the authors aggregated the results of these studies with those having non FR populations (e.g., burn victims and military personnel).

Everly, Jr. and colleagues (1999) performed a meta-analysis of 10 studies and reported a positive effect for PD with an overall mean effect size (*ES*) = .54, $p < .01$, where effect sizes ranged from .15 for British soldiers to an extremely high 5.39 for adolescent victims in a bus accident (see Table 1). These researchers grouped soldiers, adolescents and adult victims together with FRs. However, the events were mostly consistent in scope as all but one high-risk event were large-scope or disaster type events. The *ES* for seven studies in this meta-analysis was calculated by combining measures for PTSD, anxiety, depression, anger, and stress administered at one time point to form one effect size. In the remaining two studies the *ES* was calculated from an average of two and five follow-up assessments. Reporting the average of assessments of distress is puzzling since the stated objective of CISD in this report was as an early intervention to ameliorate symptoms of psychological distress, which would indicate the most interest is in the first, or earliest, assessment after the PD. Also, the natural course of distress after a high-risk event is high levels tapering downward.

Looking at the studies that compared only FRs, they report effect sizes of .93 for a mass shooting; .86 for varied limited scope; .47 for a riot; and a zero (no data reported, but author stated no difference) for a large fire (see Table 1a for timing of PD and assessment(s)). However, even though CISD was originated for FRs, and was delivered relatively closely on the heels of the high risk event, the study effect sizes did not approach the kind of improvement reported for the adult (*ES* = 1.37) and adolescent (*ES* = 5.39) victims of a hurricane and bus accident,

respectively (see Table 1b). However, these victims of the hurricane and bus accident were debriefed six months (vs. the three months for most of the FRs) after the high risk event, which may have allowed more time for natural resilience.

Table 1a. Summary of Everly's Meta-Analysis[1] FR Studies Only,
mean *ES d* = .54; $p < 0.01$

Study	PD Type & Time Post Event	Subjects	Incident	Measures[1] & Timing	Effect Size Cohen's *d* [2]
(Jenkins, 1996)[4]	CISD, 1 day	Emergency workers	Mass shooting	SCL-90 anxiety, depression. 8-10 and 30 days post PD	.93
(Bohl, 1991)[5]	CISD, 1 day	Police	Varied, not disaster	BDI, STAI, Novaco Anger, Stress 3 months post PD	.86
(Wee, 1995)[5]	CISD, 1-14 days	Emergency Medical Technicians	Los Angeles riots	FRA 3 months post PD	.47
(Hytten & Hasle, 1989)[6]	Not reported, most within 3 days	Fire Fighters	Fire	IES 1 – 3 weeks post fire	.0

adapted from (Everly Jr., et al., 1999)
[1] IES = Impact of Events Scale; BDI = Beck Depression Inventory; STAI = Spielberger State-Train Anxiety Inventory (state anxiety); FRA = Frederick Reaction Index; GHQ-28 and GHQ-12= General Health Questionnaire. For more on measures see Appendix F.
[2] weighted for study size; all PTSD outcome measures in each study were combined to obtain effect size
[4] *ES* reported by Everly averages outcome measures from one week and one month. Data not available to form an *ES* for one point in time, not used in this dissertation meta-analysis (lgw)
[5]used in this dissertation meta-analysis (Wee, 1995 is paper presentation, Wee, 1999 is journal article)
[6]it is not clear from reported data that a zero effect size is a true representation of the results, not used in this dissertation meta-analysis (lgw)

The total number of sessions of PD the subjects received before and/or between assessments was not reported in the meta-analysis. This is problematic for several reasons. First, if there was more than one PD, then the outcome measured after the last PD may reflect a cumulative effect of all PDs, rather than only the first one (PDs were held ranging from one day to up to nine months after the high-risk event). Second, the likelihood of other stressful events, both job-related and personal, surely increases with the increase in time between the high-risk event and when the PDs and assessments were administered. This would certainly complicate any conclusions about the effect of a single PD for a single event to address short-term distress.

A further challenge to the interpretation of Everly, Jr. and colleagues' meta-analysis is the lack of reporting on and attempt to address within-study group equivalence as a possible confound. Although they stated, "studies had to meet adequate group or statistical control mechanisms" (Everly Jr., et al., 1999, p.230), one cannot assume from this statement that the groups studied had similar baseline levels of distress.

Table 1b. Summary of Everly's Meta-Analysis, mean *ES d* = .54; $p < 0.01$

Study	PD	Subjects	Incident	Measures[1]	Effect Size Cohen's *d* [2]
(Nurmi, 1997)[3]	CISD	Emergency workers & hospital nurses	Ship sinking	IES, Penn Inventory	.89
(Jenkins, 1996)[4]	CISD	Emergency workers	Mass shooting	SCL-90 anxiety, depression	.93[#]
(Bohl, 1991)[5]	CISD	Police	Varied, not disaster	BDI, STAI, Novaco Anger, Stress	.86
(Chemtob, Tomas, Law, & Cremniter, 1997)	CISD	Adult victims	Hurricane Iniki	IES	1.37
(Wee, 1995)[5]	CISD	Emergency Medical Technicians	Los Angeles riots	FRA	.47
(Stallard & Law, 1993)	nr[7]	Adolescent Victims	Bus accident	IES	5.39
(Deahl, Gillham, Thomas, Searle, & Srinivasan, 1994)	nr	British Soldiers	Post-Gulf War	IES, GHQ-28	.13
(Yule, 1992)	nr	Adolescent victims	Ship sinking	IES, depression, anxiety, fear	.47
(Kenardy et al., 1996) [5]	nr	Adult victims & helpers	Earthquake	IES, GHQ-12	.15[#]
(Hytten & Hasle, 1989) [6]	nr	Fire Fighters	Fire	IES	.0

adapted from (Everly Jr., et al., 1999)

[1] IES = Impact of Events Scale; BDI = Beck Depression Inventory; STAI = Spielberger State-Train Anxiety Inventory (state anxiety); FRA = Frederick Reaction Index; GHQ-28 and GHQ-12= General Health Questionnaire. For more on measures see Appendix F.

[2] weighted for study size; all PTSD outcome measures in each study were combined to obtain effect size

[3] PD and control groups are too dissimilar in composition and exposure to event, not used in this dissertation meta-analysis (lgw)

[4] *ES* reported by Everly averages outcome measures from one week and one month. Data not available to form an *ES* for one point in time, not used in this dissertation meta-analysis (lgw)

[5] used in this dissertation meta-analysis (Wee, 1995 is paper presentation, Wee, 1999 is journal article)

[6] it is not clear from reported data that a zero effect size is a true representation of the results, not used in this dissertation meta-analysis (lgw)

[7] nr = not reported

[#] averages of measures administered at two separate time points after the PD. Jenkins study 8-10 and 30 days after PD; Kenardy study 12, 27, 50, 86 and 114 weeks after disaster.

In another meta-analysis of PDs, van Emmerik and colleagues' stated in the beginning of their discussion that CISD "has no efficacy in reducing symptoms…it has a detrimental effect" (van Emmerik, et al., 2002, p. 769). However, they soften their opinion on debriefing in the last paragraph of their discussion section by acknowledging that while there have been positive results for PD in terms of participant reported satisfaction, "…claims that single session PD can prevent development of chronic negative psychological sequalae are empirically unwarranted" (van Emmerik, et al., 2002, p. 770). The studies in this meta-analysis were single session debriefings (either group or individual) conducted within 30 days of the event in seven studies to determine whether or not PD prevented chronic symptoms of PTSD and state/trait anxiety. The final eligible study subject pool included only one study of FRs, even though it did not meet the eligibility criteria of having a pretest. The PD interventions included in this analysis were five CISDs and one 30-minute individual counseling session. The other two interventions were not PDs but an educational and an historical group debriefing. Only the last post-test assessments were used to calculate effect sizes, in line with the object of the study, looking at preventing PTSD and nonPTSD psychopathology.

The measure used to calculate the study mean effect size for PTSD symptoms was the Impact of Events Scale (Horowitz, et al., 1979). Other symptoms were measured by the Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983), Spielberger State-Trait Anxiety Inventory –state anxiety (Spielberger, Gorsuch, & Lushene, 1970; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), Brief Symptom Inventory (Conoley & Kramer, 1989; Derogatis & Melisaratos, 1983). These measures were all used in source studies in my meta-analysis.

The mean *ESs* for the PTSD specific measures had higher effect sizes (PD group was less distressed than comparison group) than the other or more general symptoms of distress. The mean *ES* (*95% CI*) for the five CISD interventions was .13 (-.29 to .55) for PTSD symptoms and .12 (-.22 to .47) for other symptoms. The three non CISD interventions had a mean effect size of .65 (.14 to 1.16) for PTSD and .36 (only one study) for other symptoms. Finally, the six no intervention control studies had a mean effect size of .47 (.28 to .66) for PTSD and .13 (-.02 to .28) for other symptoms.

A major limitation in interpreting these effect sizes is their use of a Cohen's *d* standardized mean difference effect size method "with the magnitude of change defined as the difference between pre-intervention and post intervention assessment group means divided by the pooled standard deviation" (van Emmerik, et al., 2002, p. 769) to calculate a pre-test adjusted effect size for each group. Using the standard deviation pooled is not appropriate when calculating a pre-post adjusted effect size as it is a reflection of the variability in treatment gains rather than a representation of the standardized units of sample variability on the outcome measure (Lipsey & Wilson, 2001, p. 179 & 186). They then used these two effect sizes to calculate the study Cohen's *d* or standardized mean difference *ES* for each study. Unfortunately, the method chosen to calculate the pre-post *ES* for each group in these studies makes it difficult to interpret these *ESs* and compare them to other *ESs* that were calculated per recommendations of Lipsey and Wilson (Lipsey & Wilson, 2001).

Table 2. Summary of Studies in van Emmerik and Colleagues' Meta-Analysis[1]

Study	Group	Subjects	Incident
(Bisson, et al., 1997)[3]	CISD No intervention	Victims	Burns
(Carlier, Voerman, & Gersons, 2000)	CISD No intervention	Police	Varied
(Conlon, et al., 1999)	30 min. counseling No intervention	Victims	Road traffic accident
(Mayou, et al., 2000)	CISD No intervention	Victims	Road traffic accident
(Lee, Slade, & Lygo, 1996)	CISD No intervention	Victims	Miscarriage
(Rose, et al., 1999)	CISD Educational No intervention	Victims	Violent crime
(Shalev, Peri, Rogel-Fuchs, Ursano, & Marlowe, 1998)	Historical debriefing	Soldiers	Combat exposure

Positive *ES* indicates reduction in PTSD symptoms at outcome measure vs. pre-intervention measure. Adapted from van Emmerik and colleagues (van Emmerik, et al., 2002)
[1]IES = Impact of Events Scale; HADS-A & D = Hospital Anxiety and Depression Scale; STAI-S= Spielberger State-Train Anxiety Inventory (state anxiety); CAPS = clinician administered PTSD scale; BSI = Brief Symptom Inventory; PSS = PTSD symptom scale. For more on measures see Appendix F.
[3]used in this dissertation meta-analysis

While it is difficult to interpret either meta-analysis, it is even more difficult to compare the group difference effect sizes with the pre-post effect sizes. The meta-analytic methods differences and lack of reported data make comparison moot, even when the same source studies were used.

CHAPTER IV

METHODS

This chapter presents the meta-analytic methods for examining the effects of Psychological Debriefing (PD) on distress experienced by FRs after an event. This section includes descriptions of: eligibility criteria for studies, search for eligible studies and a report of the results of that search, study coding (including protocol established to determine within-group equivalence), effect size calculation methods, and the analysis plan.

Eligibility Criteria

This section describes eligibility requirements for: Psychological Debriefing (PD) interventions; subjects; high-risk (critical) events; study designs; and defines outcome constructs.

Psychological debriefings must be described as "psychological" vs. educational in nature.

Subjects must be FRs (FRs) including, but not limited to, police, fire fighters (professional and volunteer), and EMTs (including paramedics and emergency medical services) and other groups that have been trained to assist in high-risk events (e.g., search and rescue and medical personnel). Eligible FRs must have "participated in a high-risk (critical) event where he/she was threatened with death, others were threatened with death or killed, or where there was a threat of or actual injury incurred by self or others". This is the second criterion from the *DSM IV-TR* for diagnosis of ASD and PTSD (American Psychiatric Association (APA), 2009a).

High-risk events are defined by the fact that a PD was offered after the event. The scope of the high-risk event may be large: manmade disasters (e.g., plane crashes, ship collisions, multiple auto traffic accidents, mass shootings, oil rig collapses; natural disasters (e.g., tornados,

hurricanes, earthquakes, storms at sea; terrorism (e.g., Oklahoma City, World Trade Center, 9/11); or limited: involves only a few people, does not affect entire civilian community (e.g., normal First Responder calls) and lasted for a short time period (usually one day or less), where either department policy, authorities in charge, or FRs deemed that the incident warranted a PD.

Eligible studies must have a PD and comparison group where participants who attended a PD are compared to those who did not attend a PD. There must be sufficient reported data on outcome measures to calculate a standardized mean effect size (preferably the first assessment conducted after the PD). Effect sizes must represent one time point of assessment. For example, studies only reporting outcome data in aggregate form over more than one assessment are not eligible (e.g., an average of outcomes at one week and one month post PD (Jenkins, 1996)).

Eligible outcomes are measures of distress (symptom number and/or severity) of a psychological or physical nature experienced after the critical event (e.g., dissociation, anxiety, hyperarousal, depression, sleep and/or eating dysfunction, anger). There are studies and literature on coping and two studies measured maladaptive coping skills. However, while an argument could be made that maladaptive coping is a symptom of distress, I have not deemed these measures as eligible per Leonard who makes the point that coping mechanisms "should not be confused with outcome measures" (see Leonard & Alison, 1999, p. 145).

Search for Eligible Studies

Eligible studies were identified via a multi-pronged search strategy. A comprehensive range of electronic databases, relevant professional associations, and journals were searched. Reference lists of all identified documents of interest were searched manually.

Key search terms and their variants used to search electronic databases included, but were not limited to: debrief*; PTSD or Acute Stress Disorder; PD types (e.g., CISD, CISM);

psychological and/or physical distress symptoms (e.g., depression, sleeplessness, hypervigilance, etc.); and FRs (police, law enforcement, officers, EMTs, paramedics, ambulance workers, fire fighters, fire fighters, search and rescue workers, emergency workers, medical personnel trained in disaster or high-risk event on-site response, etc.). In each database, the specific search aids available were used where feasible (e.g., keywords, MeSH terms, limitations).

Electronic databases searched included, but were not limited to: PubMed (Medline), PsycINFO (includes PILOTS), CINAHL, Social Services Abstracts, Web of Knowledge, Google Scholar, and the databases available via ProQuest (e.g., Dissertation Abstracts International, and PQDT which offers free full text dissertations and theses). Relevant professional associations searched included, but were not limited to: Society for Prevention Research, American Evaluation Association, International Critical Incident Stress Foundation, Inc.). Finally, the tables of contents of relevant journals were reviewed. These journals included, but were not limited to: *International Journal of Emergency Mental Health*, *Journal of Traumatic Stress*, *American Journal of Psychiatry*.

This literature search process yielded 16 eligible studies published or accepted (dissertations and theses) from 1988 through 2011. These studies reported on 2,920 FRs assessed for the outcome of distress after involvement in a high-risk event. . All studies had at least two groups of FRs where one group attended a PD and a comparison group did not. See Appendix C for examples of searches and search strategies.

Study Coding

Variables coded describe the characteristics of the studies themselves (including whether PD was a primary focus of the study); subject demographics of age, gender, race/ethnicity, marital status, measures of risk (self-reported and observed) during the high-risk event.

Characteristics of the PD included: protocol type; PD leader training received, peer or professional mental health person, and number of leaders; whether PD attendance was mandatory or voluntary; who determined the need for the PD. High-risk event descriptors included were: scope (large—natural disaster, riot, plane crash; or limited—apprehension of suspect, house fire); location of event by country; year the event took place. Method characteristics coded included measures, time from event to the PD and assessment, and within-study group equivalence. The codebook is provided in Appendix B.

Coding for within-study PD and comparison group equivalence was done on four categories for each study and entered into a rating form (see Figure 9, categories in boldface). To determine overall group equivalence for each study, I combined the equivalence ratings for the four categories. When equivalence within categories or among categories in a single study resulted in disparate results, I erred on the side of rating them not equivalent. All equivalence rating tables are shown in Appendix D.

Study 138 (#12 in Dissertation)
(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment (Tx) *n* = 82	Control *n* = 32	Total / ES for Group Difference *N* = 114	Group Equivalence
Demographics				**Not Equiv. est.**
Age	*M*=31.9 *SD*=9.8 (17-66)	*M*=28.8 *SD*=5.4 (20-40)	*M*=31 *ES* = .35	NEQ Tx older Tx<risk
Sex	85% male	97% male	*ES* = .43	NEQ Tx >female Tx>risk
Race	94% white	88% white	*ES* = .21	NEQ Tx >white
Education	51% high school or more	47% high school or more	*ES* = .08	EQ
Marital Status	60% married	53% married	*ES* = .14	EQ
Income	71% 10-29K	63% 10-29K	*ES* = .17	EQ
Job				**Not Reported**
Years on Job	nr	nr	nr	nr
Job Rank	nr	nr	nr	nr
Event Specific				**Not Equiv. est.**
Measure of Stress	*M*=6	*M*=4.03	*t*= -4.19, *DF*=112, *p*=.001	NEQTx >stress Tx>risk
Threat description	nr	nr	nr	nr
Work Performed	nr	nr	nr	nr
Mental/Physical Health				**Not Reported**
Number of Prior Events	nr	nr	nr	nr
Time Frame of Prior Events	nr	nr	nr	nr
Sick days previous year	nr	nr	nr	nr
Previous Mental Health	nr	nr	nr	nr
RATED GROUP EQUIVALENCE				**NOT EQUIV. est.**

Figure 9. Sample Within-Study Group Equivalence Rating Table

Calculating Effect Size

The type of effect size used in this meta-analysis is the standardized mean difference (Cohen's *d*). The effect size represents the direction and magnitude of the difference in psychological and physical distress between FRs attending a PD and those not attending as reported by FRs during the first assessment after the PD. All effect sizes were configured so that

a positive result indicates that the PD participants reported less distress than the group that did not attend a PD. FRs attended one PD in 14 studies; subjects in Study 7 attended an average of 1.5, and subjects in Study 10 attended an average of 1.2 PDs before the assessment. Only Study 3 reported an assessment after FRs had attended additional PD sessions.

All raw effect sizes were derived from data reported in the source studies. These data were reported in a range of numeric formats (predominantly continuous or dichotomous), variants of measures (e.g., multiple measures, subscales of single measures, and breakouts for categories of PD subjects (e.g., high vs. low initial distress)) for a single measure. Additionally, the design of the studies typically yielded only post-test or follow-up results, although one study did report pre-test results. All calculations to obtain the standardized mean difference (Cohen's *d*) effect size (*rawES*) were done using Wilson's *Practical Meta-Analysis Effect Size Calculator* (http://gemini.gmu.edu/cebcp/EffectSizeCalculator/index.html).

Continuous Data

The formula for calculating the standardized mean difference (Cohen's *d*) effect size ($rawES_{sm}$) is:

$$rawES_{sm} = \frac{\bar{X}_{PD} - \bar{X}_{NPD}}{SD_p}$$

where $Xbar_{PD}$ is the mean score of the group who attended the PD and $Xbar_{NPD}$ is the mean score of the group who did not attend. SD_p is the pooled standard deviation of the two groups as defined in the following equation:

$$SD_p = \sqrt{\frac{(n_{PD} - 1)SD_{PD}^2 + (n_{NPD} - 1)SD_{NPD}^2}{n_{PD} + n_{NPD} - 2}}$$

where n_{PD} is the number of subjects in the PD group and n_{NPD} is the number of subjects in the nonPD group (group not attending PD), SD_{PD} is the standard deviation for the PD group and SD_{NPD} is the standard deviation for the nonPD group.

Dichotomous Data

Two studies only reported dichotomous data. These data are most precisely represented by an odds ratio effect size type rather than the standardized mean difference effect size used in this meta-analysis. However, these two types of effect sizes are not "numerically comparable" (Lipsey & Wilson, 2001). Fortunately, it is acceptable to calculate a standardized mean effect size from dichotomous data when the dichotomized dependent variable construct (in this case level of distress) was derived from a continuous measure as they were in these two studies (Lipsey & Wilson, 2001). This is done by using a transformation (logit, Cox Logit, probit, or arcsine) to estimate the data required to compute a standardized mean difference effect size. Each of these transformations has pros and cons. I used the probit transformation reported by Wilson's calculator (Wilson) to obtain the *rawES*. The probit method is best for this meta-analysis as it is an excellent estimate if a) the underlying distribution is normal, or b) the cut points for the dichotomous variables are in the tail portion of a skewed distribution as they are in these two studies (i.e., an already distressed sample expected to score higher than the norm with the cut points made at the high end of the distribution to determine PTSD caseness or a high likelihood of PTSD caseness) (Lipsey & Wilson, 2001).

Effect Size Adjusted for Pre-Test

Only one study administered both pre- and post-tests to the PD and comparison groups using the state anxiety subscale from the State-Trait Anxiety Inventory (STAI) (Spielberger, et

al., 1983). I derived the *rawES* for this study by subtracting the pre-test *rawES* from the post-test *rawES*. This form of effect size is preferred because it takes into account the potential differences between the groups being compared prior to participating in experimental conditions.

Multiple Measures, Subscales, and Categories within a Study

If more than one eligible measure was reported, a *rawES* was calculated for each measure and then an average *rawES* was calculated for the study. If only individual subscales were reported for a measure, then a *rawES* was calculated for each subscale and an average *rawES* was calculated for the measure. Two studies reported data for study-defined categories of subjects (e.g., different levels of scoring) for a single outcome measure. I used a calculator in Excel obtained from Mark Lipsey (personal communication) to obtain a combined mean and standard deviation (which includes the between categories variance) for the PD group and the comparison group. I then used the combined data to calculate the *rawES*.

Adjustments to Effect Sizes

Once the raw effect size for each study was calculated, I used Tukey's rule to identify any outliers in the *rawES* distribution and found one which I winsorized. I then adjusted all effect sizes for small sample bias

Effect Size Outliers

I first conducted a visual inspection for outliers in the distribution of unadjusted or raw study effect sizes (*rawES*) and noted one likely outlier. I used Tukey's rule to confirm outlier status in the *rawES* data distribution (Hoaglin, Mosteller, & Tukey, 1983). Tukey's rule

identifies *true* and *suspected* outlier parameters[11] (Y_t and Y_s, respectively). True outlier parameters are established by using the interquartile range (*IQR*) which is defined as the difference between the first or lowest quartile value (*Q1*) and third quartile value (*Q3*) or *Q3* - *Q1* of the raw effect size distribution (true outlier formulae are: lower is $Y_t < (Q1 - 3 * IQR)$; upper is $Y_t > (Q3 + 3 * IQR)$). The rule for suspected outliers relaxes the criteria to one and a half times the *IQR* (suspected outlier formulae are: lower is $Y_s < (Q1 - 1.5 * IQR)$; upper is $Y_s > (Q3 + 1.5 * IQR)$).

I used the Excel© quartile function to determine quartile values for the *rawES* data in this meta-analysis (*Q1* = -.17; *Q3* = .41; and *IQR* = .58). According to Tukey's rule, true outliers for this meta-analysis, *rawES* less than -1.90 or more than 2.15; suspected outlier values are less than -1.03 or more than 1.28.

According to the values obtained using Tukey's rule, the outlier I identified initially met the true outlier criteria (Study 1, *rawES* = 2.16). I re-examined this study and confirmed that there was nothing about the reported statistics that was questionable, nor was there anything about the measures, methods, sample, or event that would warrant excluding the study. I Winsorized[12] this *rawES* to 1.28, just within the limit of Tukey's rule for suspected outliers, in order to keep it from unduly influencing analyses.

[11] I am using Tukey's term *true* outlier as I am using his algorithm. However, the use of the term *true* implies Tukey's algorithm is definitive which is not the case, it is an estimate. Therefore, it may be more prudent to read *true* as an estimated outer bound for outliers that are so far away from the main distribution that they are likely to be unduly influenced by chance.

[12] Winsorizing (reassigning extreme *ES* values to a value that maintains their direction, but decreases their magnitude to be closer to the bulk of the distribution) is commonly used in the natural sciences. Extreme *ES* outliers may be due to chance and therefore would not be predictable in a model. For further explanation (see Shadish Jr., 1992, p 155-156).

Small Sample Bias Correction

The *rawES* has been found to be "upwardly biased" for small sample sizes (Lipsey & Wilson, 2001) and thus should be adjusted. Hedges provides this adjustment (Hedges, 1981; Hedges & Olkin, 1985) which is used for the standardized mean effect size.

Small Sample Bias

$$ES_{sm} = \left(1 - \frac{3}{4N - 9}\right) rawES_{sm}$$

where *N* is the total number of subjects in both PD and no PD (NPD) groups;

Calculating Variance and Weight

Following are the formulae and methods for calculating variance due to subject sampling error, random error variance, and the inverse variance weight for use in a random effects model of analysis. All of these formulae and information are from Lipsey and Wilson (Lipsey & Wilson, 2001) and meta-analytic modules from Stata®.

Standard Error

$$se_{ESsm} = \sqrt{\frac{(n_{PD} + n_{NPD})}{n_{PD} n_{NPD}} + \frac{(rawES_{sm})^2}{2(n_{PD} + n_{NPD})}}$$

Variance (v_s) due to subject sampling error

$$v_s = se^2_{ESsm}$$

The Random Effects Model assumes there is also variance in the distribution of study effect sizes due to sources of variability other than subject sampling error (v_s), and that this random error variance (v_r) is randomly distributed. Thus the variance of each study effect size must include both v_s and v_r.

As one can see from the formula above for the standard error, v_s is based largely on the sample size with some influence from the raw effect size. In other words, generally those studies with larger populations have a more precise effect size. By weighting each study effect size by the inverse of its variance (se^2) those effect sizes from studies with smaller standard errors have larger weights assigned to them. The random effects model inverse variance weight[13] for each effect size *i* is:

$$w_i = \frac{1}{v_s + v_r}$$

Analysis Plan

This meta-analysis was conducted using a random effects model. This model assumes part of the variance in the distribution of study effect sizes is randomly distributed and cannot be explained by coded variables and subject sampling error. Random effects is the appropriate choice for this population of studies due to the heterogeneity in the context of the high-risk event, and methods in the source studies. Furthermore, a random effects model allows for a more generalizable interpretation of results than a fixed model.

