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Treating posttraumatic stress disorder in first responders: A systematic review

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ABSTRACT

First responders are generally considered to be at greater risk for full or partial posttraumatic stress disorder (PTSD) than most other occupations because their duties routinely entail confrontation with traumatic stressors. These critical incidents typically involve exposure to life threat, either directly or as a witness. There is a substantial literature that has examined the risk factors, symptom presentation, course, and comorbidities of PTSD in this population. However, to our knowledge, there are no systematic reviews of treatment studies for first responders. We conducted a systematic review of the PTSD treatment literature (English and non-English) in order to evaluate such treatment proposals based on what is known about treating PTSD in first responders. We especially sought to identify randomized controlled trials (RCTs) whose primary outcome was PTSD. Our search identified 845 peer-reviewed articles of which 0.002% (n = 2) were bona fide RCTs of PTSD treatment in first responders. Both studies tested a psychosocial treatment. We did not locate a single psychopharmacologic RCT for PTSD in first responders. An additional 2 psychosocial studies and 13 case or observational studies comprised the remaining extant literature. Though both RCTs showed significant large treatment effects ($d = 1.37$; $h = 0.92$), the literature is startlingly sparse and is not sufficient for evidence-based recommendations for first responders.

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1. Introduction

There are a limited number of occupations or professions that repeatedly put those so employed squarely in harm's way; two prominent examples are combat soldiers and first responders. Indeed, the latter group often comprises members of the former. In the context of this article, we use the term first responders to refer to a heterogeneous grouping of both paid professionals and volunteers who provide critical services in emergencies; for many their main occupational task is first response—e.g. fire fighters. Typical first responders have specialized training, sometimes with explicit certification, which both prepare them and entitle them to take action to safeguard the health and safety of those victimized. This action usually occurs on an individual basis and for the public at large, most often in emergencies. Large-scale disasters (e.g., the events of September 11, 2001) have expanded the occupational groupings who engage in first response to include construction and utility workers, laborers,

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1. Introduction

There are a limited number of occupations or professions that repeatedly put those so employed squarely in harm's way; two prominent examples are combat soldiers and first responders. Indeed, the latter group often comprises members of the former. In the context of this article, we use the term first responders to refer to a heterogeneous grouping of both paid professionals and volunteers who provide critical services in emergencies; for many their main occupational task is first response—e.g. fire fighters. Typical first responders have specialized training, sometimes with explicit certification, which both prepare them and entitle them to take action to safeguard the health and safety of those victimized. This action usually occurs on an individual basis and for the public at large, most often in emergencies. Large-scale disasters (e.g., the events of September 11, 2001) have expanded the occupational groupings who engage in first response to include construction and utility workers, laborers,

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and public sector workers (Benedek, Fullerton, & Ursano, 2007; Herbert et al., 2006), but these groups are not primarily first responders. Like many other groupings, first responders can be conceptualized as a fuzzy set where those at the margins are less prototypic than those in the center. Here the margins include occasional disaster workers, and the center includes first responder occupations.

First responder occupations have historically included police officers (e.g., Cardozo et al., 2005; McCaslin, Metzler, et al., 2006; Tak, Driscoll, Bernard, & West, 2007), fire fighters (e.g., Bryant & Harvey, 1995), search and rescue personnel (e.g., Brandt, Fullerton, Saltzgaber, Ursano, & Holloway, 1995), and ambulance personnel (emergency medical technicians and paramedics; e.g., Weiss, Marmar, Metzler, & Ronfeldt, 1995). These positions are characterized by high levels of work demands (Penalba, McGuire, & Leite, 2009) and routine exposure to both physical and psychological stressors (e.g., Galloucis, Silverman, & Francek, 2000; McCaslin, Rogers, et al., 2006). Examples of the former include overtime and special duty shifts, and arrest quotas under public and press scrutiny. Examples of routine exposure to physical stressors include heavy personal equipment for fire fighters, lifting gurneys for EMTs, and foot pursuit for police officers. Psychological stressors include routine work demands such as labor and management conflicts, harassment, and work demands with poor or outdated equipment (Liberman et al., 2002). The key psychological stressors, however, are those that are typically considered traumatic stressors. These include exposure to incidents that put the first responder or those around him or at risk for death or severe injury (e.g., backdrafts for firefighters, being attacked with a weapon for a police officer), witnessing or participating in incidents where rescue involves preventing death or mitigating serious or severe injury, and various levels of witnessing such incidents. These traumatic stressors are the primary aspect of what distinguish first responders from virtually all other occupations.

Considerable research has shown that these types of exposure increase the likelihood of posttraumatic stress disorder (PTSD), other psychiatric disorders, and burn-out. In the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2000), the symptoms of PTSD are grouped into three clusters: reexperiencing of the traumatic event; avoidance of trauma-relevant stimuli and numbing of general responsiveness; and persistent hyperarousal. The revisions to the criteria for PTSD proposed in the upcoming DSM-5 include specific reference to issues of frequency and severity of exposure to traumatic stressors using the salient example of first responders to illustrate the issue. In addition to PTSD (e.g., Chang et al., 2003; Fullerton, Ursano, & Wang, 2004; North et al., 2002; Tak et al., 2007), depression (Cardozo et al., 2005; Fullerton et al., 2004; Tak et al., 2007), somatic or psychosomatic complaints (Chang et al., 2003; Morren, Yzermans, Van Nispen, & Wevers, 2005; Witteveen et al., 2006), chronic fatigue (Morren et al., 2005; Spinhoven & Verschuur, 2006; Witteveen et al., 2006), and difficulties with alcohol (North et al., 2002; Stewart, Mitchell, Wright, & Loba, 2004) have all been documented in first responders. Some authors have speculated that the cumulative nature of the stressors may result in a unique symptom profile of PTSD in first responders (e.g., Duckworth, 1986; Tolin & Foa, 1999). There is also a literature suggesting that burn-out may be another consequence of service as a first responder (e.g., Alexander & Klein, 2001; Mitani, Fujita, Sakamoto, & Shirakawa, 2006), with evidence of an impact on HPA axis function, just as in PTSD (e.g., Chida & Steptoe, 2009).

Estimation of lifetime and current rates of full and partial PTSD among first responders has come from small-scale studies, the vast majority using self-report rather than gold standard structured clinical interviews (e.g., Maia et al., 2007). An exception that did employ a structured interview involved 132 Canadian police officers (Martin, Marchand, Boyer, & Martin, 2009) and found that 7.6% of the participants developed full PTSD, whereas 6.8% had partial PTSD following a work-related exposure to a traumatic stressor. We know of no nationally representative, large-scale study of first responders. Consequently, to provide an estimate of the potential need for treatment of symptoms of PTSD among first responders in the United States, we used data from the 2008 National Employment Matrix (Bureau of Labor Statistics, 2008). In 2008, 1,503,100 individuals were employed in these roles (see Table 1). We believe this is a conservative estimate of the number of individuals employed in first responder professions, since it omits volunteers and other non-traditional first responders. Available studies have presented a range of rates of current PTSD from a low of 7%–19% in active duty police officers (Carlier & Gersons, 1997; Gersons, 1989; Maia et al., 2007; Robinson, Sigman, & Wilson, 1997) to 46% in volunteer disaster workers responding to an airline disaster (Mitchell, Griffin, Stewart, & Loba, 2004), with many other estimates falling between these extremes. These rates are far from definitive, in that the measures and methods for indexing exposure and procedures for determining a diagnosis are not at the level required for a high quality epidemiologic estimate (Kulka et al., 1991), quite apart from the representativeness of the samples. We chose to estimate, however, from a recently published meta-regression analysis of the worldwide current prevalence of PTSD in rescue workers (Berger et al., 2011) as this is preferable to selecting any single study. That summary of 28 studies yielded a current prevalence of approximately 10% for full PTSD suggesting that 150,310 first responders may meet criteria for current PTSD, and could benefit from treatment.

It is clear from other evidence (e.g., Stein, McQuaid, Pedrelli, Lenox, & McCahill, 2000) that those with partial PTSD also experience significant impairment (Kassam-Adams, Fleisher, & Winston, 2009). Though there was no estimate made for partial PTSD by Berger et al. (2011), these authors describe the likelihood that the 10% underestimates the scope of impairment for first responders, including for reasons of not meeting full criteria. In order to make an estimate for partial PTSD, we used the relative proportion (77%) between full current PTSD and partial PTSD that was reported in the National Vietnam Veterans' Readjustment Study (NVVRS; Weiss et al., 1992), as this was one of a very few nationally-representative studies that used clinical interviewing to estimate the partial prevalence. If the need for treatment for those with partial PTSD is included and is about ¾ of the rate for full current PTSD in first responders, this suggests that an additional 115,739 first responders likely meet criteria for partial PTSD and could benefit from treatment—bringing the total of U.S. first responders affected to approximately 266,049. Nationwide, there may well be a quarter of a million first responders impaired by symptoms of PTSD for whom effective intervention would be both compassionate and utilitarian. If these are underestimates, which Berger et al. (2011) entertain as a possibility, this only emphasizes the need to know the state of the evidence about treatment for first responders. In addition, treatments for occupation-related

Table 1
2008 employment data for first responder occupations from national industry occupation employment matrix, bureau of labor statistics.

Occupation	No. employed
Police and sheriff's patrol officers	661,500
Fire-fighters	310,400
Emergency medical technicians and paramedics	210,700
Detectives and criminal investigators	112,200
First-line supervisors/managers of police and detectives	97,300
First-line supervisors/managers of fire fighting and prevention workers	55,200
Ambulance drivers and artendants [excludes EMTs]	22,200
Fire inspectors and investigators	14,700
Forensic science technicians	12,800
Transit and railroad police	4300
Forest fire inspectors and prevention specialists	1800
Total	1,503,100

Note. EMT = emergency medical technician.

traumatic disturbance need to take into account that patients may (a) continue to work in environments in which they may be re-exposed and (b) may return, posttreatment, to the same environment. This has implications for both the provision of services and the nature of the treatment protocol.