Following are the methods I used in this descriptive meta-analysis to ascertain if there is any detectable evidence that the group of studies used in this meta-analysis suffers from publication bias, and whether or not any single study exhibits undue influence. Next I explain the reporting of the descriptive results for characteristics of the studies, subjects, PDs, high-risk events, and the method characteristics of the timing of PDs and outcome assessments, and the

[13] In this meta-analysis, the random error variance is estimated by STATA using the restricted maximum likelihood estimate of between study variance for random effects analysis.

constructs of outcome measures. I then describe the method used to detect the effect of within-study group equivalence.

Publication Bias and Single Study Influence Analysis

One of the most widely recognized reasons for publication bias arises because studies that find results that are not significant are less likely to be submitted for publication, and when submitted, are less likely to be accepted. The underlying assumption is that this inability to find statistical significance is often due to small study size (i.e., lacks statistical power). Thus, this type of publication bias is often thought of as "small sample study bias." In an effort to minimize this type of publication bias in this meta-analysis, I included nonpeer reviewed journals and dissertations and theses in my search to try and ensure that the distribution of effect sizes is as representative as possible of the full range of study on this topic. It is important to note that there are other causes of publication bias. For example there may be a reluctance to publish studies that challenge the status quo or are based on new theories in the field.

To estimate whether or not the studies in this meta-analysis may suffer from small sample bias, I used the Egger test[14] (Egger, Smith, Schneider, & Minder, 1997; Harbord, Harris, & Sterne, 2009) and show a funnel plot (Begg & Mazumdar, 1994). In the absence of small sample bias the distribution of study effect sizes will be distributed symmetrically around the grand mean effect size (funnel plot) or zero. The funnel plot displays the precision (using standard error) as a function of ranked study effect sizes and assumes that in the absence of publication bias, the studies will be distributed symmetrically around the grand mean effect size. The Egger test (Egger, et al., 1997) is a refinement of the traditional funnel plot, in that it defines precision

[14] STATA "Metabias ES_{sm} *se*, egger graph"

as the inverse of the standard error and uses actual effect sizes rather than ranks, and has reasonable statistical power when applied to at least 10 studies.

I also checked for publication bias using the Duval and Tweedie (Duval & Tweedie, 2000) trim and fill method.[15] This method estimates the number and outcome of missing studies and provides a new grand mean effect size inclusive of the estimated missing studies (Steichen, 2009).

It is also possible that the effect size of one or more studies may be exerting undue influence on the grand mean effect size. To test this I calculated[16] a new grand mean ES_{sm} with each one of the studies removed, one at a time.

Descriptor Analysis

In this section I present descriptor characteristics of the studies, subjects, PDs, high-risk events, and the methodology characteristics of the timing of PDs and outcome assessments, and the constructs of outcome measures. For each descriptor I give a brief overview, and report the number of studies (*k*), the number of FRs (*n*), and the percent of all FRs (% of *N*) that share that characteristic.

Within-Study Group Equivalence

In order to assess whether within-study group equivalence was a possible confound, I conducted four bivariate regressions[17] to obtain "meta-correlations" (a correlation that is weighted by the inverse variance weight for a random effects model). These meta-correlations

[15] Metatrim from Stata
[16] STATA metaninf
[17] metareg command in STATA

provided correlation coefficients between the effect sizes and each of the four variables representing the four categories of group equivalence (demographics; years on the job; event specific stress/threat/type and time on site; and mental and physical health). Missing data was imputed for each of the four variables using the average of the coder rated equivalence data that was reported (e.g., 2 = equivalent, 1 = not equivalent).

Identifying Moderators

Criteria for identifying moderators are that the subcategories of a descriptor are heterogeneous according to the Q between statistic, or, as the Q between statistic has low power for the small numbers of studies, if the I^2 is large (approximately 75% or more. Furthermore, due to the large amount of missing data, I determined that at least half (N = 8) of the studies must have reported results on a possible moderator for it to be considered.

All of these descriptive analyses were done using Stata meta-analysis modules and meta-analysis statistical modules provided by David Wilson (2006) using random effects analysis. A 90% confidence interval was used due to the small number of studies.

CHAPTER V

RESULTS

In this section I report the grand mean effect size for distress in FRs. I then provide an overview of the 16 studies used in this meta-analysis in Table 3a. Table 3b shows the ES_{sm} and the constructs used to measure distress for each study. Next I report the results of tests of publication bias and single study influence. Due to the high incidence of nonreporting of descriptor characteristics, I present an overview of missing data, and then present descriptive results at the study level; for FRs; the PD; the high-risk event; and length of time between the event and the PD and outcome assessment. I then describe the reporting of within-study equivalence characteristics, and report results of within-study group equivalence as a possible confound. I then present relevant statistics on potential moderators. Finally, I present results from studies that had outcome assessments data after two PDs.

Grand Mean Effect Size for Distress

The grand mean effect size across the 16 studies representing 2,920 FRs (FRs) was ES_{sm} = .11 (*90% CI* -.05 to .27), a small, positive effect in favor of PD lowering distress, however this result was not statistically significant. The homogeneity analyses Q = 73.62, df = 15, p = .00, I^2 [18] = 79.6% indicate there is variation among the studies other than would be expected from subject level sampling error alone. Figure 10 shows the distribution of study effect sizes, ordered by magnitude, and the 90% confidence interval. Positive effect sizes

[18] $I^2 = (Q - df) / Q$ (Higgins & Thompson, 2002). A finding of a negative number is changed to 0% and means that there is no heterogeneity other than that due to sampling error.

indicate that the PD attendees reported less distress than the comparison group, while negative effect sizes indicate the PD attendees reported more distress than the comparison group. The ES_{sm} for Study 3 was the only effect size adjusted by a pretest.

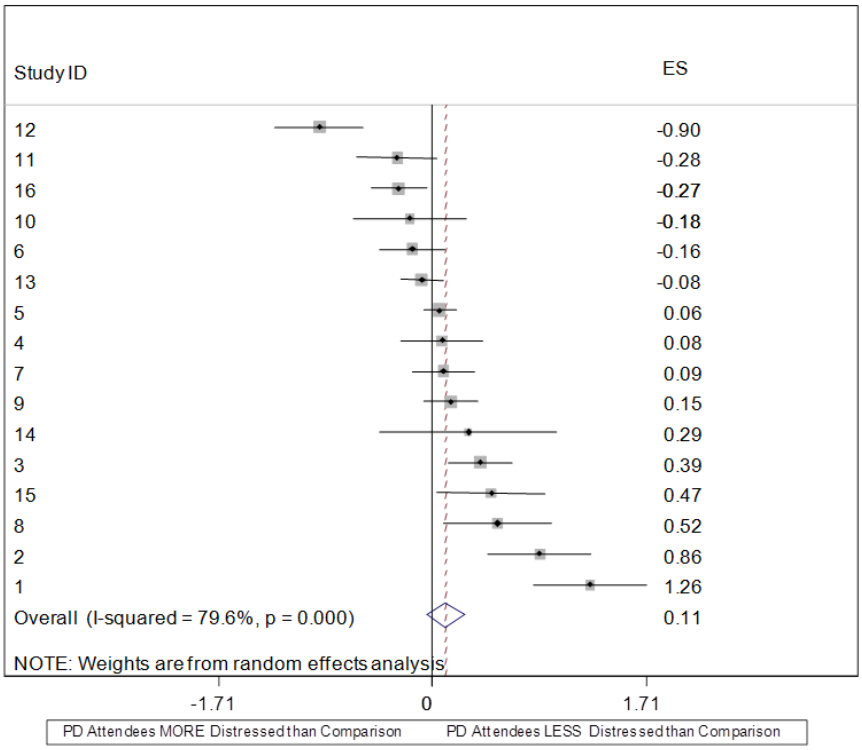

Figure 10. Forest Plot of ES_{sm} for Each Study.

An overview of the studies in this meta-analysis can be found in Table 3a which reports author and year of study publication, the year and type of high-risk event, FR type, mean age, percent male, and total number of study participants. The next table (Table 3b) reports the ES_{sm} and type of distress measured for each study.

Table 3a. Overview of Studies: Event, PD, and Demographic Descriptors

Study ID	Author (Pub. Year)	Event Year	Event Type[a]	PD Type[b]	FR Type[c]	Mean Age	% Male	*N*[d]
1.	Bohl (1988)	1987	Limited	CISD-like	Fire fighter	28	1.00	65
2.	Bohl (1991)	1987	Limited	CISD-like	Police	31	1.00	71
3.	Carlier, et al (2000)	--[e]	--	CISD	Police	30	.68	168
4.	Carlier, et al. (1998)	1992	Crash, Plane	CISD	Police	37	.81	105
5.	Harris et al (2002)	1997	--	CISD	Fire fighter	--	.97	660
6.	Kuykendall (2011)	--	--	--	Police	--	--	171
7.	Kenardy, et al (1996)	1989	Earthquake	--	Mixed	--	.62	195
8.	Leonard & Alison (1999)	--	Limited	CISD	Police	--	1.00	60
9.	McFarlane (1988)	1983	Fire, Bush	--	Fire fighter	35	--	315
10.	Redburn (1992)	1989	Crash, Plane	CISD	Fire fighter	43	1.00	55
11.	Regehr & Hill (2000)	--	--	CISD-like	Fire fighter	38	.--	127
12.	Rogers (1993)	1990	Limited	CISD-like	Mixed	31	.89	114
13.	Stephens (1997)	--	--	--	Police	35	.89	507
14.	Warren (1995)	1991	Crash, Auto	CISD	EMT	27	.91	23
15.	Wee, et al. (1999)	1992	Riot	CISD	EMT	--	.--	65
16.	Woods (2007)	2006	--	CISD	Mixed	35	.77	219

[a] Event types: limited scope = varied high-risk events: e.g., personal injury, seeing and/or causing death/injury (colleague/civilian), failed rescue, bad accidents, being prosecuted, firearm involvement.

[b] Psychological debriefing types: CISD Critical Incident Stress Debriefing 7 stage protocol; CISD-like followed a shortened or otherwise modified CISD protocol.

[c] First Responder types: Mixed (includes FR types and counselors, nurses, rescue workers, and other medical personnel); EMT emergency medical technicians and paramedics.

[d] Total number of subjects

[e] Information not reported.

Table 3b. Overview of Studies: Effect Size and Type of Distress Measured

Study ID, Author (Pub. Year)		ES_{sm}	Distress Measured
1.	Bohl (1988)	1.26 [a]	Depression, state anxiety
2.	Bohl (1991)	.86 [a]	Depression, state anxiety, anger, and trauma symptoms (nightmares, flashbacks, difficulty with sleep and/or eating)
3.	Carlier, et al (2000)	.39 [a, c]	State anxiety
4.	Carlier, et al. (1998)	.08	PTSD diagnostic criteria [b]
5.	Harris et al (2002)	.06	Depression, anxiety, avoidance, intrusion
6.	Kuykendall (2011)	-.16	Avoidance, intrusion, hyperarousal
7.	Kenardy, et al (1996)	.09	Avoidance, intrusion, Psychiatric impairment
8.	Leonard & Alison (1999)	.52 [a]	State anger, trait anger, anger expression
9.	McFarlane (1988)	.15	Psychiatric impairment
10.	Redburn (1992)	-.18	Psychological distress, subject's perceived physical health
11.	Regehr & Hill (2000)	-.28	Depression, avoidance, intrusion
12.	Rogers (1993)	.91 [a]	Avoidance, intrusion, cognitive/emotional stress
13.	Stephens (1997)	-.08	PTSD diagnostic criteria [b]
14.	Warren (1995)	.29	PTSD symptoms
15.	Wee, et al. (1999)	.47	PTSD diagnostic criteria [b]
16.	Woods (2007)	-.27 [a]	General distress and adjustment problems

[a] p<= .10; [b] per the APA Diagnostic and Statistical Manual; [c] ES_{sm} adjusted for pretest

Publication Bias and Single Study Influence

Publication Bias

The Egger test[19] was not significant indicating there is little risk of this meta-analysis suffering from publication bias. Figure 11 depicts a funnel plot showing the study effect sizes in this meta-analysis plotted against each study's effect size precision (standard error), with the less precise effect sizes (studies with smaller samples thus larger standard errors) at the bottom.

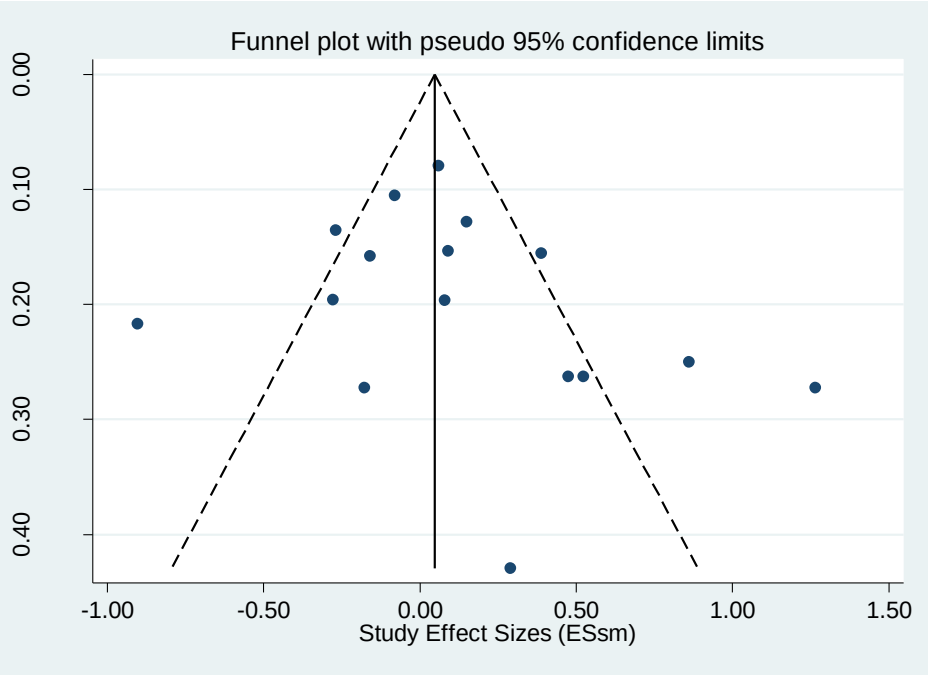

Figure 11. Funnel Plot Showing Each Study ES_{sm} Plotted Against Its Standard Error.

[19] "Metabias ES_{sm} *se*, egger graph" from Stata. null hypothesis is no small study effects

Another check for publication bias is the Duval and Tweedie (2000) trim and fill method[20]. The results again show little evidence for the presence of publication bias in this set of studies. There were two iterations and no trimming was performed leaving the number of studies and thus the data unchanged with the estimate of the grand mean effect size unchanged at .11, with a *95% CI* of -.08 to 30.

Single Study Influence

In order to check for the undue influence of any one study, I calculated the grand mean effect size 15 times[21], each time removing a different study effect size from the effect size distribution. The removal of any one study did not unduly influence the grand mean effect size of ES_{sm} = .11 (*90% CI* -.05 to .27). The lowest grand mean effect size occurred when Study 1 was removed (ES_{sm} = .04, *90% CI* -.12 to .21), and the highest when Study 12 was omitted (ES_{sm} = .16, *90% CI* -.01 to .33).

One study (Jenkins, 1996) was dropped for violating the eligibility requirement that effect sizes must represent only one time point of assessment after the PD. In light of the findings above, this most likely does not result in underreported data due to selective reporting.

Descriptive Results

This section describes the information of interest available from the 16 studies (K = 16) in this meta-analysis to explore if there was enough data reported to assess the effectiveness of PD. First I present a list of descriptors and which studies reported them. I then report descriptive statistics for all descriptors where at least nine of the sixteen studies reported data. Each table

[20] Metatrim from Stata
[21] Metainf from Stata

shows the descriptors, the number of studies (*k*) , the number of FR subjects (*n*), and the percent of the total number of subjects (% of *N*) represented in each subgroup of the descriptor.

Then, because none of the studies used random assignment of subjects, I show an overview of the pattern of reported and missing data for subject descriptors for determining PD and comparison group equivalence, and report effect sizes for all of the characteristics of interest in terms of whether the within-study groups were equivalent, not equivalent, or equivalence was not reported.

Overview of Unreported Data

While all studies reported study level information, one can see from Table 4 that only three studies reported all descriptors. The difference in the scope of the event that precipitated the PD was impossible to determine in seven studies, and five of those seven studies failed to report the year the event took place. In terms of describing the PD, ten studies did not report all information of interest. The time elapsed between the event and the PD, and the event and the measure was reported by ten studies. Of the remaining six studies, two reported the time between the event and PD, two reported the time between the event and the measure, and two did not report any timing information (see Figure 12 for a graphic representation of reporting of timing of PD and outcome measure ordered by ES_{sm}).

Table 4. Descriptor Reporting by Study (K = 16); (N = 2,920)

Study ID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Descriptors	● Reported; ○ Not Reported															
Study Level																
Publication Year	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Publication Type	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Author Discipline	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Event																
Scope	●	●	○	●	○	○	●	●	●	●	○	○	○	●	●	○
Year	●	●	○	●	●	○	●	○	●	●	○	●	○	●	●	●
Location	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Psychological Debriefing																
Type[1]	●	●	●	●	●	○	○	●	○	●	●	●	○	●	●	●
Format[2]	●	●	●	●	●	○	○	●	○	●	●	●	○	○	●	○
Leader[3]	●	●	●	●	○	○	○	●	○	●	○	●	○	○	●	○
Attendance[4]	●	●	●	●	○	○	○	●	○	○	○	●	●	●	●	●
Need[5]	●	●	●	●	●	○	○	●	○	●	○	●	●	○	○	●
Time Elapsed from																
Event to PD	●	●	●	●	●	○	○	●	○	●	○	●	●	●	●	●
Event to Measure	●	●	●	●	○	○	●	○	●	●	○	●	●	●	●	●

[1]CISD, CISD-like; [2]group, individual, both; [3]mental health professional, peer, both;
[4] voluntary or mandatory; [5]Department or FRs decide

Study Level Descriptive Results

The majority of the 16 studies in this meta-analysis were journal articles published before 2000, and were authored by researchers in psychology or psychiatry. Psychological debriefing was the primary focus of 14 studies (see Table 5). Note: throughout the tables in this meta-analysis K and N = the total number of studies and FRs, respectively; k and n = the subset of K and N represented in the category.

Table 5. Study Level Descriptors (K = 16); (N = 2,920)

Study Descriptors	Studies *k*	FRs *n*	% of *N*
Publication Year			
1988-1993	5	620	21
1995-1999	6	955	33
2000-2011	5	1,345	46
Publication Type			
Journal Article	9	2,202	75
Dissertation/Master's Thesis	7	718	25
Author Discipline			
Psychology/Psychiatry	12	1,954	67
Other (Social work or Education)	4	966	33
PD is Study Focus			
Yes	14	2,550	87
No	2	370	13

First Responder Descriptors

Fire fighters and police were represented in 10 studies (k) each comprising 56% of the total sample with almost twice as many police represented as fire fighters. In the studies reporting age (k = 11, n = 1,769), EMTs were the youngest (27 years), Fire fighters were the oldest (36), and both the Police and Mixed groups had an average age of 33. There were no female fire fighters reported in these studies. There were a total of 288 or 15% women in the studies reporting on gender (k = 12, n = 2,242). While more than half of the studies reported the number of women, there were too few women participating in the source studies to conduct further analysis. In the studies reporting marital status (k = 9, n = 1,799), EMTs were more likely to be married (77%) than police, fire fighters, and EMTs (63%, 61%, and 59%, respectively). Fire fighters had an average of 11 years on the job, police had 9.3, and the EMTs an average of 8.2 years (k = 9, n = 1,781). See Table 6 for further details about subject descriptors.

Other information about subjects was reported by less than half (k = 7) of the studies. These descriptors are FR race, education level, income, job rank, self-reported stress from the high-risk event, severity of high-risk event threat, type and length of work at event, number of prior high-risk events, when these prior high-risk events took place, sick days during the prior year, and any prior mental health treatment. The statistics for these descriptors are shown in Appendix E. For a complete breakdown of how studies reported all subject descriptors (by group, for total sample only, author stated equivalence, not reported), see Appendix D.

Table 6. Subject Descriptors (K = 16); (N = 2,920)

FR Descriptors	Studies *k*	FRs *n*	% of *N*
First Responder Type			
Fire fighters	4	562	19
Police	6	1,082	37
EMTs	3	748	26
Mixed[1]	3	528	18
Age			
Mean Age < 35	5	441	15
Mean Age >=35	6	1,328	45
Not reported	5	1,151	39
Gender			
Almost all male (<=3% female)	5	911	31
Mostly male (>3% female)	7	1,331	46
Not Reported	4	678	23
Percent Married			
Less than 60%	4	469	16
More than or = 60%	5	1,330	46
Not Reported	7	1,121	38
Mean Years on Job			
Less than or equal to 10	4	327	11
More than 10	5	1,454	50
Not Reported	7	1,139	39

Psychological Debriefing Descriptors

The most common and debated about form of PD is Critical Incident Stress Debriefing (CISD) and half of the 16 studies reported following the full CISD protocol. However, when the elements of format and leader are reported, they do not coincide with CISD recommendations. Only three of these eight CISD studies were conducted in groups and lead by a mental health professional and a peer, two of the CISD studies provided individual debriefings, two did not report whether the PD was group or individual, and three did not report who led the group. The Critical Incident Stress Foundation has trained hundreds of peer leaders (usually a-three-day training). CISD proponents often comment on the training, or lack thereof, of leaders in negative studies on CISD. However, even though evaluating PD was the focus of 14 of the 16 studies, only nine reported whether the leader was a peer and/or a mental health professional and only two mentioned the training or background of the leaders.

Whether attendance at the PD was voluntary or mandatory was not reported for the majority of the FRs (k = 6, n = 1,523). Although PD was reported as mandatory in four of the studies, in three of these studies the comparison group consisted of FRs from the same departments who did not attend. Finally, the need for a PD was determined by the FRs' department in seven of the ten studies reporting. See Table 7 for further details about PD descriptors. The length of the PD session was reported by six studies (details in Appendix E).

Table 7. Psychological Debriefing (PD) Descriptors (K = 16); (N = 2,920)

PD Descriptors	Studies *k*	FRs *n*	% of *N*
Type			
CISD	8	1,355	46
CISD-Like	4	377	13
Other	4	1,188	41
Format			
Group	7	1,197	41
Individual	2	228	8
Both	1	65	2
Not Reported	6	1,430	49
Leader			
Professional & Peer	5	507	17
Mental Health Prof. Only	4	703	24
Peer Only	0	0	0
Not Reported	7	1,710	59
Attendance			
Voluntary	6	689	24
Mandatory	4	708	24
Not Reported	6	1,523	52
Need Determination			
By Department	7	1,031	35
By Participants	3	993	34
Not Reported	6	896	31

Event Descriptors

Six of the high-risk events studied were “large scope” disasters. Limited scope events are represented in four studies and included failed rescue, line of duty death, causing death. In six of the studies the event descriptions as reported by study authors allow for the interpretation that some FRs surveyed may have been in large and some in limited scope events. Over half of the studies reported on events in the United States: California (k = 4), and one each in Iowa, Maryland, West Virginia, and the Southeast. The majority of the events took place between 1990 and 1997. See Table 8 for further details about Event Descriptors.

Table 8. Event Descriptors (K = 16); (N = 2,920)

Event Descriptors		Studies *k*	FRs *n*	% of *N*
Type				
	Large scope	6	758	26
	Limited scope	4	310	11
	Not fully reported	6	1,852	63
Location				
	United States	9	1,443	49
	Australia & New Zealand	5	1,204	41
	The Netherlands & Norway	2	273	9
Year				
	1983-1989	5	701	24
	1990-2006	6	1,186	41
	Not Reported	5	1,033	35

Study Methods Descriptors

Timing of Psychological Debriefing and Outcome Assessment

Proponents of CISD recommend that PD occur within 1 to 10 days after a critical event (Everly Jr. & Mitchell, 2012). Eleven studies reported PDs were done within seven days, four studies did not report the timing of the PD and the PD was conducted three months after the critical event in one study. PD proponents say the outcome is to ease distress following a critical event. However, nine of the studies gathered outcome information six weeks or more after the event. See Table 9 for further details about the timing of PD and outcome assessments. It is difficult to assess the effect of PD on distress soon after an event with these studies when, as shown in Figure 12, only three outcome assessments were reported as administered within the first week after the event occurred. The majority of positive effect sizes (those above the red line) are from reported outcome assessments that did not occur until 90 days to two and a half years after the event.

Table 9. Timing Descriptors: Psychological Debriefing (PD) and Outcome Assessment (K = 16); (N = 2,920)

Timing Descriptors	Studies *k*	FRs *n*	% of *N*
Event to PD			
Within 3 days	8	1,259	43
4 to 7 days	3	193	7
3 months	1	660	23
Not Reported	4	808	28
Event to Outcome Assess.			
Within 1 week	3	789	27
1.5 to 3 months	5	443	15
More than 3 months	4	670	23
Not Reported	4	1,018	35

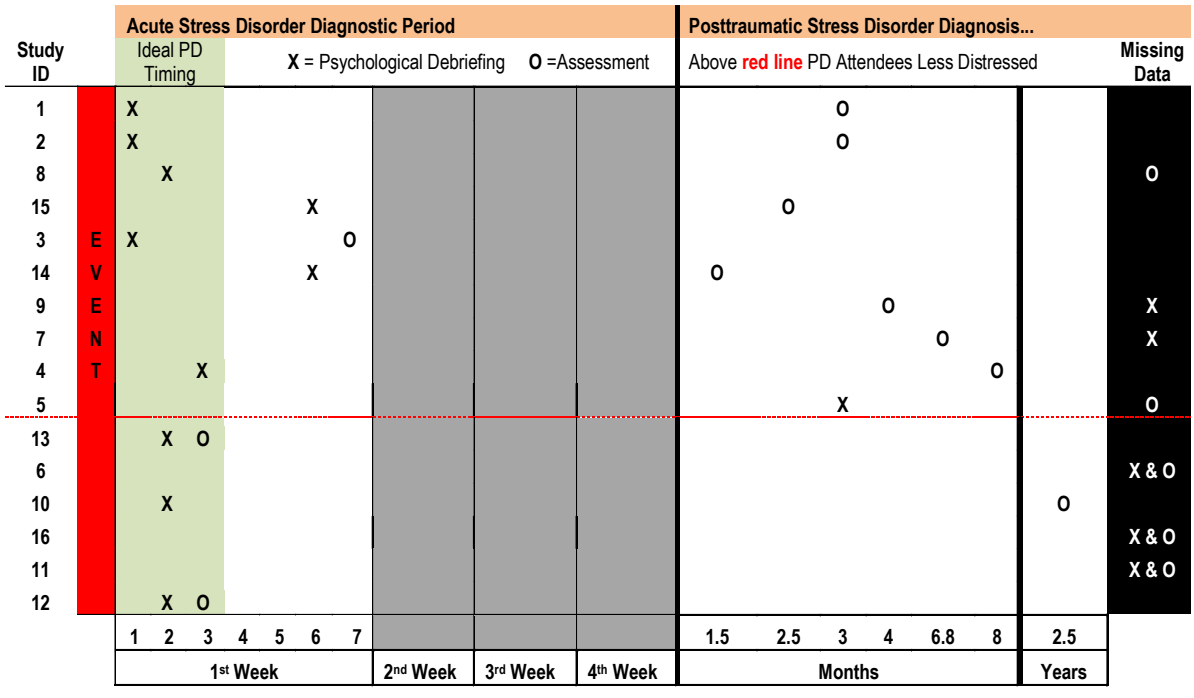

Figure 12. Time from Event to Psychological Debriefing (X) to Outcome Assessment (O) Ordered by ES_{sm} (highest to lowest)

Outcome Assessment Measure Descriptors

Fifteen studies used at least one validated outcome measure (subscale or complete measure) to assess distress. Study 14 used only an author composed questionnaire where the questions about distress were based on DSM-III trauma criteria. Measures used to calculate effect size statistics are listed in Figure 13 (see Appendix F for table of measures used by each study and a table of measure descriptions, citations, and study number). The majority of studies included some measure of PTSD specific distress. More than one measure was used to calculate the effect size in seven studies (Table 10).