Given that the substantial majority of prevalence estimates show that only a minority of those exposed remain chronically symptomatic, conceptualizations have considered a role for either risk factors or differences as a function of type of exposure. There is some evidence that there may be differences across subcategories of first responders as well, with police officers being less affected than other first responders (Ersland, Weisaeth, & Sund, 1989; Norris & Alegria, 2005; Perrin et al., 2007) and more similar to nonexposed populations (e.g., Marmar et al., 1999). Other studies, however, have not found such differences (Johnsen, Eid, Lovstad, & Michelsen, 1997; Jones, 1985; Ursano, Fullerton, Kao, & Bhartiya, 1995). The Berger et al. meta-regression found that ambulance personnel tended to have a reliability higher rate of current PTSD than police or firefighters. There are a number of possible factors that could help explain why exposure to traumatic stress may have less effect on police than on other groups of first responders: (a) self-screening, (b) pre-employment screening, (c) training, (d) type of exposures, and (e) prior exposure to similar experiences (e.g., in the military and through the course of years of duty), though this last item is conceptually more complicated (see Moran, 1998 for a discussion). The type of critical incident to which first responders are exposed may also play a differential role; for example, Clohessy and Ehlers (1999) reported that incidents involving children were especially problematic for paramedics. More studies are needed to clarify this issue.

A substantial body of literature (Bisson & Andrew, 2007; Bradley, Greene, Russ, Dutra, & Westen, 2005; Van Etten & Taylor, 1998) supports the effectiveness of several specific psychological treatments for PTSD in a variety of populations (e.g., veterans, victims of sexual assault, and those who have had motor vehicle accidents). These treatments include cognitive behavioral therapy (CBT), eye movement desensitization reprocessing (EMDR), prolonged exposure (PE), and stress inoculation therapy (SIT). As a consequence, professional societies, and government agencies have issued treatment guidelines (American Psychiatric Association, 2004; International Society of Traumatic Stress Studies in Foa, Keane, Friedman, & Cohen, 2009; Australian National Health and Medical Research Council (NHMRC) Guidelines Australian Centre for Posttraumatic Health, 2007; National Institute for Health and Clinical Excellence, 2005; Veterans Health Administration & Department of Defense, 2003) in line with the recent emphasis on the need for an evidence base to justify delivering a specific treatment. Forbes et al. (2010) have summarized and reviewed a number of these guidelines. Although these recommendations are intended to be definitive, there is controversy in the literature regarding this process (e.g., Benish, Imel, & Wampold, 2008; Ehlers et al., 2010; Wampold et al., 2010). As well, the current guidelines often do not address theoretically important moderating variables such as specific patient groups, including first responders, details of the trauma, including time elapsed since exposure, or whether or not re-exposure is likely.

There are also guidelines for treatment of PTSD with medication included in the larger overall guideline documents (e.g., Friedman, Davidson, & Stein, 2009). The specific psychobiological dysfunctions associated with the disorder (Bonne, Grillon, Vythilingam, Neumeister, & Charney, 2004; Yehuda & McFarlane, 1995) have helped to provide a rationale for the use of medications (Ipser & Stein, 2011) aside from considerations of comorbidity (e.g., depression) and available agents. Several reviews and meta-analyses (e.g.,Friedman et al., 2009; Ipser & Stein, 2011) have concluded that the evidence supports the use of medication for the short-term treatment of PTSD. Selective serotonin reuptake inhibitors (SSRIs) have the largest evidence base in both number of studies and size of trials. The various guidelines differ, however, as to whether the strength of the evidence is sufficient to recommend SSRIs as an alternative to psychosocial therapies for first-line intervention, as in the VA/DoD, International Society for Traumatic Stress Studies and the American Psychiatric Association guidelines or as a second-line intervention when psychosocial therapy is not available, acceptable, or suitable as in the National Institute for Health and Clinical Excellence; National Health and Medical Research Council; American Academy of Child and Adolescent Psychiatry guidelines (see Forbes et al., 2010).

A number of treatment guidelines also suggest that combining pharmacotherapy and psychosocial treatments for PTSD may lead people to recover more effectively than using either treatment alone as has been shown most convincingly for depression (Hollon, Thase, & Markowitz, 2002). In contrast, a recent Cochrane Review of combined pharmacotherapy and psychological therapies for PTSD (Hetrick, Purcell, Garner, & Parslow, 2010) concluded that there are too few studies to be able to draw conclusions about whether combination treatments result in better outcomes. As with the psychosocial treatments, the studies reviewed in guidelines for the pharmacotherapy of PTSD have not included any with first responders as participants.

Our objective was to conduct a thorough literature search of the status of treatment outcome studies for PTSD in first responders. The aims were to investigate (a) the degree to which first responders are acknowledged and discussed as an identified group (similar to veterans or those exposed to intimate partner violence) in treatment guidelines and (b) to what degree the findings from first responders have contributed to these guidelines. We focused on tertiary treatment: psychosocial and pharmacological treatment of first responders with diagnosed PTSD and other posttraumatic psychiatric disorders. We explicitly did not focus on approaches for secondary prevention or early intervention (e.g., Agorastos, Marmar, & Otte, 2011) because these have been adequately reviewed elsewhere (e.g., Deahl, 2000; Larsson, Michel, & Lundin, 2000); as well, early intervention.

2. Method

Inclusion criteria for studies were as follows: (a) a psychological or pharmacological intervention was delivered (b) subjects were first responders (c) subjects had a primary diagnosis of PTSD based on DSM or ICD criteria and (d) PTSD diagnosis or symptom status was the chief study outcome. Studies whose subjects had psychiatric disorders comorbid with PTSD were not excluded. To be included, psychosocial treatment studies had to compare two active treatment groups, or one active group to a nonspecific control or a wait-list group. Pharmacological investigations had to compare a drug treatment to a placebo or an active comparator.

We searched five standard databases: Embase, PsychINFO, MEDLINE, Sociological Abstracts, and PubMed. To increase our coverage we also searched three additional databases: the Cochrane Central Register of Controlled Trials; PILOTS (Published International Literature on Traumatic Stress), a specialized PTSD database maintained by the National Center for PTSD of the Department of Veteran Affairs; and LILACS (Literatura Latino Americana e do Caribe em Ciências da Saúde), a database of Latin and Caribbean health sciences articles edited by the Latin American and Caribbean Health Science Information Center. We sought to identify as many articles as possible, so did not limit the search to English only. The search strategy followed a winnowing logic in which we sought to identify (a) all studies with the appropriate subjects, and (b) all studies with appropriate interventions; subsequently we limited the studies to those focused on PTSD. Initially, we explicitly cast an overbroad net so as to guard against missing relevant studies. The strategy included a combination of keywords, descriptors, and wild cards related to first responders: (paramedical personnel OR body handlers OR fire fighters OR police personnel OR relief workers OR emergency personnel OR emergency medical services OR emergency medical technicians OR

EMTs OR medics OR allied health personnel OR law enforcement OR first responders OR rescue workers), trauma (PTSD OR post-traumatic stress disorder* OR posttraumatic stress disorder OR stress disorders, post-traumatic) and interventions (treatment OR drug therapy OR psychotherapeutic processes OR psychotherapy OR counsel* OR therapy* OR psychopharmacologic* OR mental health services OR therapeutics OR psychotropic drugs). The search included all articles indexed as of 10 November 2010; after eliminating duplicates and non-peer reviewed articles, it yielded a total of 705 articles whose abstracts were reviewed.

We also examined the reference lists of several recent reviews of psychosocial, pharmacological and combined psychosocial and pharmacological treatments for PTSD (Benish et al., 2008; 7; Bradley et al., 2005; Hetrick et al., 2010; Ipser & Stein, 2011). We identified an additional 138 citations in these reviews; two additional papers known to the authors but not otherwise identified were also examined.

3. Results

The search strategy identified 845 potentially relevant articles. Study titles and abstracts were reviewed by a team of research assistants and the authors to determine whether they met inclusion criteria. Fig. 1 shows the results of the review; the exclusions were not mutually exclusive. Twenty-one studies were not published in English and could not be further reviewed. Of the remaining 824 articles, 672 were excluded because they did not study a specific psychosocial or pharmacological treatment, 629 were eliminated because the sample did not comprise first responders, and 479 were omitted because PTSD was not the chief outcome. This left 17 articles (2.11% of the total initial pool), 13 of which were case or observational studies and were considered separately and 4 of which were examined more closely. A summary description of the key aspects of all studies is presented in Table 2.

Of the remaining four articles, two were bona fide RCTs of PTSD (Difede, Malta, et al., 2007; Gersons, Carlier, Lamberts, & Van der Kolk, 2000) and two were not (Difede, Cukor, et al., 2007; Wilson, Tinker, Becker, & Logan, 2001). While we focus on the former articles, we include the latter two for more detailed presentation and analysis, because they represented half of all the first responder treatment studies we located, excluding the case and observational studies. Case and observational studies are presented because they illustrate the development of interest in treatment of first responders.

3.1. Case and observational studies

The 13 studies fell into two distinct groups based on when they were published. Six appeared between 1986 and 1999; the remaining seven were published between 2004 and 2009 (see Table 2). Only two (Ford, 1996; Rumyantseva & Stepanov, 2008) were focused on medication, making this set of studies most relevant for psychosocial treatment. The six earliest articles (Duckworth, 1986; Ford, 1996; Gersons, 1989; Richards & Rose, 1991; Spates & Burnette, 1995; Tolin & Foa, 1999) illustrated the questions raised about treating first responders at that time given what was known about PTSD and treatment and the approaches initially taken: all examined male police officers presenting with symptoms of PTSD, though some also described comorbid symptoms of depression, physical complaints such as nausea, agoraphobic panic, and abuse of alcohol. There was recognition of the occupation-related increased risk of exposure to trauma as well as the stigma attached to seeking help for posttraumatic reactions. The preponderance of the traumatic events were those in which the officer's bodily integrity or life was at risk, both without and with actual injury, but several included events where the officer accidentally put others at risk or was unable to prevent death or injury.

The treatments described included a problem-solving program incorporating elements of rational-emotive and cognitive therapy (Duckworth, 1986), a broadly psychodynamic therapy with an emphasis on emotional catharsis (Gersons, 1989), in vivo and imaginal exposure (Richards & Rose, 1991), EMDR (Spates & Burnette, 1995), and prolonged exposure (Tolin & Foa, 1999). Systematic measures to document change were not used in the pharmacologic case study (Ford, 1996), and in only two of the psychotherapy articles (Spates