Measures Used to Calculate Study Effect Sizes	
Measures of Psychological/Physical Distress	**Measures with PTSD Symptom-Specific Distress**
Beck Depression Inventory (BDI)	Author questionnaire (Study 2)
Brief Symptom Inventory (BSI)(short form SCL-90)	Author derived scale (Study 14)
Everly Stress Inventory	Frederick Reaction Index (FRA-A)
General Health Questionnaire-12 (GHQ-12)	Impact of Events Scale (IES)
Health Perception Questionnaire	Impact of Events Scale-Revised (IES-R)
Hospital Anxiety & Depression Scale (HADS)	Los Angeles Symptom Checklist (LASC) has 1 PTSD subscale included
Novaco Provocation Inventory	Mississippi PTSD Scale-Civilian (M-PTSD-C)
State-Trait Anger Expression Inventory (STAXI)	Self Rating Scale for PTSD
State Trait Anxiety Inventory (STAI)	Structured Interview for PTSD (SCID)

Figure 13. Measures of Psychological/Physical Distress and PTSD Symptom-Specific Distress used to Calculate Study Effect Sizes.

Table 10. Measures Used to Calculate ES_{sm} Descriptors (K = 16); (N = 2,920)

Measures Descriptors	Studies *k*	FRs *n*	% of *N*
Number of Measures			
One	9	1,633	56
Two or more	7	1,287	44
Measure Constructs			
Only PTSD symptom-specific distress	5	871	30
General mental health and/or physical distress	5	663	23
Both types of distress	6	1,386	47

Within-Study Group Equivalence

Because none of the studies in this meta-analysis used a randomized design, I used data reported in each study to determine if the PD and comparison groups were equivalent (see Methods Chapter and Appendix D). This turned out to be a difficult task as few studies reported data by group, and several of the variables deemed important as predictors in the literature (listed in Figure 4) were not reported at all. See Appendix D for description of how PD and comparison groups were formed for each study.

To illustrate the complexity of this task, I first present a visual depiction (Table 11) of if and how subject characteristics were reported (see Appendix E for *k*, *n*, and % of *n* for each descriptor), and then present descriptor results in terms of the equivalence of PD and comparison groups for each study in Table 12.

Table 11. Reporting of Data by PD and Comparison (CO) Group (*K* = 16); (*N* = 2,920)

❷ data reported by PD and CO groups;
◖ author states whether or not PD and CO groups are equivalent;
○data not reported by group

Study ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Variables																
Subject Demographics																
FR Type	❷	❷	❷	❷	❷	❷	❷	❷	❷	❷	❷	❷	❷	❷	❷	❷
Age	○	❷	❷	◖	○	○	◖	○	○	○	○	❷	○	❷	○	○
Gender	❷	❷	❷	◖	◖	❷	❷	❷	○	○	○	❷	○	❷	○	○
% Married	○	○	❷	○	○	○	◖	○	○	○	○	❷	○	○	○	○
Race/Ethnicity	○	○	❷	○	◖	○	○	○	○	○	○	❷	○	○	○	○
Educational Level	◖	❷	○	◖	○	○	❷	○	○	○	○	❷	○	○	○	○
Income	○	○	○	○	○	○	○	○	○	○	○	❷	○	○	○	○
Job Experience																
Years as FR	○	❷	❷	◖	○	○	○	○	○	○	○	○	○	❷	○	○
Job Rank	○	○	❷	◖	○	○	○	◖	○	○	○	○	○	❷	○	○
Event Specific																
Self-Reported Stress/Anxiety	○	○	❷	○	○	○	○	❷	○	○	○	❷	○	○	○	○
Observer-reported threat to FR mortality/morbidity	○	○	◖	◖	○	○	○	❷	○	○	○	○	○	○	○	○
Work Performed (duration, type)	○	○	◖	◖	○	○	○	❷	○	○	○	○	○	❷	○	○
Mental/Physical Health																
Prior Year Sick Days	○	○	❷	○	○	○	○	○	○	○	○	○	○	○	○	○
# of Prior Events	○	❷	❷	◖	○	○	○	◖	○	○	◖	○	○	○	○	○
Prior Events (Timeframe)	○	○	○	○	○	○	○	○	○	○	◖	○	○	○	○	○
Prior Psychological Counseling/ Medication	○	○	❷	◖	○	○	○	○	○	○	○	○	○	○	○	○

Of the four categories of equivalence, none were reported by more than half of the studies. Note in the Overall Rated Equivalence eight studies are listed as not reported, one more than those reported on in Demographics. This is due to one study where although demographics were equivalent, the other three categories were not equivalent (see Table 12).

Table 12. Subject Descriptors Reported by Equivalence (K = 16); (N = 2,920)

Descriptors		Studies *k*	FRs *n*	% of *N*
Demographics				
	Equivalent	5	1,058	36
	Not equivalent	4	403	14
	Not reported	7	1,459	50
Job Experience-Years				
	Equivalent	4	986	34
	Not equivalent	2	191	7
	Not reported	10	1,743	60
Event Descriptors				
	Equivalent	1	105	4
	Not equivalent	4	537	18
	Not reported	11	2,278	78
Mental/Physical Health				
	Equivalent	2	165	6
	Not equivalent	2	239	8
	Not reported	12	2,516	78
Overall Rated Equivalence				
	Equivalent	3	825	28
	Not equivalent	5	571	20
	Not reported	8	1,524	52

Within-Study Group Equivalence as a Possible Confound

In order to investigate whether any of these four equivalence rating variables were correlated with the ES_{sm}, I imputed[22] the missing values for each variable and then standardized[23] the ES_{sm} and the equivalence variables to obtain the standardized β coefficient. I then examined the correlations between the ES_{sm} and each group equivalence variable separately. All correlations were weighted by the inverse of the variance of the ES_{sm} and were obtained using meta-regression.

[22] using ratings of 2=equivalent, 1=not equivalent, I used the mean of studies rated to impute values for missing data
[23] egen "variable" = std("variable") command in STATA

The resulting correlations of the four categories of equivalence with ES_{sm} were small (with the largest being .27; p = .31 for Demographics) and did not reach significance. The largest correlation was obtained between the ES_{sm} and the combined or total of the four equivalence categories and was also not significant (.52, p = .85) (see Table 13). The results of these correlations suggest there is little evidence of a substantial confound in this data set due to issues with group equivalence.

Table 13. Meta-Correlation of Equivalence Categories with Study Effect Sizes

	ES_{sm}	Demo	Job Years	Event Specific	Health	TOTAL
ES_{sm}	1.00	.27 (p = .31)	.01 (p = .98)	.25 (p = .93)	-.17 (p = .54)	.52 (p = .85)

Moderators

In order to explore potential moderators, it is necessary to show that there is more variation between the study effect sizes than can be accounted for due to subject level sampling error alone. The homogeneity analyses results for these 16 studies (Q = 73.62, df = 15, p = .00, I^2 [24] = 79.6%) indicate that there is more variability than would be expected by chance, thus an exploration of potential moderators is warranted to attempt to explain the origin of this excess variance. As shown in Table 14, five of the potential moderator variables (or descriptors) examined had significant differences between the mean effect sizes of the variable's subgroups per the Q-between statistic. These moderators (outlined by boxes in in Table 14) were years as

[24] $I^2 = (Q - df) / Q$ (Higgins & Thompson, 2002). A finding of a negative number is changed to 0% and means that there is no heterogeneity other than that due to sampling error.

an FR, and the PD format (group, individual, both), leader (mental health professional and/or peer) and who determined the need for the PD (the department or the FRs involved).

Demographics of PD Participants Moderators

The significant demographic variable was mean years on the Those studies that reported subjects with fewer years on the job (an average of less than or equal to 10 years) showed the largest PD effects of (ES_{sm} = .71; *90% CI* .41 to 1.00; k = 4) vs. those studies where the subjects had more job experience (a mean of more than 10 years) (ES_{sm} = -.06; *90% CI* -.28 to .16; k = 5).

Psychological Debriefing Moderators

Four moderators were directly related to the characteristics of the PD delivered. The studies that reported using both individual and group format sessions showed the largest effects of PD (ES_{sm} = 1.26; *90% CI* .65 to 1.88; k = 1); the studies that used only individual sessions also showed positive effects of PD (ES_{sm} = .44; *90% CI* .06 to .82; k = 2) vs. the majority of the studies that used group PD sessions only (ES_{sm} = .00; *90% CI* -.21 to .20; k = 7). The second significant PD moderator was the type of leader in terms of training. Those studies that reported the PD was led by a mental health professional showed the largest effects of PD (ES_{sm} = .56; *90% CI* .23 to .89; k = 4) vs. those studies where the PD was led by both a mental health professional and a FR peer (ES_{sm} = -.02; *90% CI* -.32 to .27; k = 5). Third, those PD sessions where FRs were mandated to attend showed the largest effects of PD (ES_{sm} = .55; *90% CI* .22 to .89; k = 1) vs. those PD sessions that were voluntary (ES_{sm} = -.01; *90% CI* -.29 to .26; k = 6). The final moderator of need, when the department determined a PD was necessary showed the largest effects of PD (ES_{sm} = .37; *90% CI* .13 to .60; k = 7) vs. when event FR participants determined they needed a PD (ES_{sm} = -.32; *90% CI* -.65 to .01; k = 3).

Table 14. Potential Moderators (K = 16); (N = 2,920)

	Studies *k*	FRs *n*	% of *N*	ES_{sm}	*CI* 90%	*Q* Between	*df*	*p*
FIRST RESPONDERS								
Type						5.18	3	.16
Fire fighters	4	562	19%	.21	-.13 to .54			
Police	6	1,082	37%	.23	-.03 to .49			
EMTs	3	748	26%	.24	-.16 to .64			
mixed	3	528	18%	-.33	-.69 to .03			
Age						3.06	2	.22
Mean Age < 35	5	441	15%	.35	-.03 to .68			
Mean Age >= 35	6	1,328	45%	-.09	-.36 to .18			
Not Reported	5	1,151	39%	.17	-.14 to .47			
Mean Years on Job						14.17	2	.001
Less than or equal to 10	4	327	11%	.71	.41 to 1.00			
More than 10	5	1,454	50%	-.06	-.28 to .16			
Not Reported	7	1,139	39%	-.04	-.23 to .15			

Table 14. Potential Moderators (K = 16); (N = 2,920) (cont.)

	Studies *k*	FRs *n*	% of *N*	ES_{sm}	*CI* 90%			*Q* Between	*df*	*p*
PSYCHOLOGICAL DEBRIEFING										
Type								.44	2	.80
CISD	8	1,355	46%	.15	-.12	to	.42			
CISD-Like	4	377	13%	.19	-.20	to	.57			
Other	4	1,188	41%	-.00	-.35	to	.35			
Format								13.85	3	.00
Group	7	1,197	41%	-.00	-.21	to	.20			
Individual	2	228	8%	.44	.06	to	.82			
Both	1	65	2%	1.26	.65	to	1.88			
Not Reported	6	1,430	49%	-.03	-.24	to	.17			
Leader								6.69	2	.05
Professional & Peer	5	507	17%	-.02	-.32	to	.27			
Mental Health Prof. Only	4	703	24%	.56	.23	to	.89			
Not Reported	7	1,710	59%	-.04	-.27	to	.20			
Attendance								6.30	2	.04
Voluntary	6	689	24%	-.01	-.29	to	.26			
Mandatory	4	708	24%	.55	.22	to	.89			
Not Reported	6	1,523	52%	.04	-.29	to	.21			
Need Determination								7.93	2	.02
By Department	7	1,031	35%	.37	.13	to	.60			
By Participants	3	993	34%	-.32	-.65	to	.01			
Not Reported	6	896	31%	.06	-.19	to	.31			

Table 14. Potential Moderators (K = 16); (N = 2,920) (cont.)

	Studies *k*	FRs *n*	% of *N*	ES_{sm}	*CI* 90%	*Q* Betw.	*df*	*p*
EVENT								
Type						2.65	2	.27
Large Scope	6	758	26%	.14	-.16 to .44			
Limited Scope	4	310	11%	.40	.03 to .77			
Not Fully Reported	6	1,852	63%	-.05	-.32 to .21			
Year						3.86	2	.15
1983-1989	5	701	24%	.40	.10 to .70			
1990-2006	6	1,186	41%	-.08	-.36 to .20			
Not Reported	5	1,033	35%	.06	-.23 to .35			
TIMING								
Event to PD						.97	3	.62
Within 3 days	8	1,259	43%	.17	-.09 to .43			
4 to 7 days	3	193	7%	.27	-.20 to .73			
3 months	1	660	23%	.06	-.60 to .72			
Not Reported	4	808	28%	-.04	-.39 to .31			
Event to Outcome Assess.						5.50	3	.14
Within 1 week	3	789	27%	-.16	-.53 to .20			
1.5 to 3 months	5	443	15%	.48	.16 to .80			
More than 3 months	4	670	23%	.05	-.27 to .38			
Not Reported	4	1,018	35%	.01	-.31 to .33			
MEASURES								
Measure Constructs						4.18	2	.12
Only PTSD specific distress	5	871	30%	.08	-.23 to .38			
Both types	6	1,386	47%	-.08	-.34 to .18			
General physical & mental health	5	663	23%	.41	.11 to .71			
WITHIN-STUDY GROUP EQUIVALENCE RATING						.15	2	.92
Equivalent	3	825	28%	.20	-.23 to .62			
Not Equivalent	5	571	20%	.13	-.22 to .47			
Not Reported	8	1524	52%	.08	-.18 to .34			

Relationships Among Potential Moderators

Five significant variables were identified as potential moderators. However, further analysis is necessary to explore whether these variables are plausible moderators. It is possible that these potential moderators may not be independently associated with the outcome. One or more of them may be correlated with additional unobserved variables that may be confounding the observed association. It is also possible that one or more of these variables may be a proxy for another variable (e.g., years on the job has many other variables packed together along with years, like age, amount of informal social support, type of insurance, different and number of experiences at high-risk events, etc.). It is not possible to examine all of the possible confounding variables in this data set due to the paucity of observation and reporting in the source studies. However, it is possible to see if the five potential moderators are confounded with each other therefore; the correlations[25] among these five variables[26] were examined (see Table 15).

The correlations among the potential moderator variables ranged from -.33 to .45. Only one pair of variables was significantly correlated—PD format and years as FR were positively correlated (r = .45; p <= .10). Thus, studies with FRs reporting more years on the job were also more likely to have the PD administered in the group format (vs. individual PDs). This significant correlation indicates an overlap or potential confound of these two variables. One possible interpretation of this correlation is that those FRs with more time on the job are the older FRs who are more entrenched in the prevailing culture of FRs that sees asking or going for help on an individual basis indicates weakness, but attending a group session is acceptable.

[25] Stata pwcorr with p = .10

[26] I imputed values for the data not reported in order to include all 16 studies (note: correlations obtained leaving not reported data coded as "missing" were similar in direction and magnitude, data not shown).

Although not statistically significant (mainly due to the small *K* of 16 studies), it is worth noting those correlations that are at least |.30|. Need and PD format were positively correlated (*r* = .35), if the department determined the need for the PD, it was more likely that PD was delivered individually. Attendance and leader were positively correlated (*r* = .40), meaning that when PD was mandatory, it was more likely that the leader was a mental health professional (not accompanied by a peer leader). Need and attendance were negatively correlated (*r* = -.33), if the department determined the need for the PD, it was more likely that PD attendance was mandatory. The correlations among these four variables may be confounded with the policy of individual FR departments regarding the use of PD. For example, if the department determines a PD is needed, it may already have a policy that PDs are to be mandatory, and only given individually. If PDs are individual, then the choice is already made that there would only be one leader for the individual PD.

Table 15. Correlation Matrix of Moderator Variables (*K* = 16); (N = 2,920)

	FR Demographics	**Psychological Debriefing Characteristics**			
	Years as FR	**Format**	**Leader**	**Attendance**	**Need**
Years as FR	--				
Format	0.45*	--			
Leader	-0.25	-0.23	--		
Attendance	-0.06	0.28	0.40	--	
Need	0.20	0.35	-0.13	-0.33	--

* $p <= .10$

Ideally, the next logical analysis to perform would be to examine these variables simultaneously via meta-regression (i.e., a form of multiple regression that can accommodate inverse variance weighting). Doing this would allow for disentangling possible overlaps and confounding among these potential moderator variables and/or other variables (both those

reported in this meta-analysis or others that were not sufficiently reported). Due to the small number of studies in this meta-analysis (K = 16), a meta-regression to simultaneously examine two or more variables would not produce reliable estimates.

Results from Studies with Two Psychological Debriefings

There were three studies where some subjects attended more than one PD. The initial assessment used to calculate the ES_{sm} for two of these studies (7 and 10) included these subjects. The third study (3) assessed the FRs again at six months after they had attended two more PD sessions and reported no significant difference between PD intervention and control groups using the Structured Interview for PTSD (Carlier, van Uchelen, Lamberts, & Gersons, 1998; Davidson, Book, Colket, & et al., 1989).

Summary of Results

The overall result of this meta-analysis was a small positive effect in favor of PD lowering distress, however this result was not statistically significant (ES_{sm} = .11; *90% CI* -.05 to .27). A range of moderator variables were examined and five were identified as significant. These results must be interpreted with caution due to the limitations of data (e.g., small number of eligible studies, and incomplete reporting of data in source studies).

The FR characteristic that was most strongly associated with positive effects of PD was groups that had fewer years on the job. PD characteristics that were most strongly associated with positive effects of PD were: use of individual PD; when the leader was a mental health professional, the PD was mandatory, and the department (vs. the FRs) determined the need for the PD.

CHAPTER VI

DISCUSSION

The result of this first meta-analysis to examine the existing evidence about the effectiveness of Psychological Debriefing in lowering distress in FRs after a high risk event were a small positive, but not significant effect in favor *of PD.* This suggests that, on average, FRs who participated in a PD may have their distress reduced about one tenth of a standard deviation more than FRs who did not participate. However, given that this finding is not significant (even at the relaxed *p* value of .10); along with other limitations in these data, this finding must be interpreted with caution. In addition, five possible candidate moderators were identified suggesting that PD may be more effective: 1) for FRs with less than 10 years on the job; and when PD is delivered in 2) individual sessions; 3) led by mental health professionals; 4) when attendance is mandated, and 5) when the department rather than the individual FRs determine a PD is needed. As with the overall effect size, these candidate moderator findings must be interpreted with caution.

In the high-risk world of FRs, it is important that these men and women be both physically and psychologically fit to perform their work safely and effectively. Therefore, it is important to be able to judge the effect of an intervention in terms of its clinical significance. In other words, if the distress experienced by FRs is lower after they attend a PD, is it lower enough to make a difference in their daily life. Unfortunately no extant research was found that has direct bearing on this question. However, one way to explore clinical significance is to look at a relevant measure of distress that encompasses a similar range of distress symptoms as measured in this meta-analysis. Winwood and colleagues (2009) have given us just such a measure.

The screening measure piloted on police officers by Winwood and colleagues (2009), the Psychological Injury Risk Indicator (PIRI) yields scores that map onto clinicians' ratings of distress severity. The 30 items of the PIRI ask about both psychological and physiological symptoms of distress. The total PIRI score ranges from 1 to 100 (pilot sample N=34; M=68; SD=10), and is subdivided into seven levels of increasing distress, with a score of ≥58 indicating a level of distress that is substantial enough for clinical concern (e.g., requires monitoring and/or treatment).

Per the results of this meta-analysis, attending a PD is associated with a reduction of distress symptoms by about one-tenth of a standard deviation. Thus, in theory, if a typical PD intervention were administered to a group of FRs similar to those represented in this meta-analysis, it would be reasonable to expect a reduction of post-treatment distress equivalent, on average, to a one point decrease in their PIRI score. Therefore, while the limitations of this meta-analysis dictate that present results must be interpreted with caution, it is reasonable to argue that an average effect of a one-point reduction in a FR scoring in the distressed range of the PIRI (58 to 100) is not likely to be considered a clinically significant improvement.

Comparison to Other PD Meta-Analyses with FRs Included as Subjects

The result of my meta-analysis of a small positive, but not significant effect matches that found by Taylor in her unpublished master's thesis (Taylor, 2007) in a meta-analysis of the effects of PD on primarily victims and some FRs. However, my result is less than the positive effect size of .54 found by Everly, Jr. and colleagues (1999). Van Emmerik and colleagues' (2002) found a nonsignificant mean effect size of .13 for the CISD studies, a significant mean effect size for non-CISD interventions of .65, and a mean effect size of .47 for the comparison no intervention group on PTSD symptoms. They found smaller nonsignificant effect sizes with

general (not PTSD specific) symptoms of distress as the outcome (CISD .12; non-CISD .36; and comparison .13). The results for PD protocol type in my meta-analysis were similar to van Emmerik and colleagues' for other symptoms of distress. I found nonsignificant mean effect sizes for CISD of .13, CISD-Like of .23, and other PD types of .00. This is in spite of the methodological differences in calculating effect sizes.

The only methods that my meta-analysis and these other two meta-analyses share is using Cohen's *d* (standardized mean difference effect size), and averaging effect sizes from all measures to obtain the study *ES*. In fact, for the two studies used in both my meta-analysis and Everly, Jr. and colleagues' (1999) we report the same effect size--Bohl's study on police (.86), and Wee's study of EMTs (.47) (Bohl, 1991; Wee, et al., 1999). However, the methods van Emmerik and colleagues used to calculate effect sizes were unusual, rendering their effect sizes not comparable to mine or Everly Jr. and colleagues.

The objective of PD was different in these three meta-analyses. Everly, Jr. and colleagues reported they were looking at PD as an early intervention to ameliorate early symptoms of distress. Van Emmerik and colleagues (2002) reported they were looking at PD as preventing PTSD and nonPTSD psychopathology. In my meta-analysis, I focused on distress and used the first outcome assessment available, and reported outcomes by time of assessment from the event. This issue of differing objectives and, as I describe below, inclusion criteria, and methods that do not match the objectives is further fuel to the literature debating the effectiveness of PD.

Everly, Jr. and colleagues included PDs that occurred as long as 6 months after the event and did not look at "early" outcome assessments, but rather averaged results from outcome measures completed at different follow-up times in two studies (9 and 30 days after PD (Jenkins, 1996); and 27, 50, 86, and 114 weeks after the earthquake (Kenardy, et al., 1996). This averaging

of outcome measures over time makes it impossible to discern the short- vs. long-term effects of PD, much less compare these study results with those that used only one follow-up time. While there was not sufficient data to obtain an effect size for the first follow-up assessment for the Jenkins study, in my meta-analysis I calculated an effect size of .09 for the first assessment in the Kenardy study vs. .15 for all four of the assessments reported in the Everly, Jr. and colleagues meta-analysis. On the other hand, van Emmerik and colleagues used only studies where the PDs were done within one month of the event.

Further differences among these meta-analyses are the subject pool, the type of event and the type of PD. Everly, Jr. and colleagues compared five studies of FRs with five studies of victims and soldiers. Van Emmerik and colleagues compared one study of FRs with victims, early miscarriage, and soldiers. I compared only FRs. Everly, Jr. and colleagues' studies were primarily large-scope (disaster) events, van Emmerik and colleagues' studies were mostly limited-scope events, and my studies were large- and limited-scope as well as undetermined scope. In terms of type of PD, Everly, Jr. and colleagues' studies were all CISD, whereas van Emmerik and colleagues and I included CISD and other types of PD.

It is difficult to see how these varying subject populations, events, and methods to calculate the *ES* in these three meta-analyses can be compared with any confidence. While, the results from my meta-analysis must be considered in light of the large amount of unreported data, and the lack of within-study group equivalence, there are several strengths in this meta-analysis as compared to the previous reviews of PD literature.

Strengths of This Meta-Analysis

Empirical studies on PD often combine different populations and different types of high-risk events. This meta-analysis limits the population to that of FRs. It distinguishes between

large- and limited-scope events. Characteristics of the PD itself are assessed in terms of PD effectiveness. Only the results of the first assessment after the PD are used to calculate each study effect, which allows for assessing effects after different lag times from PD to outcome.

Single Population

Limiting the population to only FRs makes these results more applicable to FR researchers and policy makers in the FR community. Also, using a single population reduces the influence of possible confounding effects from dissimilar populations (e.g., soldiers, victims, and persons with grave medical conditions).

Similar High Risk-Events

This meta-analysis limited the type of high-risk event studied by focusing on the population of FRs for whom a PD was deemed appropriate. These events were encountered as part of the FRs job and not the result of high-risk events in which the FR was a victim of an accident or personal violence, or medical crisis. Findings in this meta-analysis that large-scope high-risk events had a mean ES_{sm} = .14 (*90% CI* -.16 to .44, k = 6), and limited-scope studies had a mean ES_{sm} = .40 (*90% CI* .03 to .77, k = 4), lend support to the need to adequately describe the type of high-risk event under investigation. This disaggregation of types of trauma is supported by the work of Perkonigg and colleagues (2000), who found an interaction between the type of trauma and the criterion for PTSD in the *DSM-IV* of "intense fear, helplessness, or horror."

Characteristics of Psychological Debriefing

To the degree the data allowed, I examined the characteristics of the PDs used in each study. Results showed that PDs led by mental health professionals had a mean ES_{sm} = .56 (*90%*

CI .23 to .89, *n* = 4) and those led by a professional and a peer leader had a mean ES_{sm} = -.02 (*90% CI*- .32 to .27, *n* = 5). from their review of five studies involving FRs and soldiers, Arendt and Elklit observed that PD had a preventive effect when led by mental health professionals (Arendt & Elklit, 2001). PDs that were mandatory had a mean ES_{sm} = .55 (*90% CI* .22 to .89, *n* = 5). However, it must be noted that, of the four studies with mandatory PD, three were led by mental health professionals; therefore, it is not clear from these data which characteristic is driving the positive effect of PD.

Construct Measured

It is plausible that using measures of general psychological and/or physiological distress may be more favorable to assessing the outcome of PD than PTSD-specific measures. In this meta-analysis, those studies using general physical and mental health measures had a positive mean ES_{sm} = .41 (*90% CI* .11 to .71, *n* = 5), whereas those studies using only PTSD-specific measures had a positive mean ES_{sm} = .08 (*90% CI* .-23 to .38, *n* = 5). The positive association of the more general physical and mental health measures with positive effects of PD was not driven by gender (FR types in these five studies had fewer women, and only two studies had mental health professionals lead the PD). These data indicate that the outcome constructs are important in assessing the effect of PD.

Psychological Debriefing and Comparison Groups

This meta-analysis used only studies with PD and comparison groups. Using two groups allows a basic comparison between those who participated in PD vs. those who did not. Using single group studies would not allow for the counterfactual information from a group that did not receive the intervention.

Limitations of This Meta-Analysis

Studies of PD have suffered from a number of methodological and reporting deficits (Malcolm, et al., 2005; Tuckey, 2007) and most of the source studies in this meta-analysis suffer from these deficits as well. Given, the limited number of source studies, and the limitations of those source studies, specifically, the extent of missing data, the lack of random assignment, the lack of information available to determine within-study group equivalence, and measurement issues, results of this meta-analysis must be viewed with caution.

Unreported Data

Unreported data from the source studies severely limited this meta-analysis. For example, while PD effectiveness was the primary focus of 13 of the 16 studies in this meta-analysis, source studies did not report enough information to adequately code the primary characteristics of the PD to be sure that PD participants experienced the same intervention. The pattern of information reported can be seen above in Table 3, with the reporting of subject characteristics shown in Table 11. By looking at the distribution of reporting of characteristics in these tables, it is apparent that limited reporting of data was not uniform among studies. This lack of uniform reporting severely limited exploration of possible moderators. Finally, the dearth information about whether attendance was mandatory or voluntary, and who (FRs or department) should determine the need for the PD does not allow me to make evidence-based recommendations on these policies to FR departments.

Group Equivalence

None of these studies used random assignment, few reported variables of interest for determining within-study group equivalence, and only Study 3 reported a pre-test (measure

completed before the PD). Therefore, the most severe limitation across all 16 studies was the lack of attention to establishing the degree of equivalence between PD and comparison groups at baseline, particularly in level of distress.

Study 3 data serve as an example of the effect of nonequivalent groups on effect size. The post-test ES_{sm} =.14 (*90% CI* -.44 to .17), indicating a small effect not significantly different from zero, does not reflect the improvement in the PD group which was initially more distressed than the comparison group at pre-test while the comparison group mean was essentially equal from pre- to post-test (pretest ES_{sm} = -.24 (*90% CI* -.06 to .54). The ES_{sm} adjusted for the pretest in this study was .39 (*95% CI* .05 to .72), a fairly positive, significant effect. Unfortunately, it is not clear from these data that the PD can be ruled in for the lowering of distress in the PD group as they were more distressed than the comparison group at the outset.

Furthermore, approximate estimates of group equivalence were hampered due to the lack of pretest data on the outcome construct, basic demographic data, and retrospective reports of distress before the high-risk event that initiated the call for a PD. Moreover, there was no way to ensure that FR distress levels were caused by the event or were present before the event.

Measurement Issues

There were two measurement issues that limited my ability to explore moderators of the effects of PD: the variety of measures used; and the timing of the outcome assessments varied widely. The broad construct of psychological and/or physiological distress was present in all measures. However, due to the many different subconstructs of distress that were measured (e.g., state anxiety, depression, general well-being, PTSD specific) it was impossible to explore the effect of PD on any one of these subconstructs. When reported, the timing of the outcome

assessment from the event varied widely, making it unclear whether the beneficial effect found for PD relates to ameliorating immediate distress or is associated with longer-term recovery.

One final note on the limitations in the timing of the measures is the issue of recall bias. Fifteen of the studies in this meta-analysis had subjects perform retrospective pretests and post-intervention assessments at the same time, which is cause for recall bias to be a threat to the validity of the pretest measures (Hassan, 2006).

CHAPTER VII

RECOMMENDATIONS FOR FUTURE RESEARCH

Ideally, randomized controlled trials (RCTs) should be conducted to address the issue of causation and control for threats to validity (Agorastos, et al., 2011). There have been RCTs of the effects of PD for obstetrics (Gamble et al., 2005; Lavender & Walkinshaw, 1998; Priest, Henderson, Evans, & Hagan, 2003; Small, et al., 2000) and victims of accidents or violence (Conlon, et al., 1999; Hobbs, et al., 1996; Rose, et al., 1999; Sijbrandij, et al., 2006). Attempts at conducting RCTs with FRs have been blocked by FR departments (e.g., Carlier, et al., 2000) and not enough FRs participating to randomize subjects (Macnab, et al., 2003). Even a request to stagger the timing of the PD was blocked by the CISD team in charge because they were unwilling to approach the FR department about a two week delay from the time of the incident (Chang, 2008). Aside from the unwillingness of FR departments and intervention teams to participate in an RCT there are other issues. There is the unpredictability of the timing and location of high-risk events which requires researchers to stand in constant readiness with methods and measures fully prepared and with all required FR departmental permissions and Institutional Review Board agreements in place. Macnab (Macnab, et al., 2003) followed these steps and covered a large area of Canada; however he was unable to complete the study as only 18 FRs were enrolled.

Both limited- and large-scope high-risk events present other barriers to conducting RCTs. Limited-scope events will have statistical power issues in terms of numbers of subjects. A single event may not involve enough FRs to form a group for a PD, much less a PD and a comparison

group, or a delayed PD comparison group. High-risk events may not happen often enough in any one area to garner enough subjects for a study to have sufficient power. Large-scope or disaster events present different issues. The challenges of dealing with the wounded and deceased, finding food and shelter for victims as well as FRs, supercede research requests. There is also the issue of when to hold a PD during a multi-day disaster—there is currently no answer to this. These are only some of the barriers to conducting RCTs in this field.

Therefore, if there are to be more studies of the effect of PD, the field must become more adept at designing rigorous quasi-experimental studies and using other study designs appropriately (e.g., comparing two interventions, or a staggered intervention delivery) to answer remaining critical questions. These studies must state clearly the type of outcome they are measuring (short-term relief of distress or preventing long-term distress) and use appropriate measures. Steps must be taken to ensure that the PD and comparison groups are the same population and equivalent and researchers must report appropriate statistics for both groups, particularly in terms of distress before the PD. The elements of the PD must be described in detail and the PD administration must be measured for implementation fidelity. Large- and limited-scope high-risk events should be studied separately; the timing of the PD and outcome assessment(s) should be tailored to the stated purpose of the PD as well as the selection of outcome measure constructs. Finally, I discuss issues involved in designing future studies.

Outcome Measure Constructs

Outcome measures should be chosen that reflect the researcher's understanding of the purpose of PD: to ameliorate immediate distress, or prevent development of PTSD symptoms or caseness. In the case of outcome assessments done within the first month, it may be more apropos to use measures that reflect general distress and distress related specifically to the

incident. After the first month, diagnostic measures of PTSD should be used. The nature of these high-risk events defies prediction. Therefore, it is incumbent upon interested researchers to assemble appropriate brief baseline and outcome measures in advance.

Making specific recommendations about which measures are preferred according to the evidence base from this meta-analysis is problematic due to the number and type of measures used and the confusion over short- vs. long-term outcomes. In addition, the source studies in this meta-analysis were mostly conducted before the year 2000 and much has changed in the field of PTSD measurement since then. In addition, with the new *DSM-5* almost ready, more changes are likely. For example, four of the studies used the Impact of Events Scale which was introduced in 1979 (Horowitz, et al., 1979). However, the newest study used the Impact of Events Scale-Revised which was introduced in 1996 with a new subscale on hyperarousal added to the existing subscales on intrusion and avoidance (Weiss & Marmar, 1996). Due to the age of the studies presented here as well as their limitations of nonequivalence and missing data, and considering the changes that will soon be made, I cannot recommend with confidence any one measure.

My best recommendation is for researchers to carefully consider the construct they are interested in assessing and then choose a reliable, validated measure that matches that construct. The worst option for the field is for researchers to compile their own measures (which occurred in two studies in this meta-analysis), or take a validated measure and "shorten" it (which also occurred in a study in this meta-analysis). Using these types of measures vs. well-researched valid and reliable measures renders one's study difficult to interpret and compare to other studies. The United States Department of Veterans Affairs offers many assessment measures.

Descriptions, sources, and reviews of these measures can be found at http://www.ptsd.va.gov/professional/pages/assessments/ies-r.asp.

Population and Relevant Subject Characteristics

At this point in time, the target population should be narrowed to include only professional fire fighters and police. These two groups were represented in the majority of the studies in this meta-analysis, showing that their departments are amenable to studies of PD. Moreover, fire fighters and police each have their own shared culture, which should make a group intervention function more smoothly than a group comprised of FRs from different cultures. Also, there is a fairly large (for this field) body of literature specifically about police and stress/trauma which provides further guidance as to appropriate characteristics to investigate.

Once a circumscribed population has been identified, it is essential to do everything possible to ensure that the PD and comparison groups are equivalent (randomization) or conduct prospective research by getting baseline data on subjects, or obtaining information before the PD, or administering a retrospective survey as soon as possible after the PD.

The issue of group equivalence is particularly important in terms of FR self-reported level of distress after experiencing the event to ensure that the FR's current distress is due to the event precipitating the PD. The ranks of FRs are swelling with war veterans who may already be suffering from distress. A survey conducted in 1999 (http://www.bls.gov/news.release/history/vet_06072000.txt) found that 4.1% of Vietnam veterans (approximately 125,000) were still working in "protective service occupations". With the increase in veterans returning from both Gulf War Eras, it is advisable to include military experience(s) in the demographics of FRs. It is also important to incorporate findings from the predictor literature. For example, Benedek and colleagues found that with fire fighters,

associations with PTSD include: proximity to death; severity of trauma; perceived threat to self; post-disaster-related events (e.g., loss of a loved one, home or business); peri-disaster events (e.g., rescue, firefighting, and body recovery); high level of hostility; and low level of self-efficacy (Benedek, et al., 2007).

Typical comparison groups in these 16 studies consisted of FRs who elected not to attend a PD offered in their department (were absent, were not working or elected to stay on the job that day; or were from departments where PD was not offered, or the event occurred before the department started offering). This type of information makes it difficult to interpret why some FRs did not attend the debriefing session even in studies where it was stated the session was mandatory. More detailed information is needed about why FRs chose to attend or not attend PD (e.g., absent to avoid the PD rather than absent that day) should be reported. In the culture of FRs, weakness in any form, particularly mental health, is not generally acknowledged. In one study, the author did find that total years in fire fighting ($r = .4204$, $p<.01$) and years in the current fire department ($r = .3354$, $p<.05$) were negatively correlated with attending PD (Redburn, 1992).

One study of 254 medical personnel who responded to an air show crash (Fullerton, Ursano, Vance, & Wang, 2000) reported that participants who chose to attend PD were more likely to be female, report higher perceived social support from friends, have prior disaster experience, high exposure (on site), greater exposure time and treated more victims. On the flip side, those with no previous disaster experience and those who reported less social support did not attend. These results remind one of the saying, “preaching to the choir”. In other words, according to these results, those who attended debriefings were aware of the risk and willing to

do what they thought would minimize that risk, while those with limited social support after attending their first disaster eschewed debriefings (Fullerton, et al., 2000).

Aspects of Psychological Debriefing

It is clear that in order to assess the effectiveness of PDs across studies, it is essential that PD characteristics be reported in full to ensure valid comparisons. It is also essential to monitor implementation (Hulleman & Cordray, 2009; Larsson, Tedfeldt, & Andersson, 1999) to ensure that what was planned did actually occur.

This is of particular importance for the *eliciting feelings* portion of the PD since it is possible that discussing feelings, and/or hearing others' feelings, may result in exacerbating the distress of the participant doing the discussing or one or more other members of the group. Other important characteristics include protocol aspects as described for CISD and any additional elements: group or individual format; the type of leader; leader training; the length of the PD; whether attendance was voluntary or mandatory; and whether it was the department or the FRs who initiated the request for a PD. Understanding the effect of these last two characteristics would help inform department policy decisions.

Type of High-Risk Event

There are several issues related to event scope. One is the wide range of limited scope events and whether or not a) they are causing equal FR distress; b) there are enough FRs involved to have a group PD, and if not, is individual counseling a better option? An important question for large-scope events is the issue of timing. When is the best time to perform a PD during an extended-time disaster? These questions require further study.

Timing of the Psychological Debriefing and Outcome Assessment

CISD proponents currently recommend the PD be done within 1 to 10 days (Everly Jr. & Mitchell, 2012). There is evidence that attending a PD too soon might retraumatize some FRs. There is also evidence that slowing down the HPA activity cannot be done soon enough, however this is not part of a PD intervention. There is no empirical evidence to support when the best time for a PD would be (Agorastos, et al., 2011).

The timing of the outcome assessment should be matched to the researcher's definition of what outcome they are testing. For ameliorating distress to speed the FR's return to normalcy, it makes sense to time the outcome assessment within 10 days of the PD. If PD's role is prevention of PTSD symptoms or caseness, then it is advisable to add another assessment at least 30 days after the event, with follow-up assessments even further out in time.

Study Design

There are remaining critical issues in the field of PD that could be addressed without requiring the use of experimental design. For instance, addressing the critical question of who is in need of formal support and who is not after a high-risk event could be accomplished through a descriptive study to rigorously monitor FRs after limited-scope high-risk events in order to clarify the course of distress symptoms and look for markers indicating continuing distress. Using limited-scope events is recommended because they occur more frequently than large-scope events, and they have a definitive end when observation can begin, whereas large-scope events do not.

Specifically, after an identified event, a descriptive study would assess FRs three days, one, two, and three weeks, and one month after a limited scope event. The first assessment would be a brief measure of distress from the recent event. The following assessments could be

structured to always include a measure of current physical and psychological distress and a means to report any high-risk event that may have occurred since the high-risk event that initiated the study. Other measures could ask for basic demographic information, information about the FRs past personal and work-related high-risk events, and mental and physical health professional visits. These latter measures would need to be completed only once, therefore they could be split up over the third and fourth week assessments. Focus groups and individual interviews of FRs would be conducted to elaborate on the information obtained from the paper and pencil assessments.

For each subject, the researcher would compile a record of mental and physical health professional visits, sick days, and any official documents regarding ability on the job for the previous year to add to baseline information. In addition, it will be necessary to document other services received during the time of the study. Of course the information gathered would need to abide by Institutional Review Board typical standards of privacy, and provision would have to be made for further assessment or treatment should any of the records or measures indicate the need.

This type of descriptive study should begin to show us a trajectory of those who recover and those who experience problems with their day-to-day functioning. This should help us to better understand who may be more at risk for a high level of distress within a month after a high-risk event, and thus identify a target population for formal support.

Conclusion

The field of research and professional opinion on PD is fractured, and that is understandable considering the contradictory results reported in the literature. The meta-analysis presented in this dissertation is the first quantitative review of the existing evidence about the

effectiveness of Psychological Debriefing in lowering distress in First Responders after a high risk event. The overall finding of this meta-analysis was a small positive, but nonsignificant effect size (ES_{sm} = .11 (*90% CI* -.05 to .27; K = 16; N = 2,920) indicating that, on average, those FRs who attended a Psychological Debriefing may have been less distressed afterward than those who did not attend. However, this finding must be interpreted with caution.

There are considerable limitations in the evidence-base on which this meta-analysis was conducted (e.g., deficits in reporting and uncertainty about within-study group equivalence). There is large amount of heterogeneity (I^2 = 80%) between the source study effect sizes which means effects are highly variable. Therefore, the grand mean effect size found in this meta-analysis may not reflect the actual direction and magnitude of the effect of any actual PD. The evidence base remains equivocal on the overall effects of Psychological Debriefing on First Responder distress.

APPENDIX A. *DSM-IV-R* DESCRIPTIONS OF ASD AND PTSD

Diagnostic criteria for 308.3 Acute Stress Disorder

From http://www.psychiatryonline.com/content.aspx?aID=3432#3432 (American Psychiatric Association, 2009a)

Diagnostic criteria for 308.3 Acute Stress Disorder

A. The person has been exposed to a traumatic event in which both of the following were present:
    1. the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others
    2. the person's response involved intense fear, helplessness, or horror
B. Either while experiencing or after experiencing the distressing event, the individual has three (or more) of the following dissociative symptoms:
    1. a subjective sense of numbing, detachment, or absence of emotional responsiveness
    2. a reduction in awareness of his or her surroundings (e.g., "being in a daze")
    3. derealization
    4. depersonalization
    5. dissociative amnesia (i.e., inability to recall an important aspect of the trauma)
C. The traumatic event is persistently reexperienced in at least one of the following ways: recurrent images, thoughts, dreams, illusions, flashback episodes, or a sense of reliving the experience; or distress on exposure to reminders of the traumatic event.
D. Marked avoidance of stimuli that arouse recollections of the trauma (e.g., thoughts, feelings, conversations, activities, places, people).
E. Marked symptoms of anxiety or increased arousal (e.g., difficulty sleeping, irritability, poor concentration, hypervigilance, exaggerated startle response, motor restlessness).
F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning or impairs the individual's ability to pursue some necessary task, such as obtaining necessary assistance or mobilizing personal resources by telling family members about the traumatic experience.
G. The disturbance lasts for a minimum of 2 days and a maximum of 4 weeks and occurs within 4 weeks of the traumatic event.
H. The disturbance is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition, is not better accounted for by Brief Psychotic Disorder, and is not merely an exacerbation of a preexisting Axis I or Axis II disorder.

Diagnostic Features

The essential feature of Acute Stress Disorder is the development of characteristic anxiety, dissociative, and other symptoms that occurs within 1 month after exposure to an extreme traumatic stressor (Criterion A). For a discussion of the types of stressors involved, see the description of Posttraumatic Stress Disorder (Diagnostic Features). Either while experiencing the traumatic event or after the event, the individual has at least three of the following dissociative symptoms: a subjective sense of numbing, detachment, or absence of emotional responsiveness; a reduction in awareness of his or her surroundings; derealization; depersonalization; or dissociative amnesia (Criterion B). Following the trauma, the traumatic event is persistently reexperienced (Criterion C), and the individual displays marked avoidance of stimuli that may arouse recollections of the trauma (Criterion D) and has marked symptoms of anxiety or increased arousal (Criterion E). The symptoms must

cause clinically significant distress, significantly interfere with normal functioning, or impair the individual's ability to pursue necessary tasks (Criterion F). The disturbance lasts for a minimum of 2 days and a maximum of 4 weeks after the traumatic event (Criterion G); if symptoms persist beyond 4 weeks, the diagnosis of Posttraumatic Stress Disorder may be applied. The symptoms are not due to the direct physiological effects of a substance (i.e., a drug of abuse, a medication) or a general medical condition, are not better accounted for by Brief Psychotic Disorder, and are not merely an exacerbation of a preexisting mental disorder (Criterion H).

As a response to the traumatic event, the individual develops dissociative symptoms. Individuals with Acute Stress Disorder may have a decrease in emotional responsiveness, often finding it difficult or impossible to experience pleasure in previously enjoyable activities, and frequently feel guilty about pursuing usual life tasks. They may experience difficulty concentrating, feel detached from their bodies, experience the world as unreal or dreamlike, or have increasing difficulty recalling specific details of the traumatic event (dissociative amnesia). In addition, at least one symptom from each of the symptom clusters required for Posttraumatic Stress Disorder is present. First, the traumatic event is persistently reexperienced (e.g., recurrent recollections, images, thoughts, dreams, illusions, flashback episodes, a sense of reliving the event, or distress on exposure to reminders of the event). Second, reminders of the trauma (e.g., places, people, activities) are avoided. Finally, hyperarousal in response to stimuli reminiscent of the trauma is present (e.g., difficulty sleeping, irritability, poor concentration, hypervigilance, an exaggerated startle response, and motor restlessness).

Associated Features and Disorders

Associated descriptive features and mental disorders.
Symptoms of despair and hopelessness may be experienced in Acute Stress Disorder and may be sufficiently severe and persistent to meet criteria for a Major Depressive Episode, in which case an additional diagnosis of Major Depressive Disorder may be warranted. If the trauma led to another's death or to serious injury, survivors may feel guilt about having remained intact or about not providing enough help to others. Individuals with this disorder often perceive themselves to have greater responsibility for the consequences of the trauma than is warranted. Problems may result from the individual's neglect of basic health and safety needs associated with the aftermath of the trauma. Individuals with this disorder are at increased risk for the development of Posttraumatic Stress Disorder. Rates of Posttraumatic Stress Disorder of approximately 80% have been reported for motor vehicle crash survivors and victims of violent crime whose response to the trauma initially met criteria for Acute Stress Disorder. Impulsive and risk-taking behavior may occur after the trauma.

Associated physical examination findings and general medical conditions.
General medical conditions may occur as a consequence of the trauma (e.g., head injury, burns).

Specific Culture Features

Although some events are likely to be universally experienced as traumatic, the severity and pattern of response may be modulated by cultural differences in the implications of loss. There may also be culturally prescribed coping behaviors that are characteristic of particular cultures. For example, dissociative symptoms may be a more prominent part of the acute stress response in cultures in which such behaviors are sanctioned. For further discussion of cultural factors related to traumatic events, see Specific Culture and Age Features.

Prevalence

The prevalence of Acute Stress Disorder in a population exposed to a serious traumatic stress depends on the severity and persistence of the trauma and the degree of exposure to it. The prevalence of Acute Stress Disorder in the general population is not known. In the few available studies, rates ranging from 14% to 33% have been reported in individuals exposed to severe trauma (i.e., being in a motor vehicle accident, being a bystander at a mass shooting).

Course

Symptoms of Acute Stress Disorder are experienced during or immediately after the trauma, last for at least 2 days, and either resolve within 4 weeks after the conclusion of the traumatic event or the diagnosis is changed. When symptoms persist beyond 1 month, a diagnosis of Posttraumatic Stress Disorder may be appropriate if the full criteria for Posttraumatic Stress Disorder are met. The severity, duration, and proximity of an individual's exposure to the traumatic event are the most important factors in determining the likelihood of development of Acute Stress Disorder. There is some evidence that social supports, family history, childhood experiences, personality variables, and preexisting mental disorders may influence the development of Acute Stress Disorder. This disorder can develop in individuals without any predisposing conditions, particularly if the stressor is especially extreme.

Differential Diagnosis

Some symptomatology following exposure to an extreme stress is ubiquitous and often does not require any diagnosis. Acute Stress Disorder should only be considered if the symptoms last at least 2 days and cause clinically significant distress or impairment in social, occupational, or other important areas of functioning or impair the individual's ability to pursue some necessary task (e.g., obtaining necessary assistance or mobilizing personal resources by telling family members about the traumatic experience).

Acute Stress Disorder must be distinguished from a **Mental Disorder Due to a General Medical Condition** (e.g., head trauma) (see Mental Disorders Due to a General Medical Condition) and from a **Substance-Induced Disorder** (e.g., related to Alcohol Intoxication) (see Substance-Induced Mental Disorders Included Elsewhere in the Manual), which may be common consequences of exposure to an extreme stressor. In some individuals, psychotic symptoms may occur following an extreme stressor. In such cases, **Brief Psychotic Disorder** is diagnosed instead of Acute Stress Disorder. If a **Major Depressive Episode** develops after the trauma, a diagnosis of Major Depressive Disorder should be considered in addition to a diagnosis of Acute Stress Disorder. A separate diagnosis of Acute Stress Disorder should not be made if the symptoms are an **exacerbation of a preexisting mental disorder.**

By definition, a diagnosis of Acute Stress Disorder is appropriate only for symptoms that occur within 1 month of the extreme stressor. Because **Posttraumatic Stress Disorder** requires more than 1 month of symptoms, this diagnosis cannot be made during this initial 1-month period. For individuals with the diagnosis of Acute Stress Disorder whose symptoms persist for longer than 1 month, the diagnosis of Posttraumatic Stress Disorder should be considered. For individuals who have an extreme stressor but who develop a symptom pattern that does not meet criteria for Acute Stress Disorder, a diagnosis of **Adjustment Disorder** should be considered.

Malingering must be ruled out in those situations in which financial remuneration, benefit eligibility, or forensic determinations play a role.