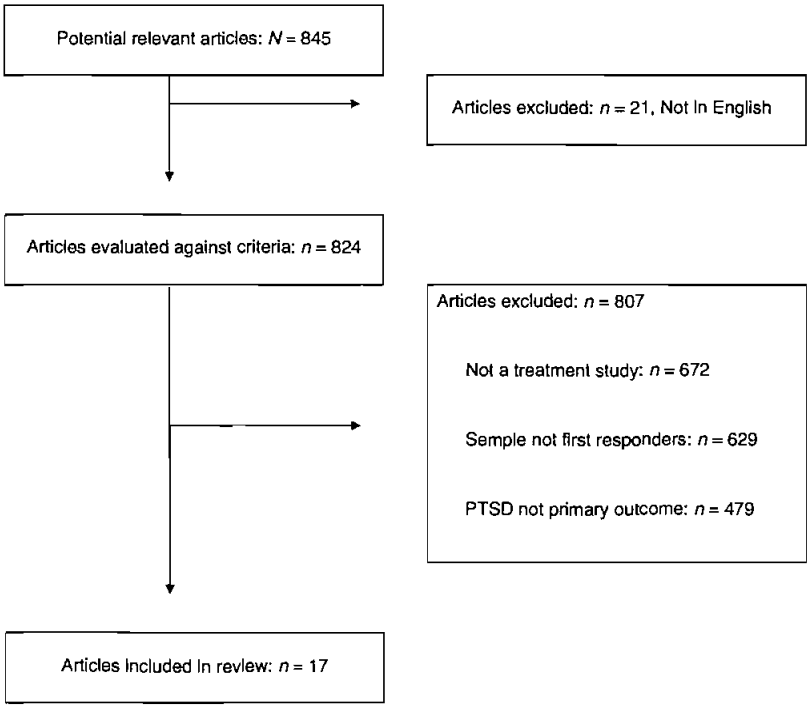

Fig. 1. Literature review exclusion flow chart. Major exclusion criteria were not mutually exclusive.

Table 2
Summary of characteristics of studies reviewed with specific focus on PTSD outcomes.

Study	Subject(s)	Design	Intervention	Measure	Mo. last f/u	PTSD outcome	PTSD ES
Cornelius and Kenyon-Jump (2007)	Retired police officer	Case	CBT as Exposure Therapy	MPTSDSS	2	Improved PTSD symptoms	NR
Coupland (2009)	Ex firefighter on leave	Case	Prazosin	Clinician's judgment	NR	Improved sleep	NR
Difede, Cukor, et al. (2007)	Firefighters, police officers, and disaster workers exposed to WTC disaster; ($N=21$)	RCT with WL control	CBT as virtual reality (VR) exposure treatment	CAPS	6	Significant ($p<.01$) group × time effect for active treatment	CAPS: $d=1.54$. Average decrease in VR group of 39%; WLC 8% increase
Difede, Malta, et al. (2007)	WTC disaster workers ($N=31$)	RCT with TAU control[a]	Manualized CBT for acute stress disorder	CAPS; PCL	3	Significant ($p<.001$) effects for group, time, and group by time for active treatment	CAPS: $d=1.37$; PCL: $d=1.66$
Duckworth (1986)	Police officer 1 (of 34) who attended counseling	Case	Rational-emotive and cognitive therapy	Non-PTSD self-report	NR	NR	NR
Ford (1996)	Ex police officer	Case	Sodium carbemazepine and valproate	Clinician's judgment	8	Withdrawn from sodium carbemazepine due to side effects; improved on sodium valproate	NR
Gersons (1989)	Police officers ($N=2$)	Case	Psychodynamic therapy with emphasis on emotional catharsis	Clinician's judgment	NR	NR	NR
Gersons et al. (2000)	Police officers ($N=42$)	RCT with WL control	Combination of CBT and psychodynamic: Brief Eclectic Psychotherapy	Dutch version of SI-PTSD	3	Significant difference ($p<.01$) in diagnostic remission for active treatment	$h=0.92$[b]
Keenan and Royle (2007)	Police officer	Case	EMDR	Clinician's judgment	15	NR	NR
Kitchiner (2004)	Firefighters ($N=3$)	Case	EMDR	DTS	Ranged from 1 to 5	Improved based on individual graphs	NR
Lansing et al. (2005)	Police officers ($N=6$)	Non experimental pre-post comparison	Modified EMDR with bi-lateral stimulation of palms and fingers	PDS	NR	Significant pre-post difference ($p<.001$)	$d=5.35$
Mulick and Naugle (2004)	Police officer and former member of military special operations	Case	Behavioral Activation Therapy	CAPS; PSS	1	Improved based on individual graphs	64% reducrion in CAPS
Richards and Rose (1991)	Police officers ($n=2$)	Case	CBT–ET	Non-PTSD self-report	3	NR	Reexperiencing
Rumyantseva and Stepanov (2008)	($N=63$) Military combatants ($n=30$); Chernobyl cleanup workers ($n=30$)	Pre to post comparison test of two groups	Coaxil (tianeptine)	SCID-PTSD; CAPS; IES-R (post data NR)	NR	Significant pre–post difference on CAPS for both groups ($p<.05$) in reexperiencing and hyperarousal and only for combatants for avoidance	$d=2.0$ and 1.44 for workers and combatants, respectively[b]
Spates and Burnette (1995)	Police officer	Case	EMDR	Non-PTSD self-report	15	NR	NR
Tolin and Foa (1999)	Police officer	Time series single case	Prolonged exposure	PSS; PSS-I	6	Remission from DSM-IV diagnosis of PTSD	NR
Wilson et al. (2001)	Police officers ($N=62$)	RCT with stress management program control	EMDR	PDS	6	Significant effect of group ($p<.05$) on post scores adjusted for baseline (favoring EMDR)	$d=0.43$

Note. PTSD = posttraumatic stress disorder; f/u = follow-up; NR = not reported; CBT = cognitive behavioral therapy; MPTSDSS = Modified PTSD Symptom Scale; WL = wait list; VR = virtual reality; CAPS = Clinician Administered PTSD scale; WTC = World Trade Center; RCT = randomized controlled trial; TAU = treatment as usual; PCL = PTSD checklist; SI-PTSD = structured interview for PTSD; EMDR = eye movement desensitization and reprocessing; DTS = Davidson Trauma Scale; PDS = Posttraumatic Stress Diagnostic Scale; PSS = PTSD Symptom Scale; SCID = Structured Clinical Interview for DSM (version not specified); IES-R = Impact of Event Scale-Revised; PSS-I = PTSD Symptom Scale-Interview;

[a] TAU comprised no treatment.