309.81 Posttraumatic Stress Disorder

From http://www.psychiatryonline.com/content.aspx?aID=3357 (American Psychiatric Association, 2009a)

Diagnostic criteria for 309.81 Posttraumatic Stress Disorder

A. The person has been exposed to a traumatic event in which both of the following were present:
   1. the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others
   2. the person's response involved intense fear, helplessness, or horror. **Note:** In children, this may be expressed instead by disorganized or agitated behavior

B. The traumatic event is persistently reexperienced in one (or more) of the following ways:
   1. recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions. **Note:** In young children, repetitive play may occur in which themes or aspects of the trauma are expressed.
   2. recurrent distressing dreams of the event. **Note:** In children, there may be frightening dreams without recognizable content.
   3. acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated). **Note:** In young children, trauma-specific reenactment may occur.
   4. intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event
   5. physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event

C. Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three (or more) of the following:
   1. efforts to avoid thoughts, feelings, or conversations associated with the trauma
   2. efforts to avoid activities, places, or people that arouse recollections of the trauma
   3. inability to recall an important aspect of the trauma
   4. markedly diminished interest or participation in significant activities
   5. feeling of detachment or estrangement from others
   6. restricted range of affect (e.g., unable to have loving feelings)
   7. sense of a foreshortened future (e.g., does not expect to have a career, marriage, children, or a normal life span)

D. Persistent symptoms of increased arousal (not present before the trauma), as indicated by two (or more) of the following:
   1. difficulty falling or staying asleep
   2. irritability or outbursts of anger
   3. difficulty concentrating
   4. hypervigilance
   5. exaggerated startle response

E. Duration of the disturbance (symptoms in Criteria B, C, and D) is more than 1 month.

F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

Specify if: **Acute:** if duration of symptoms is less than 3 months

Chronic: if duration of symptoms is 3 months or more

Specify if: **With Delayed Onset:** if onset of symptoms is at least 6 months after the stressor

Diagnostic Features

The essential feature of Posttraumatic Stress Disorder is the development of characteristic symptoms following exposure to an extreme traumatic stressor involving direct personal experience of an event that involves actual or threatened death or serious injury, or other threat to one's physical integrity; or witnessing an event that involves death, injury, or a threat to the physical integrity of another person; or learning about unexpected or violent death, serious harm, or threat of death or injury experienced by a family member or other close associate (Criterion A1). The person's response to the event must involve intense fear, helplessness, or horror (or in children, the response must involve disorganized or agitated behavior) (Criterion A2). The characteristic symptoms resulting from the exposure to the extreme trauma include persistent reexperiencing of the traumatic event (Criterion B), persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (Criterion C), and persistent symptoms of increased arousal (Criterion D). The full symptom picture must be present for more than 1 month (Criterion E), and the disturbance must cause clinically significant distress or impairment in social, occupational, or other important areas of functioning (Criterion F).

Traumatic events that are experienced directly include, but are not limited to, military combat, violent personal assault (sexual assault, physical attack, robbery, mugging), being kidnapped, being taken hostage, terrorist attack, torture, incarceration as a prisoner of war or in a concentration camp, natural or manmade disasters, severe automobile accidents, or being diagnosed with a life-threatening illness. For children, sexually traumatic events may include developmentally inappropriate sexual experiences without threatened or actual violence or injury. Witnessed events include, but are not limited to, observing the serious injury or unnatural death of another person due to violent assault, accident, war, or disaster or unexpectedly witnessing a dead body or body parts. Events experienced by others that are learned about include, but are not limited to, violent personal assault, serious accident, or serious injury experienced by a family member or a close friend; learning about the sudden, unexpected death of a family member or a close friend; or learning that one's child has a life-threatening disease. The disorder may be especially severe or long lasting when the stressor is of human design (e.g., torture, rape). The likelihood of developing this disorder may increase as the intensity of and physical proximity to the stressor increase.

The traumatic event can be reexperienced in various ways. Commonly the person has recurrent and intrusive recollections of the event (Criterion B1) or recurrent distressing dreams during which the event can be replayed or otherwise represented (Criterion B2). In rare instances, the person experiences dissociative states that last from a few seconds to several hours, or even days, during which components of the event are relived and the person behaves as though experiencing the event at that moment (Criterion B3). These episodes, often referred to as "flashbacks," are typically brief but can be associated with prolonged distress and heightened arousal. Intense psychological distress (Criterion B4) or physiological reactivity (Criterion B5) often occurs when the person is exposed to triggering events that resemble or symbolize an aspect of the traumatic event (e.g., anniversaries of the traumatic event; cold, snowy weather or uniformed guards for survivors of death camps in cold

climates; hot, humid weather for combat veterans of the South Pacific; entering any elevator for a woman who was raped in an elevator).

Stimuli associated with the trauma are persistently avoided. The person commonly makes deliberate efforts to avoid thoughts, feelings, or conversations about the traumatic event (Criterion C1) and to avoid activities, situations, or people who arouse recollections of it (Criterion C2). This avoidance of reminders may include amnesia for an important aspect of the traumatic event (Criterion C3). Diminished responsiveness to the external world, referred to as "psychic numbing" or "emotional anesthesia," usually begins soon after the traumatic event. The individual may complain of having markedly diminished interest or participation in previously enjoyed activities (Criterion C4), of feeling detached or estranged from other people (Criterion C5), or of having markedly reduced ability to feel emotions (especially those associated with intimacy, tenderness, and sexuality) (Criterion C6). The individual may have a sense of a foreshortened future (e.g., not expecting to have a career, marriage, children, or a normal life span) (Criterion C7).

The individual has persistent symptoms of anxiety or increased arousal that were not present before the trauma. These symptoms may include difficulty falling or staying asleep that may be due to recurrent nightmares during which the traumatic event is relived (Criterion D1), hypervigilance (Criterion D4), and exaggerated startle response (Criterion D5). Some individuals report irritability or outbursts of anger (Criterion D2) or difficulty concentrating or completing tasks (Criterion D3).

Specifiers

The following specifiers may be used to specify onset and duration of the symptoms of Posttraumatic Stress Disorder:

Acute. This specifier should be used when the duration of symptoms is less than 3 months.

Chronic. This specifier should be used when the symptoms last 3 months or longer.

With Delayed Onset. This specifier indicates that at least 6 months have passed between the traumatic event and the onset of the symptoms.

Associated Features and Disorders

Associated descriptive features and mental disorders.

Individuals with Posttraumatic Stress Disorder may describe painful guilt feelings about surviving when others did not survive or about the things they had to do to survive. Avoidance patterns may interfere with interpersonal relationships and lead to marital conflict, divorce, or loss of job. Auditory hallucinations and paranoid ideation can be present in some severe and chronic cases. The following associated constellation of symptoms may occur and are more commonly seen in association with an interpersonal stressor (e.g., childhood sexual or physical abuse, domestic battering): impaired affect modulation; self-destructive and impulsive behavior; dissociative symptoms; somatic complaints; feelings of ineffectiveness, shame, despair, or hopelessness; feeling permanently damaged; a loss of previously sustained beliefs; hostility; social withdrawal; feeling constantly threatened; impaired relationships with others; or a change from the individual's previous personality characteristics.

Posttraumatic Stress Disorder is associated with increased rates of Major Depressive Disorder, Substance-Related Disorders, Panic Disorder, Agoraphobia, Obsessive-Compulsive Disorder,

Generalized Anxiety Disorder, Social Phobia, Specific Phobia, and Bipolar Disorder. These disorders can either precede, follow, or emerge concurrently with the onset of Posttraumatic Stress Disorder.

Associated laboratory findings.
Increased arousal may be measured through studies of autonomic functioning (e.g., heart rate, electromyography, sweat gland activity).

Associated physical examination findings and general medical conditions.
Physical injuries may occur as a direct consequence of the trauma. In addition, chronic Posttraumatic Stress Disorder may be associated with increased rates of somatic complaints and, possibly, general medical conditions.

Specific Culture and Age Features

Individuals who have recently emigrated from areas of considerable social unrest and civil conflict may have elevated rates of Posttraumatic Stress Disorder. Such individuals may be especially reluctant to divulge experiences of torture and trauma due to their vulnerable political immigrant status. Specific assessments of traumatic experiences and concomitant symptoms are needed for such individuals.

In younger children, distressing dreams of the event may, within several weeks, change into generalized nightmares of monsters, of rescuing others, or of threats to self or others. Young children usually do not have the sense that they are reliving the past; rather, the reliving of the trauma may occur through repetitive play (e.g., a child who was involved in a serious automobile accident repeatedly reenacts car crashes with toy cars). Because it may be difficult for children to report diminished interest in significant activities and constriction of affect, these symptoms should be carefully evaluated with reports from parents, teachers, and other observers. In children, the sense of a foreshortened future may be evidenced by the belief that life will be too short to include becoming an adult. There may also be "omen formation"—that is, belief in an ability to foresee future untoward events. Children may also exhibit various physical symptoms, such as stomachaches and headaches.

Prevalence

Community-based studies reveal a lifetime prevalence for Posttraumatic Stress Disorder of approximately 8% of the adult population in the United States. Information is not currently available with regard to the general population prevalence in other countries. Studies of at-risk individuals (i.e., groups exposed to specific traumatic incidents) yield variable findings, with the highest rates (ranging between one-third and more than half of those exposed) found among survivors of rape, military combat and captivity, and ethnically or politically motivated internment and genocide.

Course

Posttraumatic Stress Disorder can occur at any age, including childhood. Symptoms usually begin within the first 3 months after the trauma, although there may be a delay of months, or even years, before symptoms appear. Frequently, a person's reaction to a trauma initially meets criteria for Acute Stress Disorder (see **308.3** Acute Stress Disorder) in the immediate aftermath of the trauma. The symptoms of the disorder and the relative predominance of reexperiencing, avoidance, and hyperarousal symptoms may vary over time. Duration of the symptoms varies, with complete recovery occurring within 3 months in approximately half of cases, with many others having persisting symptoms for longer than 12 months after the trauma. In some cases, the course is characterized by a waxing and waning of symptoms. Symptom reactivation may occur in response to reminders of the

original trauma, life stressors, or new traumatic events.

The severity, duration, and proximity of an individual's exposure to the traumatic event are the most important factors affecting the likelihood of developing this disorder. There is some evidence that social supports, family history, childhood experiences, personality variables, and preexisting mental disorders may influence the development of Posttraumatic Stress Disorder. This disorder can develop in individuals without any predisposing conditions, particularly if the stressor is especially extreme.

Familial Pattern

There is evidence of a heritable component to the transmission of Posttraumatic Stress Disorder. Furthermore, a history of depression in first-degree relatives has been related to an increased vulnerability to developing Postraumatic Stress Disorder.

Differential Diagnosis

In Posttraumatic Stress Disorder, the stressor must be of an extreme (i.e., life-threatening) nature. In contrast, in **Adjustment Disorder**, the stressor can be of any severity. The diagnosis of Adjustment Disorder is appropriate both for situations in which the response to an extreme stressor does not meet the criteria for Posttraumatic Stress Disorder (or another specific mental disorder) and for situations in which the symptom pattern of Posttraumatic Stress Disorder occurs in response to a stressor that is not extreme (e.g., spouse leaving, being fired).

Not all psychopathology that occurs in individuals exposed to an extreme stressor should necessarily be attributed to Posttraumatic Stress Disorder. **Symptoms of avoidance, numbing, and increased arousal that are present before exposure to the stressor** do not meet criteria for the diagnosis of Posttraumatic Stress Disorder and require consideration of other diagnoses (e.g., a Mood Disorder or another Anxiety Disorder). Moreover, if the symptom response pattern to the extreme stressor meets criteria for **another mental disorder** (e.g., Brief Psychotic Disorder, Conversion Disorder, Major Depressive Disorder), these diagnoses should be given instead of, or in addition to, Posttraumatic Stress Disorder.

Acute Stress Disorder is distinguished from Posttraumatic Stress Disorder because the symptom pattern in Acute Stress Disorder must occur within 4 weeks of the traumatic event and resolve within that 4-week period. If the symptoms persist for more than 1 month and meet criteria for Posttraumatic Stress Disorder, the diagnosis is changed from Acute Stress Disorder to Posttraumatic Stress Disorder.

In **Obsessive-Compulsive Disorder**, there are recurrent intrusive thoughts, but these are experienced as inappropriate and are not related to an experienced traumatic event. Flashbacks in Posttraumatic Stress Disorder must be distinguished from illusions, hallucinations, and other perceptual disturbances that may occur in **Schizophrenia**, **other Psychotic Disorders**, **Mood Disorder With Psychotic Features**, a **delirium**, **Substance-Induced Disorders**, and **Psychotic Disorders Due to a General Medical Condition**.

Malingering should be ruled out in those situations in which financial remuneration, benefit eligibility, and forensic determinations play a role.

APPENDIX B. CODEBOOK FOR STUDIES

Initial Coding

Eligibility Criteria

A. Intervention—Debriefing
Psychological debriefing including Critical Incident Stress Debriefing (CISD) and other debriefings that elicit self-disclosure.

B. Subjects—First Responders—
Police, firefighters (professional and volunteer) EMT/paramedics, and official volunteers, medical personnel, and lay personnel trained for volunteering at disaster sites. Must have been on site and experience threat of injury or death to self or others.
Not eligible are victims/survivors, medical patients, peacekeepers, soldiers, and bodyhandlers.

C. Events
Large-scope events:
Manmade disasters (e.g., plane crashes, ship collisions, multiple auto traffic accidents, mass shootings, oil rig collapses),
Natural disasters (e.g., tornados, hurricanes, earthquakes, storms at sea)
Terrorism (e.g., Oklahoma City, World Trade Center, 9/11).
Bioterrorism

Limited-scope events:
limited to those incidents where it was determined by department policy, authorities in charge, or first responders that the incident was of enough significance to warrant a debriefing.

There is no limit on when or where the incident took place.

D. Outcomes—psychological and physical symptoms of distress
PTSD specific symptoms, ASD specific symptoms, general measures of distress

E. Research Design--Must include a comparison group

F. Date of Publication—Anytime

G. Language--any

*****MAKE SURE THERE IS A DV THAT CAN BE CODED BEFORE ANYTHING ELSE*****

Study Level ==========

StudyID.....Complete study number
Collect all relevant reports. Assign Study Number and then use two decimals to number reports
Study # is 123 and the first report is 123.01, etc.

PubYr *Write in*.....Year Published

Author *Write in*.....Discipline of senior author
1 psychology/psychiatry
2 social work
-97 can't tell
3 other: _____
PubType .....Type of publication
label: valPubType
1 Journal
2 Book or Chapter
3 Dissertation
4 Technical Report
-97 Not Reported
PubYr *Write in*.....Year Published

DebriefFocus.....Effect of debriefing a study focus
1 Yes
2 No
-97 not reported

Group Identification* ==========

Treatment Groups write in name(s) usually Debriefing
Comparison Groups write in name(s) usually No Debriefing
Total number of Tx groups
Total number of Ctrl groups
Tx group using for coding write in name
Ctrl group using for coding write in name
Ctrl condition *Write in* what happened to controls

NTx.....# in Tx group
NCtrl.....# in control group
Nttl.....total of tx and control group

Subject Characteristics ==========

<u>Demographic group equivalence variables</u>

Each characteristic do all subjects, tx group, control group

FRTypeall.....Type of First Responders
1 Firefighters
2 Police

3 EMTs
5 mixed

FRTypeTx.....Type of First Responders
FRTypeCtrl.....Type of First Responders

Ageall.....Mean age of all subjects
AgeTx.....Mean age of treatment group
AgeCtrl.....Mean age of control group

Educall.....Mean education level
EducTx.....treatment group
EducCtrl.....control group

Raceall.....Race/Ethnicity
RaceTx.....treatment group
RaceCtrl.....control group

Sexall.....Sex of respondents
SexTx.....treatment group
SexCtrl.....control group

Marriedall.....Percent married
MarriedTx.....treatment group
MarriedCtrl.....control group

SickDaysall.....# sick days prior to event
SickDaysTx.....treatment group
SickDaysCtrl.....control group

JobExpall.....Years on job
JobExpTx.....treatment group
JobExpCtrl.....control group

Previous psychological treatment group equivalence variables *write in*

PriorEventsTx.....prior experience with critical events
PriorEventsCtrl.....prior experience with critical events
MentalPhysHlthTx.....Any previous mental health tx
MentalPhysHlthCtrl.....Any previous mental health tx

Event exposure stress variables group equivalence variables

EventStressTx....measure of stressfulness of event—treatment group
EventStressCtrl....measure of stressfulness of event—control group
EventExposureTx .....measure of exposure of event—treatment group
EventExposureCtrl .....measure of exposure of event—control group

Complete Rating Sheet for Equivalence

Study #

(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment ***n =***	**Control** ***n =***	**Group Difference** ***N =***	**Group Equivalence Rating**
Demographics				
Age				
Sex				
Race				
Education				
Marital Status				
Income				
Job				
Years on Job				
Job Rank				
Event Specific				
Measure of Stress				
Threat description				
Work Performed				
Mental/Physical Health				
Number of Prior Events				
Time Frame of Prior Events				
Sick days previous year				
Previous Mental Health				
RATED GROUP EQUIVALENCE				

```
Use these codes for Equiv*:
            1  equivalent
            2  not equivalent
          -97  not reported

EquivDemo.....................Groups equivalent on demographics
EquivJob......................Groups equivalent on years on job
EquivEventSpecific........Groups equivalent on event stress/threat
EquivMentPhysHealth....Groups equivalent on mental/physical health
EquivGrp.........................Equivalence between Tx & Ctrl

Use these codes for Eq_* to show how data reported:
           1    Reported by experimental group
           2    Groups reported equivalent by study author
           3    Reported for total sample only
           4    Not reported

Eq_Demo, Eq_Job, Eq_EvSpec, Eq_MPHlth, Eq_Grp
```

PD(Tx)==========

```
PDType  Write in.....................Type of debriefing described

PDLeaderType  Write in.................professional, peer or other

PDNumdebriefers........Number of debriefers running the debriefing
           1   one
           2   two
         -97   not reported


PDFormat..............................Group/Individual debriefing
         -97   not reported
           1   group
           2   individual

PDLength  Write in.........................Debrief session length

PDAttendance.....................................................
           1  mandatory
           2  voluntary
              -97 not reported
PDNeed  Write in.................How need for Debriefing Determined
```

begin Event ==========

```
EventPlace   write in..............Country where Event took place

EventType  Write in.................................Type of Event
       label:  valEventType
```

1 earthquake
2 fire
3 riot
4 mass shooting
5 individual shooting
6 varied events—write in

EventYr *Write in year*.....Year Event occurred

EvScope.....Event Complex vs. Limited-Scope
1 large
2 limited
-97 not reported

DV measures ==========

Measure *Write in*.....Measure(s) used for ES

MeasConstruct.....distress construct
1 PTSD specific
2 general psychological/physical distress
2 both

MeasForm *Write in*.....How measure given
mailed survey, interview, administered

Construct.....What does measure or subscale measure
PTSD caseness
PTSD symptoms
Other constructs in studies
Support
Alcohol misuse
Anger
Anxiety
Anxiety and depression
Depression
Avoidance
Coping

Health—General
Hyperarousal
Intrusion
Mental stress
Nonspecific psychopathology
Personal control over situation
Physical stress
Re-experiencing symptoms
Resolution
Stress symptoms
Debriefing helpfulness

MeasureSubscale.....name of measure & subscale

ScoreDir.....tell which direction is fewer PTSD symptoms

Timing of PD and Assessment
==========

MeasureTime *Write in*.....time from event to measure

EventtoTx *Write in*.....Time from event to debriefing

Effect Sizes ==========

Standardized Mean Difference

use Wilson's online calculator to obtain all ESs
For each study determine ES for each measure. Average all subscales for each measure.
For overall study ES average all measures.

If only PTSD "Caseness" is given then note that for the ES.

Pvalue.....given by author
TxMean .....given by author
TxSD.....given by author
CtrlMean.....given by author
CtrlSD.....given by author
tscore.....given by author
df.....given by author

rawES.....unadjusted ES

ES.....adjusted ES

BetterGrp.....which group had fewer symptoms
1 treatment
2 control
3 equal

StatsUsed.....Stats used for ES calculation
label: valStatsUsed *written in at first*
-97 not reported
1 means & S.D.
2 means & t test
3 proportion

APPENDIX C. KEYWORD SEARCH RESULTS FOR ELIGIBLE STUDIES

Sample search strategies.

Table 1. Search Results in PubMed Medline (1900 through 2011):

Search Strategy 1		**Search Strategy 2**	**PubMed Medline[1]**
In "text" unless indicated otherwise	**Articles**	In "text" unless indicated otherwise	**Articles**
debrief* AND 9/11	0		
Debrief AND World Trade Center	0		
debrief* (index list not helpful) **Note**: debrief* looks for debrief[All Fields] OR debrief'[All Fields] OR debriefed[All Fields] OR debriefed'[All Fields] OR debriefer[All Fields] OR debriefers[All Fields] OR debriefers'[All Fields] OR debriefing[All Fields] OR debriefing/critical[All Fields] OR debriefing/perioperative[All Fields] OR debriefing/reviews[All Fields] OR debriefing/testing[All Fields] OR debriefing'[All Fields] OR debriefing's[All Fields] OR debriefingens[All Fields] OR debriefings[All Fields] OR debriefs[All Fields])	1624	Debrief*	1624
1st way to narrow Article types (RCT, evaluation studies, comparative study)	200		
2nd way to narrow 1624 Filters activated: Randomized Controlled Trial, Evaluation Studies, Comparative Study, Publication date from 1900/01/01 to 2011/12/31, Adult: 19-44 years, Middle Aged: 45-64 years	89	Filters activated: Publication date from 1900/01/01 to 2011/12/31, Adult: 19-44 years, Middle Aged: 45-64 years	457
		AND PTSD	57
AND PTSD	15		
		NOT (miscarriage or postnatal[Title/Abstract])	55
		NOT (student or military[Title/Abstract])	46

	NOT review[Filter]	42
	AND crisis intervention[MeSH Major Topic]	17
	Note: debrief* AND crisis intervention[MeSH Major Topic] yielded 32 articles.	
Found 1 possible study, but did not meet full eligibility requirements (groups too different: military & firefighters) Eid, J., Helge-Johnsen, B.r., & Weisaeth, L. (2001). The effects of group psychological debriefing on acute stress reactions following a traffic accident: A quasi-experimental approach. *International Journal of Emergency Mental Health, 3*(3), 145-154.	Found 1 possible study, but did not meet full eligibility requirements (no statistical data for effect size) Smith, C., & Chesnay, M. (1994). Critical incident stress debriefings for crisis management in post-traumatic stress disorders. *Medicine & Law, 13*, 185-191.	

Table 2. Example of Search Results in PsycINFO which includes the relatively new database Pilots dedicated to psychological trauma (2001 through 2011) for Studies from 9/11:

Final search query: **debrief*** and **9/11** and not KW=(**military** or **soldier** or **combat)**

Searching all document text **Limits: age is Adulthood (18+)**	**PsycINFO**
debriefing	4322
debrief*	4638
debrief* AND 9/11	271
debrief* AND 9/11 AND published 2001-2012	266
debrief* AND 9/11 AND published 2001-2012 IN social sciences area	443
debrief* AND 9/11 AND published 2001-2012 AND human	265
debrief* AND 9/11 AND published 2001-2012 AND human AND [subject population adult]	84
debrief* AND 9/11 AND published 2001-2012 AND human AND [subject population adult] AND NOT [in keywords] military or combat or soldier	68

APPENDIX D. WITHIN-STUDY GROUP EQUIVALENCE

This Appendix contains all information on within study group equivalence.The following Table 1 shows the four categories of equivalence considered and the final rating of within study group equivalence, listed by most to least equivalent.

Table 1. Within Study Equivalence between Treatment and Control Groups

Study	Demographics[1]	Job Experience[2]	Event Specific[3]	Mental/Physical Health[4]	RATED GROUP EQUIVALENCE
4	Equivalent	NR	Equivalent	Equiv (est.)	Equiv est.
5	Equivalent	Equivalent	NR	NR	Equiv est.
8	Equiv	Equivalent	NOT Equiv	Equivalent	Equiv est.
2	NOT Equiv est.	Equivalent	NR	NOT Equiv	NOT Equiv
7	NOT Equiv est.	NR	NOT Equiv est.	NR	NOT Equiv est.
3	Equiv est.	NOT Equiv	NOT Equiv	NOT Equiv	NOT Equiv est.
12	NOT Equiv est.	NR	NOT Equiv est.	NR	NOT Equiv est.
14	NOT Equiv est.	NOT Equiv est.	NR	NR	NOT Equiv est.
9	NR	NR	NR	NR	Insufficient data
6	NR	NR	NR	NR	Insufficient data
13	NR	NR	NR	NR	Insufficient data
11	NR	NR	NR	NR	Insufficient data
15	NR	NR	NR	NR	Insufficient data
1	Equivalent	NR	NR	NR	Insufficient data
10	NR	NR	NR	NR	Insufficient data
16	NR	NR	NR	NR	Insufficient data

1 **Demographics**: age, sex, race, education, marital status, income

2 **Job Experience**: years on job, job rank (e.g., detective vs. patrolman)

3 **Event Specific**: measure of stress (level of stress from event, self-reported), threat description (e.g., number of gun shots fired, injuries), work performed (e.g., length of time on site, type of work outside of normal First Responder's training)

4 **Mental/Physical Health**: number of prior events, time frame of prior events, sick days from work before event, previous use of counseling or medication for mental health

5 **Rated Group Equivalence**: composite judgment of group equivalence considers overall equivalence of each subgroup of equivalence as well as the magnitude of any differences reported by study author (e.g., although Study 142 shows equivalence in two of the four subgroups [Job and Mental/Physical Health], there is a large difference in the Event Specific constructs of Measure of Stress and Threat Description with the treatment group reporting more stress/fear and experiencing more threatening circumstances. See Table A142.)

Table 2 shows how the descriptors considered in the within study group equivalence determination were reported. These variables are shown in four categories: Demographics, Job Experience, Event Specific, and Mental/Physical Health, used to determine group equivalence. After each variable of interest are four categories of data reporting: for treatment and control separately (ideal for determining equivalence within experimental study groups); a statement by the study author(s) that the treatment and comparison groups were equivalent or not; for total number of subjects in the study; no

data or information. Authors' statements like "no significant differences were found" prevents the use of effect sizes to aid in further determining within study group equivalence (as well as direction and magnitude of difference) and gives no information for comparison among studies. Author statements of no difference between groups were coded as equivalent. While data for all subjects aids in comparing between studies, it does not allow a determination of within study group equivalence.