[b] Effect size calculated from data presented.

& Burnette, 1995; Tolin & Foa, 1999). All cases showed improvement, often described as dramatic, after relatively few sessions (range = 4–10); not all studies reported the number of sessions.

The seven articles published more recently (Cornelius & Kenyon-Jump, 2007; Coupland, 2009; Keenan & Royle, 2007; Kitchiner, 2004; Lansing, Amen, Hanks, & Rudy, 2005; Mulick & Naugle, 2004; Rumyantseva & Stepanov, 2008) are, as a set, similar to the first but show some important differences as well. First, though police officers represent the most frequently studied first responder population, there are descriptions of firefighters and disaster (Chernobyl) clean-up workers. Second, there is an expansion of interest in mechanisms of change with neuroimaging changes examined along with symptom changes. Third, the treatments delivered are both standard—medication, EMDR, CBT – and less usual – Behavioral Activation. Unlike the first set, however, the articles presume that PTSD in first responders is expectable and not something requiring a special rationale, justification, or explanation.

All but one of these seven latter articles employed standard measures to track outcome and all but one clearly reported the amount of psychotherapeutic contact; all reported successful outcomes. Treatment intensity ranged from a low of 4 sessions (frequency was not reported) to a high of 15 sessions. Variations in intensity occurred, with some sessions (EMDR) lasting up to 3 h. Treatment was not necessarily weekly; the 15-session treatment extended over the course of 7 months.

Not surprisingly, as a set, the symptomatic presentation of the patients, and the psychological issues and formulations are remarkably similar to the earlier set of studies. One might have expected the examination of more standardized treatment approaches for PTSD from the early to the later set. Surprisingly, there is considerable heterogeneity in basic parameters of dose – frequency, intensity, and duration of treatment – variation that would not easily be captured in a single manual for any of the standard approaches.

3.2. Randomized controlled trials

Gersons et al. (2000) randomly assigned Amsterdam police officers to Brief Eclectic Psychotherapy (BEP) $n = 22$, or a wait-list control group (WLC) $n = 20$. Difede and colleagues (Difede, Malta, et al., 2007) assigned disaster workers exposed to World Trade Center (WTC) recovery and rescue efforts in New York City after the 9/11 terrorist attacks to either CBT ($n = 15$) or treatment as usual (TAU, $n = 16$). No participants in the TAU group sought or received treatment during the time of the study, making it equivalent to a wait-list control group. Pooling the two studies, there were 37 subjects who received treatment and 36 who did not; the majority were middle aged, married, white males with 82% reporting at least 12 years of education. No additional information regarding occupation was given by either the Gersons et al. (2000) or Difede, Malta, et al. (2007). In addition to assessment at baseline and treatment completion, both studies collected data at a 3-month follow-up, though in the Difede, Malta, et al. (2007) study 3-month data are reported for only six CBT subjects.

The number of duty- and nonduty-related traumatic events was assessed in the Gersons et al. study, which included only those who requested treatment after a traumatic event experienced on duty. Level of PTSD symptoms and diagnostic status were measured with a version of the Structured Interview for PTSD (Davidson, Smith, & Kudler, 1989). A diagnosis of current PTSD was an inclusion criterion. The Difede, Malta, et al. (2007) study measured trauma and stressful events history with the Life Stressor Checklist-Revised (Green, 1996). Level of PTSD symptoms was measured with the Clinician Administered PTSD Scale (CAPS; see Weathers, Keane, & Davidson, 2001) and the PTSD Checklist, (PCL; see McDonald & Calhoun, 2010), though whether it was the specific or civilian version was not specified. The CAPS was used to make a diagnosis of PTSD, but the inclusion criteria were expanded from meeting full criteria to allow partial PTSD defined as meeting two of the three symptom cluster criteria and a total score ≥ 30.

The Difede, Malta, et al. (2007) study subjects reported an average of 21.19 (SD = 6.77) months between their WTC attack exposure and baseline, with 66.7% of participants reporting a trauma history prior to the WTC attack. Those assigned to CBT had an average of 9 days at the WTC disaster site compared to 11 for the TAU group (not a significant difference), but at baseline the groups did not differ on any measure. Police officers in the Gersons et al. study reported an average of 16 years on the force and 3 years between their exposure and baseline. Those assigned to BEP reported four traumas outside of police work; those in the WLC, three. In the Amsterdam study the only difference at baseline was that the BEP group was three years older.