Table 2. How Descriptors for Subjects were Reported

Equivalence Subject Descriptives	Studies (*k*) (*K*=16)	Sample (*n*) (*N*=2,920)	% of *N*
DEMOGRAPHICS			
Age			
data by experimental group	4	376	13
author statement about group equivalence	2	300	10
data for all subjects only	7	1,948	67
Not Reported	3	296	10
Gender			
data by experimental group	8	867	30
author reported group equivalence	2	765	26
all subjects only	3	781	27
Not Reported	3	507	17
Race/Ethnicity			
data by experimental group	2	282	10
author reported group equivalence	1	660	23
all subjects only	1	55	2
Not Reported	12	1,923	66
Educational Level			
data by experimental group	3	380	13
author reported group equivalence	2	170	6
all subjects only	3	1,386	47
Not Reported	8	984	34
Married			
data by experimental group	2	282	10
author reported group equivalence	2	300	10
all subjects only	6	1,452	50
Not Reported	6	886	30
Income			
data by experimental group	1	114	4
author reported group equivalence	0	0	0
all subjects only	1	660	23
Not Reported	14	2,146	73
JOB EXPERIENCE			
Years on Job			
data by experimental group	3	262	9
author reported group equivalence	1	105	4

Equivalence Subject Descriptives	Studies (*k*) (*K*=16)	Sample (*n*) (*N*=2,920)	% of *N*
all subjects only	5	1,414	48
Not Reported	7	1139	39
Job Rank			
data by experimental group	2	191	7
author reported group equivalence	2	165	6
all subjects only	4	1,349	46
Not Reported	8	1,215	42
EVENT SPECIFIC			
Self-Reported Stress			
data by experimental group	3	342	12
author reported group equivalence	3	427	15
all subjects only	1	65	2
Not Reported	9	2,086	86
Threat Description			
data by experimental group	1	60	2
author reported group equivalence	3	468	16
all subjects only	2	380	13
Not Reported	10	2,012	69
Work Performed			
data by experimental group	2	83	3
author reported group equivalence	2	273	9
all subjects only	4	630	22
Not Reported	8	1,934	66
MENTAL/PHYSICAL HEALTH			
Sick Days (Prior Year)			
data by experimental group	1	168	6
author reported group equivalence	0	0	0
all subjects only	0	0	0
Not Reported	15	2,752	94
Prior Events (Number)			
data by experimental group	2	239	8
author reported group equivalence	3	292	10
all subjects only	1	507	17
Not Reported	10	1,882	64
Prior Events (Timeframe)			
data by experimental group	0	0	0
author reported group equivalence	1	127	4
all subjects only	0	0	0
Not Reported	15	2,793	96
Prior Psychological Counseling/Medication			
data by experimental group	1	168	6
author reported group equivalence	1	105	4
all subjects only	0	0	0
Not Reported	14	2,647	91

None of these studies assigned subjects randomly to treatment and comparison groups. Formation of comparison groups is shown in Table 3.

Table 3. How Comparison Groups were Formed

Study	PD	PD group	*Comparison Group*	ES_{sm}
1	Mandatory	from depts where mandatory	from depts where not offered	1.26
2	Mandatory	from depts where mandatory	from depts where not offered	.86
3	Voluntary	chose debriefing	declined debriefing (did not perceive event as "shocking" or had no time	.39
4	Voluntary	worked the day after the event	either chose to keep working or took a day off after event, thus missed PD but these said they would have "liked to be debriefed	.08
5	Not reported	Not reported	Not reported	.06
6	Not reported		not offered CISD, the event happened before CISD was being used, or they chose not to participate in CISD	-.16
7	Not reported	Not reported	Not reported	.09
8	Voluntary	PD offered	PD not offered	.52
9	Not reported	Not reported	Not reported	.15
10	Not reported	PD voluntary for all who were on site of crash	Not reported	-.18
11	Not reported	Not reported	Not reported	-.28
12	Voluntary	depts notified author of CISD participants	depts notified author of groups who opted out of CISD	-.90
13	Mandatory	Not reported	Not reported	-.08
14	Voluntary	choice of subject to attend or not, all were on scene	choice of subject to attend or not, all were on scene	.29
15	Mandatory	debriefing mandatory	No reason given for not attending PD	.47
16	Voluntary	Not reported	Not reported	-.27

Therefore, assessing equivalence between the treatment and control groups became a complex, but necessary task. I formed four areas of equivalence: demographics, job experience, event specific information, and mental/physical health.

The Demographics area consists of age, sex, race, education, marital status, and income. Job experience includes years on the job and the rank of the subjects. Event specific information consists of the subject's report or ranking of how much stress/anxiety/distress the event caused; reports of specific threats/dangers faced during the event; and what type of work the First Responder was required to do during the event (e.g., was it work they were trained to do). Mental/Physical Health issues are the number of prior events the subject has experienced, the time frame of these events with respect to

the event under study, sick days from work before the event, and whether or not the subject has had mental health counseling/diagnoses/medication.

I first entered all available data from each study into a table (16 tables), noting where there were no data reported. I then determined equivalence for each variable within its respective area of equivalence. I used the study author's statistics, or calculated effect sizes where data were available. If an effect size was < .20 then the groups were determined to be equivalent as Cohen considers this a small effect size (Cohen, 1988).

I then combined these findings to determine the equivalence for that area. Finally, I looked at the equivalence ratings for the four categories, giving more weight to any area that showed a large magnitude of nonequivalence (coder judgment noted by "est." after equivalence determination), and determined a Rated Group Equivalence rating for each study of Equivalent, Not Equivalent, or Insufficient Data. The overall group equivalence for each study notes where coder judgment was used ("est." appears after rating), however the estimated status is dropped for final coding.

These areas of equivalence were chosen by two criteria. First, what was actually reported, and second information that has been discussed as important from the literature cited in Chapter II in the predictor literature section.

Group Level Equivalence Characteristics by Study

Study 9

(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment *n* = 233	Control *n* = 82	Group Difference *N* = 315	Group Equivalence
Demographics				**Not Reported**
Age	nr	nr	*M* =35.1, *SD*=10.6	nr
Sex	nr	nr	nr	nr
Race	nr	nr	nr	nr
Education	nr	nr	nr	nr
Marital Status	nr	nr	74% married	nr
Income	nr	nr	nr	nr
Job				**Not Reported**
Years on Job	nr	nr	nr	nr
Job Rank	nr	nr	nr	nr
Event Specific				**Not Reported**
Measure of Stress	nr	nr	20% close to or panicked 7% bereaved	nr
Threat description	nr	nr	41% used emergency procedures to protect from fire 23% property damage 20% close to death 27% injured (12% hospitalized)	nr
Work Performed	nr	nr	Fire and rescue averaged 15.6 hrs fighting fire	nr
Mental/Physical Health				**Not Reported**
Number of Prior Events	nr	nr	nr	nr
Time Frame of Prior Events	nr	nr	nr	nr
Sick days from Work	nr	nr	nr	nr
Previous Mental Health	nr	nr	nr	nr
RATED GROUP EQUIVALENCE				**NOT REPORTED**

Study 7

(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment *n* = 62	Control *n* = 133	Group Difference *N* = 195	Group Equivalence
Demographics				**NOT Equiv (est.)**
Age	nr	nr	Equiv. per author	EQ
Sex	58% male	72% male	X^2=3.85, *p*<.05	NEQ Tx>Female Tx>risk
Race	nr	nr	nr	nr
Education	*M*=8.71	*M*=7.52	*t*=3.28, p<.005	NEQ Tx>Educ Tx<risk
Marital Status	nr	nr	Equiv. per author	EQ
Income	nr	nr	nr	nr
Job				**Not Reported**
Years on Job	nr	nr	nr	nr
Job Rank	nr	nr	nr	nr
Event Specific				**NOT Equiv (est.)**
Measure of Stress	nr	nr	Equiv. per author	EQ
Threat description	89% non threat	76% non threat	X^2=4.31, *p*<.05	NEQ Tx <threat Tx< risk
Work Performed	nr	nr	Equiv. per author	EQ
Mental/Physical Health				**Not Reported**
Number of Prior Events	nr	nr	nr	nr
Time Frame of Prior Events	nr	nr	nr	nr
Sick days from Work	nr	nr	nr	nr
Previous Mental Health	nr	nr	nr	nr
RATED GROUP EQUIVALENCE				**NOT Equiv (est.)**

Study 3

(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment *n* = 86	Control *n* = 82	Group Difference *N* = 168	Group Equivalence
Demographics				**Equiv (est.)**
Age	*M*=28.9 *SD*=5.6	*M*=31.7 *SD*=7.1	*F*(2)=7.4, *p*<.01 *M*=31 ES=.44	NE Tx younger Tx >risk
Sex	70% M	65% M		EQ
Race	92% from Netherlands	89% from Netherlands		EQ est.
Education	nr	nr	nr	nr
Marital Status	66% married	71% married	$X^2(1)=6.6$, p <.05 ES=.11	EQ Tx>risk
Income	nr	nr	nr	nr
Job				**Not Equiv**
Years on Job	*M*=5.1 *SD*=6	*M*=8.7 *SD*=7.9	*ES* = .51	NEQ Tx<years Tx >risk
Job Rank	nr	nr	$X^2(1)=6.6$, p <.05	NEQ Tx>patrol officers vs. higher ranks
Event Specific				**NOT Equiv**
Measure of Stress	*M*=31.4 *SD*=9.9	*M*=29.3 *SD*=7.4	*ES* = .24	NEQ Tx >stress Tx>risk
Threat description	nr	nr	Equiv. per author	EQ
Work Performed	nr	nr	$X^2(1)=4.7$, p <.05	NEQ Tx less likely to have event involve death or serious injury Tx<risk
Mental/Physical Health				**NOT Equiv**
Number of Prior Events	*M*=10.3 *SD*=5.5	*M*=14.4 *SD*=6.3	*ES* = .69	NEQ Tx<events Tx<risk
Time Frame of Prior Events	nr	nr	nr	nr
Sick days previous year	*M*=3.1 *SD*=6.3	*M*=7.2 *SD*=24.7	*ES* = .23	NEQ Tx<sick days Tx<risk
Previous Mental Health	6%	10%	*ES* = .15	EQ
RATED GROUP EQUIVALENCE				**NOT Equiv (est.)**

Study 13

(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment *n* = 121	Control *n* = 404	Group Difference *N* = 525	Group Equivalence
Demographics				**Not Reported**
Age	nr	nr	*M*=35.22 *SD*=8.18	nr
Sex	nr	nr	89% Male	nr
Race	nr	nr	nr	nr
Education	nr	nr	68% secondary, 22% tertiary 10% no qualifications	nr
Marital Status	nr	nr	nr	nr
Income	nr	nr	nr	nr
Job				**Not Reported**
Years on Job	nr	nr	55% have 1-10 years experience	nr
Job Rank	nr	nr	72% constables 25% sergeants 3% higher ranks	nr
Event Specific				**Not Reported**
Measure of Stress	nr	nr	nr	nr
Threat description	nr	nr	nr	nr
Work Performed	nr	nr	nr	nr
Mental/Physical Health				**Not Reported**
Number of Prior Events	nr	nr	89% limited events 11% disasters *M*=2.6 *SD*=1.7 Equiv. per author	EQ
Time Frame of Prior Events	nr	nr	nr	nr
Sick days previous year	nr	nr	nr	nr
Previous Mental Health	nr	nr	nr	nr
RATED GROUP EQUIVALENCE				**Not Reported**

Study 4

(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment *n* = 46	Control *n* = 59	Group Difference *N* = 105	Group Equivalence
Demographics				**Equiv.**
Age	nr	nr	Equiv. per author *M*=37 *SD*= 6.3	EQ
Sex	nr	nr	Equiv. per author 81% Male	EQ
Race	nr	nr	nr	nr
Education	nr	nr	Equiv. per author	EQ
Marital Status	nr	nr	Equiv. per author	EQ
Income	nr	nr	nr	nr
Job				**Equiv.**
Years on Job	nr	nr	Equiv. per author *M*=13 *SD*= 6.4	EQ
Job Rank	nr	nr	Equiv. per author	EQ
Event Specific				**Equiv.**
Measure of Stress	nr	nr	Equiv. per author	EQ
Threat description	nr	nr	Equiv. per author	EQ
Work Performed	nr	nr	Equiv. per author	EQ
Mental/Physical Health				**Equiv. est.**
Number of Prior Events	nr	nr	Equiv. per author	EQ
Time Frame of Prior Events	nr	nr	nr	nr
Sick days previous year	nr	nr	nr	nr
Previous Mental Health	nr	nr	Equiv. per author	EQ
RATED GROUP EQUIVALENCE				**EQUIV. est.**

Study 11

(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment *n* = 37	Control *n* = 90	Group Difference *N* = 127	Group Equivalence
Demographics				**Not Reported**
Age	nr	nr	*M*=37.5 (range 16-63)	nr
Sex	nr	nr	nr	nr
Race	nr	nr	nr	nr
Education	nr	nr	nr	nr
Marital Status	nr	nr	78% married or common-law	nr
Income	nr	nr	nr	nr
Job				**Not Reported**
Years on Job	nr	nr	*M*=12 years (range 30 days - 38 years)	nr
Job Rank	nr	nr	36% officers	nr
Event Specific				**Not Reported**
Measure of Stress	nr	nr	60% saw child death	NEQ Tx >distress Per author
Threat description	nr	nr	nr	nr
Work Performed	nr	nr	nr	nr
Mental/Physical Health				**Not Reported**
Number of Prior Events	nr	nr	Equiv. per author	EQ
Time Frame of Prior Events	nr	nr	nr	nr
Sick days previous year	nr	nr	nr	nr
Previous Mental Health	nr	nr	nr	nr
RATED GROUP EQUIVALENCE				**NOT REPOTED**

Study 12

(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment *n* = 82	Control *n* = 32	Group Difference *N* = 114	Group Equivalence
Demographics				**Not Equiv. est.**
Age	*M*=31.9 *SD*=9.8 (17-66)	*M*=28.8 *SD*=5.4 (20-40)	*M*=31 *ES* = .35	NEQ Tx older Tx<risk
Sex	85% male	97% male	*ES* = .43	NEQ Tx >female Tx>risk
Race	94% white	88% white	*ES* = .21	NEQ Tx >white
Education	51% high school or more	47% high school or more	*ES* = .08	EQ
Marital Status	60% married	53% married	*ES* = .14	EQ
Income	71% 10-29K	63% 10-29K	*ES* = .17	EQ
Job				**Not Reported**
Years on Job	nr	nr	nr	nr
Job Rank	nr	nr	nr	nr
Event Specific				**Not Equiv. est.**
Measure of Stress	*M*=6	*M*=4.03	*t*= -4.19, *DF*=112, *p*=.001	NEQTx >stress Tx>risk
Threat description	nr	nr	nr	nr
Work Performed	nr	nr	nr	nr
Mental/Physical Health				**Not Reported**
Number of Prior Events	nr	nr	nr	nr
Time Frame of Prior Events	nr	nr	nr	nr
Sick days previous year	nr	nr	nr	nr
Previous Mental Health	nr	nr	nr	nr
RATED GROUP EQUIVALENCE				**NOT EQUIV. est.**

Study 15

(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment *n* = 42	Control *n* = 23	Group Difference *N* = 65	Group Equivalence
Demographics				**Not Reported**
Age	nr	nr	nr	nr
Sex	nr	nr	nr	nr
Race	nr	nr	nr	nr
Education	nr	nr	nr	nr
Marital Status	nr	nr	nr	nr
Income	nr	nr	nr	nr
Job				**Not Reported**
Years on Job	nr	nr	nr	nr
Job Rank	nr	nr	nr	nr
Event Specific				**Not Reported**
Measure of Stress	nr	nr	PTSD symptoms 53% few 35% mild 10% moderate	nr
Threat description	nr	nr	73% attacked or threatened by crowd	nr
Work Performed	nr	nr	*M*=37 *SD*=48 Dispatch responses *M*=65 *SD*=29 EMT hours	nr
Mental/Physical Health				**Not Reported**
Number of Prior Events	nr	nr	nr	nr
Time Frame of Prior Events	nr	nr	nr	nr
Sick days previous year	nr	nr	nr	nr
Previous Mental Health	nr	nr	nr	nr
RATED GROUP EQUIVALENCE				**NOT REPORTED**

Study 8

(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment *n* = 30	Control *n* = 30	Group Difference *N* = 60	Group Equivalence
Demographics				**Equiv.**
Age	nr	nr	Range 21-52 Equiv. per author	EQ
Sex	100% male	100% male	100% male	EQ
Race	nr	nr	nr	nr
Education	nr	nr	nr	nr
Marital Status	nr	nr	63% married	nr
Income	nr	nr	nr	nr
Job				**Equiv.**
Years on Job	nr	nr	Equiv. per author	EQ
Job Rank	nr	nr	Equiv. per author	EQ
Trait Anger	*M*=49.8 *SD*=11.6	*M*=57.1 *SD*=13.1	*ES* = .59	NEQ Tx < Angry
Event Specific				**Not Equiv.**
Measure of Stress				EQ
Fear for self	*M*=3.0 *SD*=1.3	*M*=2.97 *SD*=1.7	*ES* = .02	EQ
Fear for colleague	*M*=2.6 *SD*=1.6	*M*=2.8 *SD*=1.4	*ES* = .13	EQ
Fear for public	*M*=2.0 *SD*=1.6	*M*=1.7 *SD*=1.6	*ES* = .19	EQ
Remember incident	*M*=3.6 *SD*=0.8	*M*=3.4 *SD*=1.0	*ES* = .22	NEQ Tx >memory Tx>risk
Time to prepare	*M*=0.9 *SD*=1.4	*M*=0.6 *SD*=1.1	*ES* = .24	NEQ Tx >time to prep Tx<risk
Threat description				NEQ
Police fired shots	*M*=2.4 *SD*=3. 3	*M*=1.4 *SD*=1.9	*ES* = .37	NEQ Tx > shots Tx>risk
Shots fired at police (*M, SD*)	*M*=3.5 *SD*=6.6	*M*=0.2 *SD*=0.6	*ES* = .70	NEQ Tx >rec'd fire Tx>risk
Person shot or killed	47%	20%	*ES* = .58	NEQ Tx >injury/death Tx>risk
Mental/Physical Health				**Equiv.**
Number of Prior Events	nr	nr	Equiv. per author	EQ
Time Frame of Prior Events	nr	nr	nr	nr
Sick days previous year	nr	nr	nr	nr
Previous Mental Health	nr	nr	nr	nr
RATED GROUP EQUIVALENCE				**NOT EQUIV. est.**

Study 2

(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment *n* = 40	Control *n* = 31	Group Difference *N* = 71	Group Equivalence
Demographics				**Not Equiv.**
Age	*M*=30.85 *SD*=5.7	*M*=30.42 *SD*=7.4	*M*=30.6 *ES* = .36	NEQ Tx older Tx<risk
Sex	100% male	100% male	100% male	EQ
Race	nr	nr	nr	nr
Education	*M*=14.02 *SD*=1.86	*M*=13.39 *SD*=1.56	*ES* = .36	NEQ Tx<educ. Tx>risk
Marital Status	nr	nr	58% married Equiv. per Author	EQ
Income	nr	nr	nr	nr
Job				**Equiv.**
Years on Job	*M*=5.83 *SD*=4	*M*=5.55 *SD*=4.11	*ES* = .07	EQ
Job Rank	nr	nr	nr	nr
Event Specific				**Not Reported**
Measure of Stress	nr	nr	nr	nr
Threat description	nr	nr	nr	nr
Work Performed	nr	nr	nr	nr
Mental/Physical Health				**Not Equiv.**
Number of Prior Events	*M*=4.43 *SD*=5.18	*M*=5.81 *SD*=4.66	*ES* = .87	NEQ Tx<priors Tx<risk
Time Frame of Prior Events	nr	nr	nr	nr
Sick days previous year	nr	nr	nr	nr
Previous Mental Health	nr	nr	nr	nr
RATED GROUP EQUIVALENCE				**NOT EQUIV.**

Study 1

(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment *n* = 30	Control *n* = 35	Group Difference *N* = 65	Group Equivalence
Demographics				**Equiv.**
Age	nr	nr	Equiv. per author *M*=28 *SD*=6.27	EQ
Sex	100% male	100% male	100% male	EQ
Race	nr	nr	nr	nr
Education	*M*=13.3 *SD*=1.49	*M*=13.8 *SD*=*nr*	*F(1)*=1.63 (not significant)	EQ
Marital Status	nr	nr	32% married	nr
Income	nr	nr	nr	nr
Job				**Not Reported**
Years on Job	nr	nr	*M*=3.9 *SD*=2.87	nr
Job Rank	nr	nr	nr	nr
Event Specific				**Not Reported**
Measure of Stress	nr	nr	nr	nr
Threat description	nr	nr	nr	nr
Work Performed	nr	nr	nr	nr
Mental/Physical Health				**Not Reported**
Number of Prior Events	nr	nr	nr	nr
Time Frame of Prior Events	nr	nr	nr	nr
Sick days previous year	nr	nr	nr	nr
Previous Mental Health	nr	nr	nr	nr
RATED GROUP EQUIVALENCE				**NOT REPORTED**

Study 10

(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment *n* = 24	Control *n* = 31	Group Difference *N* = 55	Group Equivalence
Demographics				**Not Reported**
Age	nr	nr	*M*=42.7 (26-59)	nr
Sex	nr	nr	male	nr
Race	nr	nr	97% Caucasian	nr
Education	nr	nr	nr	nr
Marital Status	nr	nr	nr	nr
Income	nr	nr	nr	nr
Job				**Not Reported**
Years on Job	nr	nr	*M*=17.1 (1-33)	nr
Job Rank	nr	nr	30% higher ranks	nr
Event Specific				**Not Reported**
Measure of Stress	nr	nr	nr	nr
Threat description	nr	nr	nr	nr
Work Performed	nr	nr	88.3% worked on crash site	nr
Mental/Physical Health				**Not Reported**
Number of Prior Events	nr	nr	nr	nr
Time Frame of Prior Events	nr	nr	nr	nr
Sick days previous year	nr	nr	nr	nr
Previous Mental Health	nr	nr	nr	nr
RATED GROUP EQUIVALENCE				**NOT REPORTED**

Study 5

(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment *n* = 264	Control *n* = 396	Group Difference *N* = 660	Group Equivalence
Demographics				**Equiv.**
Age	nr	nr	Equiv. per author Modal range 30-39	EQ
Sex	nr	nr	Equiv. per author 97% male	EQ
Race	nr	nr	Equiv. per author 79% white	EQ
Education	nr	nr	Equiv. per author 31%>HS, 68% HS	EQ
Marital Status	nr	nr	Equiv. per author 77% married	EQ
Income	nr	nr	Equiv. per author Modal range 30-39k per year	EQ
Job				**Equiv.**
Years on Job	nr	nr	Equiv. per author *median*=12	EQ
Job Rank	nr	nr	Equiv. per author 51% lower 38% middle 9% upper	EQ
Event Specific				**Not Reported**
Measure of Stress	nr	nr	nr	nr
Threat description	nr	nr	nr	nr
Work Performed	nr	nr	nr	nr
Mental/Physical Health				**Not Reported**
Number of Prior Events	nr	nr	nr	nr
Time Frame of Prior Events	nr	nr	nr	nr
Sick days previous year	nr	nr	nr	nr
Previous Mental Health	nr	nr	nr	nr
RATED GROUP EQUIVALENCE				**EQUIV. est.**

Study 16

(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment *n* = 109	Control *n* = 110	Group Difference *N* = 219	Group Equivalence
Demographics				**Not Reported**
Age	nr	nr	*M*=35.4	nr
Sex	nr	nr	77% male	nr
Race	nr	nr	nr	nr
Education	nr	nr	46% >HS 54% HS	nr
Marital Status	nr	nr	59% married	nr
Income	nr	nr	nr	nr
Job				**Not Reported**
Years on Job	nr	nr	nr	nr
Job Rank	nr	nr	nr	nr
Event Specific				**Not Reported**
Measure of Stress	nr	nr	nr	nr
Threat description	nr	nr	nr	nr
Work Performed	nr	nr	nr	nr
Mental/Physical Health				**Not Reported**
Number of Prior Events	nr	nr	nr	nr
Time Frame of Prior Events	nr	nr	nr	nr
Sick days previous year	nr	nr	nr	nr
Previous Mental Health	nr	nr	nr	nr
RATED GROUP EQUIVALENCE				**NOT REPORTED**

Study 14

(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment *n* = 9	Control *n* = 14	Group Difference *N* = 23	Group Equivalence
Demographics				**Not Equiv. est.**
Age	*M*=28.9	*M*=26.3	*M*=27.3	NEQ Tx older est. Tx<risk?
Sex	89% Male	93% Male	*ES* = .14	EQ
Race	nr	nr	nr	nr
Education	nr	nr	nr	nr
Marital Status	nr	nr	nr	nr
Income	nr	nr	nr	nr
Job				**Not Equiv. est.**
Years on Job	*M*=5.6	*M*=3.6	*M*=4.42	NEQ est. Tx<risk?
Job Rank	66% EMT-P	71% EMT-P	EMTs & EMT-Paramedics *ES* = .11	EQ
Event Specific				**Not Reported**
Measure of Stress	nr	nr	nr	nr
Threat description	nr	nr	nr	nr
Work Performed	*M*=2.9	*M*=2.9	nr	EQ
Mental/Physical Health				**Not Reported**
Number of Prior Events	nr	nr	nr	nr
Time Frame of Prior Events	nr	nr	nr	nr
Sick days previous year	nr	nr	nr	nr
Previous Mental Health	nr	nr	nr	nr
RATED GROUP EQUIVALENCE				**NOT Equiv (est.)**

Study 6

(nr = not reported, EQ = equivalent, est.= coder judgment, NEQ=not equivalent)

	Treatment *n* = 107	Control *n* = 64	Group Difference *N* = 171	Group Equivalence
Demographics				**Not Reported**
Age	nr	nr	nr	nr
Sex	nr	nr	nr	nr
Race	nr	nr	nr	nr
Education	nr	nr	nr	nr
Marital Status	nr	nr	nr	nr
Income	nr	nr	nr	nr
Job				**Not Reported**
Years on Job	nr	nr	nr	nr
Job Rank	nr	nr	nr	nr
Event Specific				**Not Reported**
Measure of Stress	nr	nr	nr	nr
Threat description	nr	nr	nr	nr
Work Performed	nr	nr	nr	nr
Mental/Physical Health				**Not Reported**
Number of Prior Events	nr	nr	nr	nr
Time Frame of Prior Events	nr	nr	nr	nr
Sick days from Work	nr	nr	nr	nr
Previous Mental Health	nr	nr	nr	nr
RATED GROUP EQUIVALENCE				**NOT REPORTED**

APPENDIX E. CHARACTERISTICS REPORTED BY LESS THAN HALF OF STUDIES

Table 1. Subject and Equivalence Descriptors

Subject and Equivalence Descriptors	Studies *k* (*K*=16)	FRs *n* (*N*=2920)	% of *N*
Race			
More than 75% White	3	337	12%
Not Reported	13	2,583	88%
Education Level			
More than 50% > High School	3	250	9%
Less than 50% > High School	4	1,581	54%
Not Reported	9	1,089	37%
Income			
24% 30,000+	1	114	4%
100% 30,000+	1	660	23%
Not Reported	14	2,146	73%
Job Rank			
More than 50% Upper Rank	1	23	1%
Less than 50% Upper Rank	4	1,349	46%
Not Reported	11	1,548	53%
Event Stress (self-reported)			
Reported Any Data	4	407	14%
No Data Reported	12	2,513	86%
Event Threat (observed)			
Reported Any Data	3	440	15%
No Data Reported	13	2,480	85%
Event Work (type and length)			
Reported Any Data	6	713	24%
No Data Reported	10	2,207	76%
Prior Events (number)			
Reported Any Data	3	746	26%
No Data Reported	13	2,174	74%
Prior Events (timing)			
Reported Any Data	0	0	0%
No Data Reported	16	2,920	100%
Sick Days (prior year)			
Reported Any Data	1	168	6%
No Data Reported	15	2,752	94%
Any Prior Mental Health Tx			
Reported Any Data	1	168	6%
No Data Reported	15	2,752	94%
PD Length (Minutes)			
60 or less	2	165	6%
90	3	355	12%
120	1	127	4%
Not Reported	10	2,273	78%

APPENDIX F. DESCRIPTION OF MEASURES USED FOR STUDY EFFECT SIZES

Table B1 lists Study number, measures and subscale(s) (subscale used, or if more than one subscale was averaged) used to form the *ES* for psychological/physical distress. Table B2 lists measures used, description, citations, and the study that used it.