The interventions in both studies were well-characterized, and therapists in both received supervision. The Difede, Malta, et al. (2007) study CBT condition was a modified version of Bryant's (Bryant, Harvey, Dang, Sackville, & Basten, 1998; Bryant, Sackville, Dang, Moulds, & Guthrie, 1999) manualized CBT for acute stress disorder. It comprised twelve 75-minute sessions with these elements: psychoeducation, treatment rationale and contracting, breathing exercises, imaginal exposure, gradual in-vivo exposure, cognitive reprocessing, relapse prevention, and homework. The homework had three elements: listening to imaginal exposures from the treatment sessions that had been audiotaped; graduated in vivo exposure; and cognitive reprocessing. The modifications to the manual were not explicitly specified. After the baseline evaluation, the TAU group was referred back to their referral source (e.g. occupational health, employee assistance) to obtain treatment, but none received treatment for their PTSD. No information was provided regarding medication status.

BEP in the Gersons et al. study was 16 weekly, 60-minute sessions based on a manual described as a combination of elements from CBT and phase-oriented brief psychodynamic therapy. It comprised these elements: psychoeducation, imaginary guidance, writing assignments and mementos, domain of meaning and integration, and a farewell ritual. The goal of the meaning and integration phase is to acknowledge and accept views of the self and the world that are irrevocably changed as a function of the traumatic exposure (see, e.g., Weiss, 1993). The farewell ritual is planned action (such as burning or burying a memento) which aids the client in accepting the loss associated with the critical incident and represents a return to ordinary life. At baseline, the Gersons et al. study subjects were required to be free of medication for at least 4 weeks.

Both studies measured treatment fidelity or integrity. In the Gersons et al. study, the patients submitted checklists of therapist activities as did the two therapists; in addition they noted any deviations from the protocol. Therapists (the number was not presented) in the Difede, Malta, et al. (2007) study received weekly supervision of audiotaped sessions. A rating of treatment fidelity (Bryant et al., 1998; 1999) was completed by an unstated number of raters on 25% of the sessions. Neither study reported significant deviations from the manualized protocol. The relationship between treatment fidelity and outcome was not examined in either study; the Gersons et al. study tested and did not find a difference in outcome between the two therapists.

There was a single dropout in the Gersons et al. study, but in the Difede, Malta, et al. (2007) study eight of 15 participants assigned to CBT did not complete treatment. CBT treatment noncompleters were less educated and had lower incomes than completers.

The primary outcome of PTSD status was indexed and analyzed differently in the two studies. The Difede, Malta, et al. (2007) study highlighted an ANOVA on treatment completers only (7 CBT, 14 TAU) that examined the baseline versus end of treatment contrast (time), condition (group), and their interaction on CAPS and PCL scores. Both PTSD measures showed a significant effect of all three

components, with the pre-post difference significantly greater in the CBT group. Cohen's *d* was 1.37 for the CAPS and 1.66 for the PCL. Intent-to-treat analyses did not show an effect of treatment. The Gersons et al. study indexed outcome categorically, using remission of the current PTSD diagnosis as well as four variants of symptom reduction; return to work was also a primary outcome. The data analysis strategy was not presented but appeared to be a set of multiple simple comparisons between the BEP and WLC groups, using an ANOVA approach, though this is at odds with the tabled values. At treatment termination 91% of the BEP group no longer met criteria for PTSD, significantly greater than the 50% in the WLC group; three of the other symptom variants also showed a treatment effect. Neither returning to work nor having <3 avoidance symptoms, however, showed improvement at termination. The Gersons et al. study did not present an effect size for the main outcome. Consequently, we calculated an effect size for the difference between .91 and .50. The value of Cohen (1988) was approximately 0.92; values of *h* greater than 0.80 are considered large effects.

Both trials also assessed secondary outcomes, predominantly measures of comorbid symptoms and diagnoses. The Difede, Malta, et al. (2007) study also tracked interpersonal functioning and alcohol use. In the main, the Difede, Malta, et al. (2007) study failed to find meaningful differences between the two conditions in the secondary outcomes of depression, general psychiatric symptoms, interpersonal functioning and alcohol use. In contrast, the Gersons et al. study reported significant differences between those on wait-list and those who received BEP on most non-PTSD psychiatric symptoms. Both trials also reported data from the three-month follow-up; these results were consistent, on the whole, with those at treatment completion.

3.3. Other controlled trials

Wilson et al. (2001) did not focus on PTSD as the primary outcome in their randomized study of Colorado Springs police officers, primarily because job stress was the focus and PTSD symptom levels were exclusively mild (82%) or moderate (18%) in the sample. The effect on the level of stress measured by the 11-point Subjective Units of Disturbance Scale (SUDS; Wolpe, 1973) of EMDR treatment ($n=33$) was compared to the SUDS in a group ($n=28$) receiving a stress management program using six one-hour videotapes. Posttreatment and 6 month follow-up data were collected. PTSD symptom status was one among eight other secondary outcomes. Officers reported an average of 13 years (SD = 7) working in the police department. Exposure to traumatic events was not explicitly specified, nor was the time since trauma reported. Because a few officers were said to meet criteria for PTSD, it is assumed that some did experience a Criterion A event.

Three two-hour sessions of EMDR were delivered with treatment fidelity monitored and reported as acceptable. An ANCOVA (the covariate was baseline score) of group by time was conducted for each of the nine outcomes separately. A treatment effect was not found for a number of secondary outcomes at either posttest or follow-up. For those that did show an effect, EMDR was more effective than the stress management program. Cohen's *d* for the SUDS was 1.48, a substantial effect that did not change at follow-up. For PTSD symptoms, measured by Foa's (1995) Posttraumatic Stress Diagnostic Scale (PDS), participants in the EMDR treatment group showed lower scores at both time points, but here the effect was not nearly as robust, $d=0.43$.