Table B1. Measure(s) Used to Form Effect Size for Each Study for First Post PD Assessment

Study #	Num. Measures used in Study *ES*	Measure(s)	Subscale(s)[1]
1	2	Beck Depression Inventory (BDI) State-Trait Anxiety Inventory (STAI)……	 State anxiety
2	4	BDI STAI……... Novaco Provocation Inventory Author written questionnaire[2]	 State anxiety
3	1	STAI……...	State anxiety
4	1	Structured Interview for PTSD (SCID-SI-PTSD)[2]	
5	2	Impact of Events Scale (IES)[2]…… Hospital Anxiety and Depression Scale (HADS)	Intrusion, avoidance Anxiety, depression
6	1	IES[2]	
7	2	IES[2] and GHQ-12	
8	1	State-Trait Anger Expression Inventory (STAXI).	State anger; trait anger; author compiled anger expression from 3 subscales: anger-in, anger-out, anger-control
9	1	General Health Questionnaire-12 (GHQ-12)	
10	2	Brief Symptom Inventory (BSI) Health Perception Questionnaire……	 Study author used 32 out of 36 items
11	2	IES[2] and BDI	
12	2	IES[2] Everly Stress Inventory……..	 Cognitive/emotional stress
13	1	Mississippi PTSD Scale-Civilian (M-PTSD-C)[2]	
14	1	Author scale (6 symptoms from PTSD DSM-III)[2]	
15	1	Frederick Reaction Index (FRA-A)[2]	
16	1	Los Angeles Symptom Checklist (LASC)[2]	

[1] *ES* calculated for each subscale, then averaged for measure *ES*
[2] PTSD measure

Table B2: Measure Name, Description, Citation, and Study where Outcome was used in Effect Size

Measure	Description	Citation	Study#
Study author-compiled questionnaire	8 items from PTSD DSM-III. Distress over last 4 months. Rated 1-5, 1 not at all, 5 significant problem Irritability; sleep disturbance; feel guilty related to EMT/EMT paramedic experiences; emotionally numb/detached; interpersonal difficulties; nightmares about EMT/EMTP experiences; flashbacks; depression	Study author	14
Study author-written questionnaire	6 items--PTSD distress. Distress over last week Rated 1-3, Never, Occasionally, Often Nightmares; flashbacks; difficulty falling asleep; difficulty staying asleep; loss of appetite; always hungry	Study author	2
Beck Depression Inventory (BDI)	21 items--Depression assesses presence and severity of affective, cognitive, motivational, vegetative, psychomotor components	(Beck, 1967; Beck & Beamesderfer, 1974)	1, 2, 11
Brief Symptom Inventory (BSI)	53 items--primarily psychological symptoms along 9 dimensions. 5 point rating scale Short form of SCL-90. Convergent with MMPI scales Symptom Scales: Somatization; Obsessive-Compulsive; Interpersonal Sensitivity; Depression; Anxiety; Hostility; Phobic Anxiety; Paranoid Ideation; Psychoticism Global Indices: Global Severity Index--helps measure overall psychological distress level; Positive Symptom Distress Index--helps measure the intensity of symptoms; Positive Symptom Total--number of self-reported symptoms	(Conoley & Kramer, 1989; Derogatis & Melisaratos, 1983)	10
Everly Stress Inventory	Described in study as 30 item subscale-- cognitive/emotional stress arousal, rated 1-3, never, sometimes, often. But, 24 items in measure shown in appendix with 5 point rating scale—not at all, rarely, sometimes, often, or a lot. irritability; anxiety; sleep difficulty; tension headaches; depression	(Everly Jr. & Sobelman, 1987)	12
Frederick Reaction Index-Adult (FRA-A)	28 items--DSM PTSD symptoms 5 point rating scale--none of the time to most of the time	(Frederick, 1985, 1987)	15

Table B2: Measure Name, Description, Citation, and Study where Outcome was used in Effect Size

Measure	Description	Citation	Study#
General Health Questionnaire-12 (GHQ-12)	12 items--Full GHQ is 60 items. The GHQ-12 has "comparable psychometric properties to the longer versions used to detect psychiatric disorder in the general population and within community or non-psychiatric clinical settings such as primary care or general medical out-patients. It assesses the respondent's current state and asks if that differs from his or her usual state. It is therefore sensitive to short-term psychiatric disorders but not for long-standing attributes of the respondent" (D. Goldberg & Williams, 2011)	For full GHQ see (Goldberg, 1972; Goldberg & Williams, 2011; Goldberg & Hillier, 1979)	9
Hospital Anxiety and Depression Scale (HADS)	14 items --presence/absence and severity of anxiety/depression—original use was for patients in hospital medical outpatient clinic	(Zigmond & Snaith, 1983)	5
Health Perception Questionnaire	36 items--Assesses respondent's psychological perception of physical health based on symptoms experienced.	(Ware Jr., 1976; Ware Jr. & Karmos, 1976)	10
Impact of Events Scale (IES)	15-item self-report assesses subjective distress caused by an event Subscales: Intrusion, Avoidance	(Horowitz, Wilner, & Alvarez, 1979; Weiss & Marmar, 1996; Zilberg, Weiss, & Horowitz, 1982)	7, 6, 8, 11, 12
Impact of Events Scale-Revised (IES-R)	22 item self-report assesses subjective distress caused by an event during past 7 days Subscales: Intrusion, Avoidance, Hyperarousal Mean scores allow comparison with SCL-90-R Not used for PTSD diagnosis, but cutoff scores for preliminary diagnosis of PTSD cited in literature.	(Weiss & Marmar, 1996)	No studies reported using IES-R
Los Angeles Symptom Checklist	Full measure includes PTSD, general distress and adjustment problems. Subscale of 17 PTSD items (reexperiencing, avoidance, hyperarousal—DSM-IV). convergent with SCID-R for DSM-IIIR	(King, King, Leskin, & Foy, 1995)	16
Mississippi PTSD Scale-Civilian (M-PTSD-C)	35 items 5 point Likert scale Self-report on DSM-IV PTSD criteria and author's experience—usual directions are "since incident" Over past month	(Keane, Caddell, & Taylor, 1986)	13

Table B2: Measure Name, Description, Citation, and Study where Outcome was used in Effect Size

Measure	Description	Citation	Study#
Novaco Provocation Inventory	80 items--anger range of situations that evoke anger and intensity of anger	(Novaco, 1975)	2
Structured Interview for PTSD (SCID-SI-PTSD)	Allows distinguishing between symptoms linked to high-risk event under study and unrelated, high-risk events. based on DSM-III, but adapted to match DSM-III-R criteria when reanalyzed	(Davidson, Book, Colket, & et al., 1989)	4
Self-Rating Scale for PTSD (SRS-PTSD)	Frequency times intensity was scored	(Carlier, van Uchelen, Lamberts, & Gersons, 1998; Davidson, Book, Colket, & et al, 1997)	3
Spielberger State-Trait Anger Expression Inventory (STAXI)	44 items make up 6 scales and 2 subscales State Anger: intensity of anger at a particular time Trait Anger: disposition to experience anger	(Spielberger, 1996)	8
Spielberger State-Trait Anxiety Inventory (STAI)	20 items State Anxiety-how person feels now Trait Anxiety-how person habitually feels	(Spielberger, Gorsuch, & Lushene, 1970; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983)	1, 2, 3, 8

REFERENCES

NOTE: Source Studies Used in this Meta-Analysis are preceded by an asterisk (*).

Adams, R.E., Boscarino, J.A., & Figley, C.R. (2006). Compassion fatigue and psychological distress among social workers: a validation study. *American Journal of Orthopsychiatry, 76*(1).

Adams, R.E., Figley, C.R., & Boscarino, J.A. (2008). The Compassion Fatigue Scale: Its use with social workers following urban disaster. *Research and Social Work Practice, 18*(3), 238-250.

Agorastos, A., Marmar, C., & Otte, C. (2011). Immediate and early behavioral interventions for the prevention of acute and posttraumatic stress disorder. *Current Opinion in Psychiatry, 24*(6), 526.

American Psychiatric Association. (2012a). DSM-5: The Future Manual. Retrieved from http://www.psych.org/MainMenu/Research/DSMIV/DSMV.aspx

American Psychiatric Association. (2012b). Trauma- and Stressor-Related Disorders. Retrieved from http://www.dsm5.org/ProposedRevision/Pages/TraumaandStressorRelatedDisorders.aspx

American Psychiatric Association (APA). (2009a). *Diagnostic and Statistical Manual of Mental Disorders: 4th edition, Text Revision (DSM-IV-TR)*. Washington, D.C.: American Psychiatric Association.

American Psychiatric Association (APA). (2009b). Frequently Asked Questions About DSM (Publication no. http://www.dsmivtr.org/2-1faqs.cfm). Retrieved 2/24/2009, from http://www.dsmivtr.org/2-1faqs.cfm

American Psychiatric Association (APA), & Committee on Psychiatric Dimensions of Disaster. (2004). *Disaster Psychiatry Handbook*: American Psychiatric Foundation.

Andreasen, N.C. (2004). Acute and delayed posttraumatic stress disorders: A history and some issues. *The American Journal of Psychiatry, 161*, 1321-1323.

Andrews, B., Brewin, C.R., Philpott, R., & Stewart, L. (2007). Delayed-onset posttraumatic stress disorder: A systematic review of the evidence. *The American Journal of Psychiatry, 164*(9), 1319-1326.

Arendt, M., & Elklit, A. (2001). Effectiveness of psychological debriefing. *Acta Psychiatrica Scandinavica, 104*, 423-437.

Armstrong, K.R., Lund, P.E., McWright, L.T., & Tichenor, V. (1995). Multiple stressor debriefing and the American Red Cross: The East Bay Hills fire experience. *Social Work, 40*(1), 83-90.

Bartholomew, R.E., & Muniratnam, M.C.S. (2011). How should mental health professionals respond to outbreaks of mass psychogenic illness? *Journal of Cognitive Psychotherapy, 25*(4), 235-239(235). doi: 10.1891/0889-8391.25.4.235

Beck, A. (1967). *Depression: Clinical, Experimental, and Theoretical Aspects*. New York: Harper & Row.

Beck, A., & Beamesderfer, A. (1974). Assessment of depression: The depression Inventory. In P Pichot (Ed.), *Psychological Measurements in Psychopharmacology*. Paris: Karger, Basel.

Begg, C.B., & Mazumdar, M. (1994). Operating characteristics of a rank correlation test for publication bias. *Biometrics, 50*, 1088-1101.

Ben-Ezra, M., Essar, N., & Saar, R. (2005). Post-traumatic reactions among rescue personnel 96 hours after the Hilton hotel bombing in Sinai: The effect of previous exposure. *Stress and Health: Journal of the International Society for the Investigation of Stress, 21*(4), 269-272.

Benedek, D.M., Fullerton, C.S., & Ursano, R.J. (2007). First responders: Mental health consequences of natural and human-made disasters for public safety workers. *Annual Review of Public Health, 28*, 55-68.

Bennett, P., Williams, Y., Page, N., Hood, K., Woollard, M., & Vetter, N. (2005). Associations between organizational and incident factors and emotional distress in emergency ambulance personnel. *British Journal of Clinical Psychology, 44*(2), 215-226.

Bernard, B., & Driscoll, R. (2006). Health hazard evaluation of police officers, and firefighters after Hurricane Katrina--New Orleans, La, Oct 17-18 and Nov 30-Dec 5, 2005. *Morbidity and Mortality Weekly Report, 55*, 456-458.

Bisson, J., Jenkins, P., Alexander, J., & Bannister, C. (1997). Randomised controlled trial of psychological debriefing for victims of acute burn trauma. *British Journal of Psychiatry, 171*(1), 78-81. doi: 10.1192/bjp.171.1.78

Bloch, S., Reibstein, J., Holroyd, P., & Themen, J. (1979). A method for the study of therapeutic factors in group psychotherapy. *British Journal of Psychiatry, 134*(257-236).

Boals, A. (2012). The use of meaning making in expressive writing: When meaning is beneficial. *Journal of Social and Clinical Psychology, 31*(4), 393-409.

Bohl, N. (1988). *Effect of psychological interventions after critical incidents on anger, anxiety, and depression in police and firefighters*. Unpublished doctoral dissertation. California Graduate Institute. West Los Angeles.

*Bohl, N. (1991). The effectiveness of brief psychological interventions in police officers after critical incidents. In J Reese, J M Horn & C Dunning (Eds.), *Critical Incidents in Policing. Revised* (pp. 31-38). Washington, D. C.: U.S. Department of Justice, Federal Bureau of Investigation: U.S. Government Printing Office.

Boscarino, J.A., Figley, C.R., & Adams, R.E. (2004). Compassion fatigue following the September 11 terrorist attacks: A study of secondary trauma among New York City social workers. *International Journal of Emergency Mental Health, 6*(2), 57-66.

Bowler, R., Han, H., Gocheva, V., Nakagawa, S., Alper, H., DiGrande, L., & Cone, J. (2010). Gender Differences in Probable Posttraumatic Stress Disorder Among Police Responders to the 2001 World Trade Center Terrorist Attack. *American Journal of Industrial Medicine, 53*(12), 1186-1196. doi: 10.1002/ajim.20876

Breslau, N., Chilcoat, H., Kessler, R., Peterson, E., & Lucia, V. (1999). Vulnerability to assaultive violence: further specification of the sex difference in post-traumatic stress disorder. *Psychologial Medicine, 29*, 813-821.

Breslau, N., Kessler, R., Chilcoat Schultz, L., Davis, G., & Andreski, P. (1998). Trauma and posttraumatic stress disorder in the community: the 1996 Detroit Area Survey of Trauma. *Archives of General Psychiatry, 55*, 626-632.

Brown, A. (1996). Letter to the editor. *Journal of Emergency Medical Services, 21*(11), 10-12.

Bryant, R.A. (2007). Early intervention for post-traumatic stress disorder. *Early Intervention in Psychiatry, 1*(1), 19-26. doi: 10.1111/j.1751-7893.2007.00006.x

Bryant, R.A. (2009). A study of the protective function of acute morphine administration on subsequent posttraumatic stress disorder. *Biological Psychiatry, 65*(5), 438-440.

Carlier, I.V.E., Lamberts, R.D., & Gersons, B.P.R. (1997). Risk factors for posttraumatic stress symptomatology in police officers: A prospective analysis. *Journal of Nervous and Mental Disease, 185*(8), 498-506.

*Carlier, I.V.E., Lamberts, R.D., van Uchelen, A.J., & Gersons, B.P.R. (1998). Disaster-related post-traumatic stress in police officers: A field study of the impact of debriefing. *Stress Medicine, 14*(3), 143-148.

Carlier, I.V.E., van Uchelen, J.J., Lamberts, R.D., & Gersons, B.P.R. (1998). Clinical utility of a brief diagnostic test for PTSD. *Psychosomatic Medicine, 60*, 42-47.

*Carlier, I.V.E., Voerman, A.E., & Gersons, B.P.R. (2000). The influence of occupational debriefing on post-traumatic stress symptomatology in traumatized police officers. *British Journal of Medical Psychology, 73*(1), 87–98.

Chang, R.R. (2008). *Critical incident stress debriefing and the effect of timing of intervention on first responders: A preliminary study.* Available from ProQuest Dissertations and Theses database. (UMI No. 3342066).

Chemtob, C.M., Tomas, S., Law, W., & Cremniter, D. (1997). Postdisaster psychosocial intervention: a field study of the impact of debriefing on psychological distress. *American Journal of Psychiatry, 154*(3), 415-417.

Christiansen, D.M., & Elklit, A. (2008). Risk factors predict post-traumatic stress disorder differently in men and women. *Annals of General Psychiatry, 7*, 24-36. doi: 10.1186/1744-859X-7-24

Cieslak, R., Benight, C.C., Luszczynska, A., & Laudenslager, M.L. (2011). Longitudinal relationships between self-efficacy, post-traumatic distress and salivary cortisol among motor vehicle accident survivors. *Stress and Health, 27*(3), W261.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Conlon, L., Fahy, T., & Conroy, R. (1999). PTSD in ambulant RTA victims: a randomized controlled trial of debriefing. *Journal of Psychosomatic Research, 46*(1), 37-44.

Conoley, J., & Kramer, J. (Eds.). (1989). *The Tenth Mental Measurement Yearbook*. Lincoln, NE: The University of Nebraska Press.

Curtis, J.M. (1995). Elements of critical incident debriefing. *Psychological Reports, 77*(1), 91-96.

Davidson, J., Book, S., Colket, J., & et al. (1989). Validity and reliability of the DSM-III criteria for post-traumatic stress disorder: Experience with a structured interview. *The Journal of Nervous and Mental Disease, 177*, 336-341.

Davidson, J., Book, S., Colket, J., & et al. (1997). Assessment of a new self-rating scale for posttraumatic stress disorder. *Psychological Medicine, 27*(1), 153-160.

Deahl, M., Gillham, A.B., Thomas, J., Searle, M., & Srinivasan, M. (1994). Psychological sequelae following the gulf war: Factors associated with subsequent morbidity and the effectiveness of psychological debriefing. *British Journal of Psychiatry, 165*(1), 60-65.

Deahl, M., Srinivasan, M., Jones, N., Neblett, C., & Jolly, A. (2001). Evaluating psychological debriefing: Are we measuring the right outcomes? *Journal of Traumatic Stress, 14*(3), 527-529.

DePass, C.M. (2005). *Vicarious trauma in correctional mental health staff.* Available from ProQuest Dissertations and Theses database. (UMI No. 3195232)

Derogatis, L., & Melisaratos, N. (1983). The Brief Symptom Inventory: An introductory report. *Psychologial Medicine, 13*, 595-605.

Devilly, G.J., & Cotton, P. (2003). Psychological debriefing and the workplace: Defining a concept, controversies and guidelines for intervention. *Australian Psychologist, 38*(2), 144-150. doi: 10.1080/00050060310001707147

DeWolf Bosek, M.S., Glenn, L.M., & Reynolds, L. (2011). Is It Ethical to Do Dialysis But Not Cardiopulmonary Resuscitation? *JONA's Healthcare Law, Ethics, & Regulation, 13*(2), 47-52.

Dougall, A.L., Herberman, H.B., Delahanty, D.L., Inslicht, S.S., & Baum, A. (2000). Similarity of prior trauma exposure as a determinant of chronic stress responding to an airline disaster. *Journal of Consulting and Clinical Psychology, 68*(2), 290-295.

Duval, S., & Tweedie, R. (2000). A nonparametric "trim and fill" method of accounting for publication bias in meta-analysis. *Journal of the American Statistical Association, 95*(449), 89-98.

Egger, M., Smith, G.D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *British Medical Journal, 315*, 629-634.

Epstein, R.S., Fullerton, C.S., & Ursano, R.J. (1998). Posttraumatic stress disorder following an air disaster: A prospective study. *American Journal of Psychiatry, 155*(7), 934-938.

Everly Jr., G.S., Boyle, S.H., & Lating, J.M. (1999). The effectiveness of psychological debriefing with vicarious trauma: A meta-analysis. *Stress Medicine, 15*, 229-233.

Everly Jr., G.S., & Mitchell, J. (1999). *Critical incident stress management (CISM): A new era and standard of care in crisis intervention*. Ellicott City, MD: Chevron Publishing.

Everly Jr., G.S., & Mitchell, J.T. (2012). A primer on Critical Incident Stress Management (CISM). Retrieved from http://icisf.org/who-we-are/what-is-cism

Everly Jr., G.S., & Sobelman, S.A. (1987). *Assessement of the Human Stress Response: Neurological, Biochemical, and Psychological Foundations*. New York: AMS Press, Inc.

Figley, C.R. (1999). Police compassion fatigue (PCF): Theory, research, assessment, treatment, and prevention. In J M Violanti & D Paton (Eds.), *Police Trauma: Psychological Aftermath of Civilian Combat* (pp. 37-53). Springfield, IL: Charles C. Thomas Publisher, Ltd.

Frederick, C. (1985). Children traumatized by catestrophic situation. In S Eth & RS Pynoos (Eds.), *Posttraumatic Stress Disorder in Children* (pp. 71-100). Washington, D.C.: American Psychiatric Press, Inc.

Frederick, C. (1987). Psychic trauma in victims of crime and terrorism. In GR Vandenbos & BK Bryant (Eds.), *Cataclysm, Crisis and Catastrophes*. Washington, D.C.: American Psychiatric Press, Inc.

Fullerton, C.S., Ursano, R.J., Vance, K., & Wang, L. (2000). Debriefing following trauma. *Psychiatric Quarterly, 71*(3), 259-276.

Fullerton, C.S., Ursano, R.J., & Wang, L. (2004). Acute stress disorder, posttraumatic stress disorder, and depression in disaster or rescue workers. *American Journal of Psychiatry, 161*, 1370-1376.

Gabriel, R., Ferrando, L., Cortón, E.S., Mingote, C., Garciá-Camba, E., Liria, A.F., & Galea, S. (2007). Psychopathological consequences after a terrorist attack: An epidemiological study among victims, the general population, and police officers. *European Psychiatry, 22*, 339-346.

Gamble, J., Creedy, D., Moyle, W., Webster, J., McAllister, M., & Dickson, P. (2005). Effectiveness of a counseling intervention after a traumatic childbirth: A randomized controlled trial. *Birth, 32*(11), 11-19.

Gentry, J.E., Baranowsky, A.B., & Dunning, K. (2002). ARP: The Accelerated Recovery Program (ARP) for compassion fatigue. In C R Figley (Ed.), *Treating Compassion Fatigue* (pp. 123-137). New York: Brunner-Routledge.

Gist, R.S., Woodall, S.J., & Magenheimer, L.K. (1999). "And then you do the Hokey-Pokey and you turn yourself around...". In R Gist & B Lubin (Eds.), *Response to Disaster: Psychosocial, Community and Ecological Approaches* (pp. 269-289). Philadelphia, PA: Brunner & Mazel.

Goldberg, D. (1972). *The Detection of Psychiatric Illness by Questionnaire*. London: Oxford University Press

Goldberg, D.P., & Hillier, V.F. (1979). A scaled version of the General Health Questionnaire. *Psychological Medicine, 9*(1), 139-145.

Goldberg, D., & Williams, P. (2011). General Health Questionnaire, from http://www.gl-assessment.co.uk/health_and_psychology/resources/general_health_questionnaire/faqs.asp?css=1#faq1

Greenberg, M., Wortman, C., & Stone, A. (1996). Emotional expression and physical health: Revising traumatic memories or fostering self-regulation? *Journal of Personality and Social Psychology, 71*(3), 588-602.

Grieger, T., Fullerton, C., Ursano, R., & Reeves, J. (2003). Acute stress disorder, alcohol use, and perception of safety among hospital staff after the sniper attacks. *Psychiatric Services, 54*(10), 1383-1387.

Guo, U., Chen, C., Lu, M., Tan, H., Lee, H., & Wang, T. (2004). Posttraumatic stress disorder among professional and non-professional rescuers involved in an earthquake in Taiwan. *Psychiatry Research, 127*, 35-41.

Harbord, R.M., Harris, R.J., & Sterne, J.A.C. (2009). Updated tests for small-study effects in meta-analyses. In Jonathan A C Sterne (Ed.), *Meta-Analysis in Stata: An Updated Collection from the Stata Journal* (pp. 138-150). College Station TX: StataCorp LP.

*Harris, M.B., Balolu, M., & Stacks, J.R. (2002). Mental health of trauma-exposed firefighters and critical incident stress debriefing. *Journal of Loss and Trauma, 7*, 223-238.

Hassan, E. (2006). Recall bias can be a threat to retrospective and prospective research designs. *The Internet Journal of Epidemiology, 3*(2). Retrieved from http://www.ispub.com/journal/the_internet_journal_of_epidemiology/volume_3_number_2_12/article_printable/recall_bias_can_be_a_threat_to_retrospective_and_prospective_research_designs.html

Hawker, D.M., Durkin, J., & Hawker, D.S.J. (2011). To debrief or not to debrief our heroes: that is the question. *Clinical Psychology and Psychotherapy, 18*(6), 453-463. doi: DOI: 10.1002/cpp.730

Hedges, L.V. (1981). Distribution theory for Glasses estimator of effects size and related estimators. *Journal of Educational Statistics, 6*, 107-128.

Hedges, L.V., & Olkin, I. (1985). *Statistical Methods for Meta-Analysis*. Orlando, FL: Academic Press.

Henckens, M.J.A.G., Hermans, E.J., Pu, Z., Joels, M., & Fernandez, G. (2009). Stressed memories: How acute stress affects memory formation in humans. *The Journal of Neuroscience, 29*(32), 10111-10119.

Higgins, J.P.T., & Thompson, S.G. (2002). Quantifying heterogeneity in a meta-analysis. *Statistics in Medicine, 21*, 1539-1558.

Hoaglin, D., Mosteller, F., & Tukey, J. (Eds.). (1983). *Understanding Robust and Exploratory Data Analysis*. New York: John Wiley & Sons.

Hobbs, M., Mayou, R., Harrison, B., & Worlock, P. (1996). A randomised controlled trial of psychological debriefing for victims of road traffic accidents. *British Medical Journal, 313*(7070), 1438-1439.

Hobfoll, S.E., Walter, K.H., & Horsey, K.J. (2008). Dose and fit are vital to intervention success. *Psychiatry, 71*(4), 308-318.

Hobfoll, S.E., Watson, P.E., Bell, C.C., Bryant, R.A., Brymer, M.J., Friedman, M.J., Ursano, R. (2007). Five essential elements of immediate and mid-term mass trauma intervention: Empirical evidence. *Psychiatry, 70*(4), 283-315.

Hodgkinson, P.E., & Shepherd, M.A. (1994). The impact of disaster support work. *Journal of Traumatic Stress, 7*(4), 587-600.

Holbrook, T., Galarneau, M., Dye, J., Quinn, K., & Dougherty, A. (2010). Morphine Use after Combat Injury in Iraq and Post-Traumatic Stress Disorder. *The New England Journal of Medicine, 362*(2), 110-117.

Horowitz, M., Wilner, N., & Alvarez, W. (1979). Impact of events scale: a measure of subjective distress. *Psychosomatic Medicine, 41*(4), 209-218.

Huff, C. (2006). Emotional debriefing. *Hospitals & Health Networks, 80*(8), 38-40.

Hulleman, C.S., & Cordray, D.S. (2009). Moving from the lab to the field: The role of fidelity and achieved relative intervention strength. *Journal of Research on Educational Effectiveness, 2*, 88-110.

Hytten, K., & Hasle, A. (1989). Fire fighters: A study of stress and coping. *Acta Psychiatrica Scandinavica Suppl., 355*, 50-55.

International Association of Chiefs of Police (IACP). (2009). IACP Police Psychological Services Section: Critical incident debriefing/defusing. Retrieved from http://www.theiacp.org/psych_services_section/

International Association of Fire Chiefs (IAFC). (2005). SIT REP # 2 - September 5, 2005. Retrieved from http://www.iafc.org/displayindustryarticle.cfm?articlenbr=29130

International Association of Fire Fighters (IAFF). (2007). Facilitators Guide to: Preparing for a pandemic flu: What first responders need to know. Retrieved from http://www.iaff.org/et/PandemicFlu/OLD/media/Facilitator's%20Guide%20Preparing%20for%20a%20Pandemic%20Flu.pdf

International Critical Incident Stress Foundation Inc. (ICISF). (2012a). Certificate of Specialized Training Overview, from http://www.icisf.org/education-a-training/certificate-of-specialized-training

International Critical Incident Stress Foundation Inc. (ICISF). (2012b). CISM Teams Retrieved April 1, 2012, from http://www.icisf.org/cism-teams

International Critical Incident Stress Foundation Inc. (ICISF). (2012c). Strategic Plan: January 2009 to December 2011 Retrieved April 1, 2012, from http://icisf.org/images/pdfs/strategic_plan.pdf

Jeannette, J.M., & Scoboria, A. (2008). Firefighter preferences regarding post-incident intervention. *Work & Stress, 22*(4), 314-326.

Jenkins, S.R. (1996). Social support and debriefing efficacy among emergency medical workers after a mass shooting incident. *Journal of Social Behavior and Personality, 11*(3), 477-492.

Keane, T., Caddell, J., & Taylor, K. (1986). *The Mississippi Scale*. Boston, MA: Veteran's Administration Medical Centre.

Kearns, M., Ressler, K., Zatzick, D., & Rothbaum, B. (2012). Early interventions for PTSD: A review. *Depression and Anxiety, 29*(10), 833-842. doi: 10.1002/da.21997

*Kenardy, J.A., Webster, R.A., Lewin, T.J., Carr, V.J., Hazell, P.L., & Carter, G.L. (1996). Stress debriefing and patterns of recovery following a natural disaster. *Journal of Traumatic Stress, 9*(1), 37-49.

Kessler, R., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. (1995). Posttraumatic stress disorder in the national comorbidity survey. *Archives of General Psychiatry, 52*, 1048-1060.

King, L., King, D., Leskin, G., & Foy, D. (1995). The Los Angeles symptom checklist: A self-report measure of posttraumatic stress disorder. *Assessment, 2*, 1-17.

Kirschman, E., Scrivner, E., Ellison, K., & Marcy, C. (1992). Work and well-being: Lessons from law enforcement. In J D Quick & L R Murphy (Eds.), *Stress & Well-Being at Work: Assessments and Interventions for Occupational Mental Health* (pp. 178-192). Washington, D.C.: American Psychological Association.

Kross, E., & Ayduk, O. (2011). Making meaning out of negative experiences by self-distancing. *Current Directions in Psychological Science, 20*(3), 187-191. doi: 10.1177/0963721411408883

*Kuykendall, J.H. (2011). *The effect of variations in critical incident stress debriefing on law enforcement officers' perceptions and PTSD symptoms.* Available from ProQuest Dissertations and Theses database. (UMI No. 3437985)

Larsson, G., Tedfeldt, E., & Andersson, B. (1999). Conditions affecting experiences of the quality of psychological debriefings: preliminary findings from a grounded theory study. *International Journal of Emergency Mental Health, 1*(2), 91-97.

Lavender, T., & Walkinshaw, S. (1998). Can midwives reduce pastpartume psychological morbidity? A randomized trial. *Birth, 25*(4), 215-219.

Lee, C., Slade, P., & Lygo, V. (1996). The influence of psychological debriefing on emotional adaptation in women following early miscarriage: a preliminary study. *British Journal of Medical Psychology, 69*, 47-58.

*Leonard, R., & Alison, L. (1999). Critical incident stress debriefing and its effects on coping strategies and anger in a sample of Australian police officers involved in shooting incidents. *Work & Stress, 13*(2), 144-161.

Lilly, M., Pole, N., Best, S., Metzler, T., & Marmar, C.R. (2009). Gender and PTSD: What can we learn from female police officers. *Journal of Anxiety Disorders, 23*(6), 767-774. doi: 10.1016/j.janxdis.2009.02.015

Lipsey, M., & Wilson, D. (2001) Practical Meta-Analysis. *Vol. 49. Applied Social Research Methods Series* (pp. 247). Thousand Oaks, CA: Sage Publications.

Littrell, J. (2009). Expression of Emotion: When It Causes Trauma and When It Helps. *Journal of Evidence-Based Social Work, 6*(3), 300-320.

Macnab, A., Sun, C., & Lowe, J. (2003). Randomized, controlled trial of three levels of critical incident stress intervention. *Prehospital Disaster Medicine, 18*(4), 365-369.

Malcolm, A.S., Seaton, J., Perera, A., Sheehan, D.C., & Van Hasselt, V.B. (2005). Critical Incident Stress Debriefing and Law Enforcement: An Evaluative Review. *Brief Treatment and Crisis Intervention, 5*(3), 261.

Mansdorf, I.J. (2008). Psychological interventions following terrorist attacks. *British Medical Bulletin, 88*(1), 7-22.

Maren, S., & Chang, C. (2006). Recent fear is resistant to extinction. *Proceedings of the National Academy of Sciences USA, 103*(47), 18020-18025. doi: 10.1073/pnas.0608398103

Marmar, C.R., McCaslin, S.E., Metzler, T.J., Best, S., Weiss, D.S., Fagan, J., . . . Neylan, T. (2006). Predictors of posttraumatic stress in police and other first responders. *Annals of New York Academy of Sciences, 1071*, 1–18. doi: 10.1196/annals.1364.001

Marshall, R.D., Spitzer, R., & Liebowitz, M.R. (1999). Review and critique of the new DSM-IV diagnosis of acute stress disorder. *American Journal of Psychiatry, 156*, 1677-1685.

Mayo Clinic Staff. (2011). Sickle cell anemia: Risk factors. Retrieved from http://www.mayoclinic.com/health/sickle-cell-anemia/DS00324/DSECTION=risk-factors

Mayou, R., Ehlers, A., & Hobbs, M. (2000). Psychological debriefing for road traffic accident victims. *British Journal of Psychiatry, 176*, 589-593.

McCammon, S.L., & Allison, E.J. (1995). Debriefing and treating emergency workers. In CR Figley (Ed.), *Compassion Fatigue: Coping with Secondary Traumatic Stress Disorder in Those who Treat the Traumatized* (1st ed., pp. 115-130). New York: Brunner/Mazel, Inc.

*McFarlane, A.C. (1988). The longitudinal course of posttraumatic morbidity: The range of outcomes and their predictors. *Journal of Nervous and Mental Disease, 176*(1), 30-39.

McFarlane, A.C., & Papay, P. (1992). Multiple diagnoses in posttraumatic stress disorder in the victims of a natural disaster. *Journal of Nervous and Mental Disease, 180*(8), 498-504.

Meldrum, L., King, R., & Spooner, D. (2002). Secondary traumatic stress in case managers working in community mental health services. In C R Figley (Ed.), *Treating Compassion Fatigue*. New York: Brunner-Routledge.

Mitchell, J. (1983). When disaster strikes: The critical incident stress debriefing process. *JEMS: A Journal of Emergency Medical Services, 8*, 36-39.

Mitchell, J. (1984). *Effects of stress management training on paramedic coping styles and perceived stress levels.* Available from ProQuest Dissertations and Theses database. (UMI No. 8412031)

Mitchell, J. (2003). *Crisis Intervention & CISM: A Research Summary*. Ellicott City, MD: International Critical Incident Stress Foundation.

Mitchell, J. (2004). *Crisis Intervention and Critical Incident Stress Management: A Defense of the Field*. Ellicott City, MD: International Critical Incident Stress Foundation, Inc.

Mitchell, J. (2007). Innovative, precise, and descriptive terms for group crisis support services: a United Nations initiative. *International Journal of Emergency Mental Health, 9*(4), 247-252.

Mitchell, J., & Everly Jr., G. (1997). *Critical Incident Stress Debriefing: An Operations Manual for the Prevention of Traumatic Stress Among Emergency Services and Disaster Workers* (rev. 2nd ed.). Ellicott City, MD: Chevron Publishing Corporation.

Munroe, J.F., Shay, J., Fisher, L., Makary, C., Rapperport, K., & Zimering, R. (1995). Preventing Compassion Fatigue: A team Treatment Model. In CR Figley (Ed.), *Preventing Secondary Traumatic Stress Disorder*. New York: Bunner/Mazel, Inc.

Myers, D., & Wee, D.F. (2002). Strategies for managing disaster mental health worker stress. In Charles R Figley (Ed.), *Treating Compassion Fatigue* (pp. 181-211). New York: Brunner-Routledge.

National Association of State Mental Health Program Directors (NASMHPD) Medical Directors Council. (2004). *State Mental Health Authorities' Response to Terrorism*. Alexandria, VA.

Norris, F.H., Kaniasty, K., Conrad, M.L., Inman, G.L., & Murphy, A.D. (2002). Placing age differences in cultural context: A comparison of the effects of age on PTSD after disasters in the United States, Mexico, and Poland. *Journal of Clinical Geropsychology, 8*(3), 153-173.

North, C.S., Tivis, L., McMillen, C., Pfefferbaum, B., Cox, J., Spitznagel, E., . . . Smith, E. (2002). Coping, functioning, and adjustment of rescue workers after the Oklahoma City bombing. *Journal of Traumatic Stress, 15*(3), 171-175.

North, C.S., Tivis, L., McMillen, J.C., Pfefferbaum, B., Spitznagel, E.L., Cox, J., Smith, E.M. (2002). Psychiatric disorders in rescue workers after the Oklahoma City bombing. *American Journal of Psychiatry, 159*(5), 857-859.

Novaco, R. (1975). *Anger Control: The Development and Evaluation of an Experimental Treatment*. Lexington, MA: D.C. Heath.

Nurmi, L.A. (1997). *Experienced stress and the value of CISD among Finnish emergency personnel in the Estonia ferry disaster.* Paper presented at the 4th World Congress on Stress, Trauma, and Coping in the Emergency Services Professions, Baltimore, MD.

O'Flaherty, J. (2005). *Vicarious traumatization in first responders of an airline disaster: A phenomenological exploration of the experience among airline employees.* Available from ProQuest Dissertations and Theses database. (UMI No. 3211960)

Olff, M., Langeland, W., Draijer, N., & Gersons, B.P.R. (2007). Gender differences in posttraumatic stress disorder. *Psychological Bulletin, 133*(2), 183-204.

Ortlepp, K. (1998). *Non-professional trauma debriefers in the workplace: individual and organisational antecedents and consequences of their experiences.* Available from ProQuest Dissertations and Theses database. (UMI No. CA88782)

Oxford Journals. (2012), from www.oxfordjournals.org/our_journals/tropej/online/ma_chap3.ppt

Ozen, S., & Aytekin, S. (2004). Frequency of PTSD in a group of search and rescue workers two months after 2003 Bingol (Turkey) earthquake. *Journal of Nervous and Mental Disease, 192*, 573-575.

Paton, D., Smith, L.-M., & Stephens, C. (1998). Work-related psychological trauma: A social psychological and organisational approach to understanding response and recovery. *The Australasian Journal of Disaster and Trauma Studies, 1*.

Pearlman, L.A., & Saakvitne, K.W. (1995). Treating therapists with vicarious traumatization and secondary traumatic stress disorders. In Charles R Figley (Ed.), *Compassion Fatigue: Coping with secondary traumatic stress disorder in those who treat the traumatized*. New York: Bruner-Routledge.

Pender, D., & Prichard, K. (2008). Group process research and emergence of therapeutic factors in critical incident stress debriefing. *International Journal of Emergency Mental Health, 10*(1), 39-48.

Perkonigg, A., Kessler, R., Storz, S., & Wittchen, H.-U. (2000). Traumatic events and post-traumatic stress disorder in the community: prevalence, risk factors and comorbidity. *Acta Psychiatrica Scandinavica, 101*(1), 46-59. doi: 10.1034/j.1600-0447.2000.101001046.x

Perrin, M., DiGrande, L., Wheeler, K., Thorpe, L., Farfel, A., & Brackbill, R. (2007). Differences in PTSD prevalence and associated risk factors among World Trade Center disaster rescue and recovery workers. *American Journal of Psychiatry, 164*(9), 1385-1394.

Pole, N., Best, S., Weiss, D., Metzler, T.J., Liberman, A., Fagan, J., & Marmar, C. (2001). Effects of gender and ethnicity on duty-related posttraumatic stress symptoms among urban police officers. *Journal of Nervous and Mental Disease, 189*(7), 442-448.

Priest, S., Henderson, J., Evans, S., & Hagan, R. (2003). Stress debriefing after childbirth: Randomised controlled Trial. *MJA, 178*, 542-545.

Raphael, B. (1986). *When Disaster Strikes*. New York: Basic Books.

*Redburn, B.G. (1992). *Disaster and rescue: Worker effect and coping strategies.* Available from ProQuest Dissertations and Theses database. (UMI No. 9312267)

*Regehr, C., & Hill, J. (2000). Evaluating the efficacy of crisis debriefing groups. *Social Work with Groups, 23*(3), 69-79.

Regel, S. (2007). Post-trauma support in the workplace: the current status and practice of critical incident stress management (CISM) and psychological debriefing (PD) within organizations in the UK. *Occupatonal Medicine (Lond), 57*(6), 411–416. doi: 10.1093/occmed/kqm071

Regel, S., Joseph, S., & Dyregrov, A. (2007). Psychological debriefing in cross-cultural contexts: ten implications for practice. *International Journal of Emergency Mental Health, 9*(1), 37-45.

Ressler, K.J., Mercer, K.B., Bradley, B., Jovanovic, T., Mahan, A., Kerley, K., . . . May, V. (2011). Post-traumatic stress disorder is associated with PACAP and the PAC1 receptor. *Nature, 470*(7335), 492-497. doi: doi:10.1038/nature09856

Rivard, J., Dietz, P., Martell, D., & Widawski, M. (2002). Acute Dissociative Responses in Law Enforcement Officers Involved in Critical Shooting Incidents: The Clinical and Forensic Implications. *Journal of Forensic Sciences, 47*(5), 1-8. doi: 10.1520/JFS15504J

Robinson, R.C. (2008). Reflections on the debriefing debate. *International Journal of Emergency Mental Health, 10*(4), 253-259.

Robinson, R.C., & Mitchell, J.T. (1993). Evaluation of psychological debriefings. *Journal of Traumatic Stress, 6*(3), 367-382.

Robinson, R.C., & Murdoch, P. (1998). *Guidelines for Establishing and Maintaining Peer Support Programs in Emergency Services*. Ellicott City, MD: Chevron.

*Rogers, O.W. (1993). *An examination of critical incident stress debriefing for emergency service providers: a quasi-experimental field survey.* Available from ProQuest Dissertations and Theses database. (UMI No. 9319842)

Rose, S., Bisson, J.I., Churchill, R., & Wessely, S. (2009). Psychological debriefing for preventing post traumatic stress disorder (PTSD) (Review). *2002*(2), 1-61. Retrieved from Cochrane Database of Systematic Reviews, Art. No. CD000560 website: doi:10.1002/14651858.CD000560

Rose, S., Brewin, C.R., Andrews, B., & Kirk, M. (1999). A randomized controlled trial of individual psychological debriefing for victims of violent crime. *Psychological Medicine, 29*(4), 793-799.

Sailes, P.A.M. (1997). *Critical incident stress debriefing: Who participates and what factors influence participation.* Available from ProQuest Dissertations and Theses database. (UMI No. 1386950)

Sawyer, C.M. (2000). *A survey of team members who participate in traumatic event group psychological debriefings.* Available from ProQuest Dissertations and Theses database. (UMI No. 9993546)

Scheff, T. (1979). *Catharsis in healing, ritual, and drama*. Berkeley: University of California Press.

Shadish Jr., W.R. (1992). Do family and marital psychotherapies change what people do? A meta-analysis of behavioral outcomes. In Thomas D Cook (Ed.), *Meta-Analysis For Explanation: A Casebook* (pp. 378). New York: Russel Sage Foundation--Google ebook.

Shalev, A.Y., Peri, T., Rogel-Fuchs, Y., Ursano, R.J., & Marlowe, D. (1998). Historical group debriefing after combat exposure. *Military Medicine, 163*(7), 494-498.

Sijbrandij, M., Olff, M., Reitsma, J.B., Carlier, I.V.E., & Gersons, B.P.R. (2006). Emotional or educational debriefing after psychological trauma. Randomised controlled trial. *British Journal of Psychiatry, 189*(2), 150-155. doi: 10.1192/bjp.bp.105.021121

Small, R., Lumley, J., Donohue, L., Potter, A., & Walderstrom, U. (2000). Midwife-led debriefing to reduce maternal depression following operative birth: A randomised controlled trial. *British Medical Journal, 321*(7268), 1043-1047.

Spielberger, C. (1996). *State-Trait Anger Expression Inventory Manual*. Lutz, FL: Psychological Assessment Resources Inc.

Spielberger, C., Gorsuch, R., & Lushene, R. (1970). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press, Inc.

Spielberger, C., Gorsuch, R., Lushene, R., Vagg, P., & Jacobs, G. (1983). *Manual for the State-Trait Anxiety Inventory (Form Y)*. Palo Alto, CA: Consulting Psychologists Press, Inc.

Staab, J., Grieger, T., Fullerton, C., & Ursano, R.J. (1996). Acute stress disorder, subsequent posttraumatic stress disorder and depression after a series of typhoons. *Anxiety, 2*, 219-225.

Stallard, P., & Law, F. (1993). Screening and psychological debriefing of adolescent survivors of life-threatening events. *British Journal of Psychiatry, 163*, 660-665.

Steichen, T.J. (2009). Nonparametric trim and fill analysis of publication bias in meta-analysis. In Jonathan AC Sterne (Ed.), *Meta-Analysis in Stata: An Updated Collection from the Stata Journal* (pp. 165-177). College Station TX: StataCorp LP.

Stein, D.J., Cloitre, M., Neneroff, C.B., Nutt, D.J., Seedat, S., Shalev, A.Y., . . . Zohar, J. (2009). Cape Town consensus on posttraumatic stress disorder. *CNS Spectrums, 14*(1 (Suppl 1)), 52-58.

*Stephens, C. (1997). Debriefing, social support and PTSD in the New Zealand Police: Testing a multidimensional model of organisational traumatic stress. *The Australasian Journal of Disaster and Trauma Studies, 1*.

Stuber, J., Resnick, H., & Galea, S. (2006). Gender disparities in posttraumatic stress disorder after mass trauma. *Gender Medicine, 3*(1), 54-67.

Stuhlmiller, C., & Dunning, C. (2000). Challenging the mainstream: From pathogenic to salutogenic models of posttrauma intervention. In John M Violanti, Douglas Paton & Christine Dunning (Eds.), *Posttraumatic Stress Intervention: Challenges, Issues, and Perspectives* (pp. 10-42). Springfield, IL: Charles C Thomas Publisher, Ltd.

Summerfield, D.A. (2005). Coping with the aftermath of trauma: NICE guidelines on post-traumatic stress disorder have fundamental flaw. *British Medical Journal, 331*(7507).

Swaim, J., McMullen, M., Williams, C., Moore, J., & Gilbertson, A. (2007). A study of the psychological factors in outcomes for officers who survive ballistic assault. *International Journal of Emergency Mental Health, 9*(4), 281-289.

Talbot, A. (1990). The importance of parallel process in debriefing crisis counselors. *Journal of Traumatic Stress, 3*(2), 265-277.

Talbot, A., Manton, M., & Dunn, P.J. (1992). Debriefing the debriefers: An intervention strategy to assist psychologists after a crisis. *Journal of Traumatic Stress, 5*(1), 45-62.

Tanielian, T.L., & Stein, B.D. (2006). Understanding and preparing for the psychological consequences of terrorism. In David Kamien (Ed.), *McGraw-Hill Homeland Security Handbook* (pp. 689-701): The Rand Corporation.

Taylor, A. (2007). *Examining the effectiveness of psychological debriefing following a critical incident: A meta-analysis* Available from ProQuest Dissertations and Theses database. (UMI No. MR33774)

The Israel Center for the Treatment of Psychotrauma. (2009). Stress vs. Trauma Retrieved 9/12/2009, from http://www.traumaweb.org/content.asp?pageid=58

Tolin, D., & Foa, E. (2006). Sex differences in trauma and posttraumatic stress disorder: A quantitative review of 25 years of research. *Psychological Bulletin, 132*(6), 959-992.

Tuckey, M.R. (2007). Issues in the debriefing debate for the emergency services: Moving research outcomes forward. *Clinical Psychology: Science and Practice, 14*, 106-116.

Uchino, B.N. (2009). Understanding the links between social support and physical health: A life-span perspective with emphasis on the separability of perceived and received support. *Perspectives in Psychological Science, 4*(3), 236-255.

Valent, P. (2002). Diagnosis and treatment of helper stresses, traumas, and illnesses. In C R Figley (Ed.), *Treating Compassion Fatigue* (pp. 17-37). New York: Brunner-Routledge.

van Emmerik, A.A.P., Kamphuis, J.H., Hulsbosch, A.M., & Emmelkamp, P.M.G. (2002). Single session debriefing after psychological trauma: A meta-analysis. *The Lancet, 360*(9335), 766-771.

Ware Jr., J. (1976). Scales for measuring general health perceptions. *Health Services Research, 11*, 396-415

Ware Jr., J., & Karmos, A. (1976). *Development and validation of scales to measure perceived health and patient role propensity*. School of Medicine, Southern Illinois University. Carbondale, IL.

*Warren, K.D. (1995). *Critical Incident Stress Debriefing with emergency service workers.* Available from ProQuest Dissertations and Theses database. (UMI No. 9617029)

Watson, P., Brymer, M., & Bonanno, G. (2011). Postdisaster Psychological Intervention Since 9/11. *The American Psychologist, 66*(6), 482.

Wee, D.F. (1995). *Stress response of emergency medical services personnel following the Los Angeles civil disturbance.* Paper presented at the Congress on Stress, Trauma, and Coping in the Emergency Services Professions, Baltimore, MD.

*Wee, D.F., Mills, D.M., & Koehler, G. (1999). The effects of Critical Incident Stress Debriefing (CISD) on emergency medical services personnel following the Los Angeles civil disturbance. *International Journal of Emergency Mental Health, 1*(1), 33-37.

Weiss, D., & Marmar, C. (1996). Impact of Events Scale - Revised (IES-R). Retrieved from http://www.ptsd.va.gov/professional/pages/assessments/ies-r.asp

Weuste, M.B. (2005). *Critical incident stress and debriefing of child welfare workers.* Available from ProQuest Dissertations and Theses database. (UMI No. AAT 3182569)

Wilson, D.B. Practical Meta-Analysis Effect Size Calculator. Retrieved from http://www.campbellcollaboration.org/escalc/html/EffectSizeCalculator-SMD-main.php

Wilson, D.B. (2006). [Meta-Analysis Statistical Program].

Winget, C.N., & Umbenhauer, S.L. (1982). Disaster planning: The mental health worker as "victim by proxy". *Journal of Health and Human Resources, 4*(3), 363-373.

Winwood, P., Tuckey, M., Peters, R., & Dollard, M. (2009). Identificationa nd measurement of work-related psychological injury: Piloting the psychological injury risk indicator among frontline police. *Journal of Occupational and Environmental Medicine, 51*(9), 1057-1065.

Wisnivesky, J.P., Teitelbaum, S.L., Todd, A.C., Boffetta, P., Crane, M., & al., e. (2011). Persistence of multiple illnesses in World Trade Center rescue and recovery workers: a cohort study. *The Lancet, 378*(9794), 888-897.

*Woods, G.L. (2007). *Post traumatic stress symptoms and Critical Incident Stress Debriefing (CISD) in Emergency Medical Services (EMS) personnel.* Available from ProQuest Dissertations and Theses database. (UMI No. 1441928)

Wynkoop, T.F. (2002). Stress and burnout in crisis intervention. In J. E. Hendricks & B. D. Byers (Eds.), *Crisis Intervention in Ciminal Justice/Social Service* (pp. 361-402). Springfield, IL: Charles C. Thomas.

Yehuda, R. (2002). Posttraumatic stress disorder. *New England Journal of Medicine, 346*(2), 108-114.

Yule, W. (1992). Post-traumatic stress disorder in child survivors of shipping disasters: The sinking of the Jupiter. *Psychotherapy and Psychosomatics, 57*, 200-205.

Zigmond, A., & Snaith, R. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica, 67*, 361-370.

Zilberg, N., Weiss, D., & Horowitz, M. (1982). Impact of Event Scale: A cross-validation study and some empirical evidence supporting a conseptual model of stress response syndromes. *Journal of Consulting and Clinical Psychology, 50*, 407-414.

Zimering, R., Munroe, J., & Gulliver, S. (2003). Secondary traumatization in mental health care providers. *Psychiatric Times, xx*(4). Retrieved from http://www.psychiatrictimes.com/p030443.html

Zohar, J., Juven-Wetzler, A., Sonnino, R., Cwikel-Hamzany, S., Balaban, E., & Cohen, H. (2011). New insights into secondary prevention in post-traumatic stress disorder. *Dialogues in Clinical Neuroscience, 13*(3), 301-309.

Zohar, J., Sonnino, R., Juven-Wetzler, A., & Cohen, H. (2009). Can posttraumatic stress disorder be prevented? *CNS Spectrums, 14*(1 Suppl 1), 44-51.