Difede and colleagues (Difede, Cukor, et al., 2007) compared a virtual reality (VR) exposure treatment group ($n=13$) to a matched wait-list control (WLC) group ($n=8$) in a quasi-experimental design with baseline, posttreatment, and 6 month assessments. Participants had at least partial direct exposure to the WTC terrorist attacks of 9/11 and included firefighters, police officers, non-rescue disaster workers, and civilians. Matching was done on total PTSD symptoms, WTC exposure, and sociodemographic characteristics. All who were assigned to the VR arm had either failed previous treatment or were receiving medication; treatment history for the WLC group was not presented. Participants reported a range of 5 months to 3 years between initial exposure to WTC attacks and treatment.

The VR-enhanced exposure therapy was integrated with "other therapeutic techniques commonly used in PTSD outcome studies involving CBT including psychoeducation, relaxation training, and cognitive restructuring" (Difede, Cukor, et al., 2007, p. 1640). Number of treatment sessions ranged from 10 to 17 weekly 75 minute sessions. There was a series of 11 computer-generated sequences in the VR component increased in intensity of exposure. In addition to assessment using the SUDS, distress and engagement during exposure were also measured.

One subject dropped out of VR treatment, and two more had to stop participation for reasons not related to the study. This left 10 analyzable subjects who received VR treatment; follow-up data were collected from nine. The main analysis, a repeated-measures ANOVA, showed a significant time by group interaction, $F(1, 16)=10.82$, $p<.01$ for total PTSD symptoms. There was a large interaction effect size (partial $\eta^2=0.40$) and a large posttreatment difference in mean symptom level ($d=1.54$) with the WLC showing higher symptom levels. Paired *t*-tests showed that PTSD symptoms at follow-up for those in the VR group were significantly different from baseline. No significant change was reported from posttreatment to follow-up.

3.4. Implications and recommendations

The goal of the present study was to summarize the evidence base regarding the treatment of PTSD in first responders. As many as 400,000 first responders in the United States and undoubtedly many more in other countries (e.g., Japan after the Tōhoku earthquake and tsunami) are likely suffering from symptoms of PTSD with associated functional impairments. Treatment research with this population, however, has been sparse. Our literature search yielded only two RCTs of PTSD in first responders; both examined psychosocial interventions. Work on medication interventions in first responders is virtually non-existent: one case study (Ford, 1996) and one paper whose participants were a series of individuals who worked at Chernobyl (Rumyantseva & Stepanov, 2008) were identified. We located no RCTs of pharmacotherapy alone or combined with psychosocial treatment.

This paucity of research is particularly surprising when compared with the volume of treatment research conducted with other trauma populations (e.g., combat veterans), which in turn form the basis of PTSD treatment guidelines (though the 28 worldwide studies of prevalence for first responders analyzed by Berger et al. (2011) is in line with the limited research base on first responders). There are several factors, both organizational and individual, which might act as barriers to treatment research with first responders. First is duty status, with active-duty being associated with lower levels of treatment referral and engagement because of long hours or shift work which provide limited opportunity to access services. The second is a reluctance to commit to treatment because of concerns of stigma—being negatively evaluated by peers and/or leadership (see Hoge et al., 2004, for a discussion of this issue in military populations). Third, seeking treatment for duty-related incidents can lead to unsought, negative changes in job duties or reduced pay (e.g., Deisinger, 2003). Finally, first responder organizations lack the structure and affiliation with academic institutions, the primary source of the researchers that characterizes the Veterans Administration Health System. There are few if any close parallels for non-active duty/retired or non-traditional first responders, and no national service organizations (e.g., Veterans of Foreign Wars) that have a large advocacy role.

Two psychosocial treatments for PTSD in first responders, CBT and BEP, were studied in the RCTs identified in this review. When

compared to other psychosocial treatments for PTSD, variants of CBT have the largest evidence base in support of their effectiveness across the widest range of trauma populations (see Foa et al., 2009 for a review). Although the high drop-out rate in the Difede, Malta, et al. (2007) study (40%, a higher rate than the 20–30% dropout range reported by Bradley et al. (2005) as typical of exposure treatment studies) attenuates their strength, the findings comprise preliminary evidence for CBT's effectiveness in the treatment of PTSD in first responders. BEP has dramatically fewer – RCTs – only three – in support of its effectiveness (Gersons et al., 2000; Lindauer et al., 2005; Schnyder, Müller, Maercker, & Wittmann, 2011), but the strength of the findings for the Gersons et al. study does not appear to be inferior to that of the Difede, Malta, et al. (2007) trial.

If one takes the perspective of the CONSORT (Consolidated Standards of Reporting Trials; Moher et al., 2010) Statement Checklist, additional information in the reporting of both RCTs would have been required. In the Difede, Malta, et al. (2007) study it was not specified whether adjunctive treatment, including pharmacotherapy, was permitted, attenuating the ability to make causal inferences regarding the efficacy of the primary treatment. Though the Gersons et al. study reported a greater decrease in PTSD symptoms in the treatment group, it did not employ a standardized outcome measure of PTSD symptoms.

Commentaries on a recent meta-analysis of clinical trials directly comparing only 'bona fide' PTSD treatments (Benish et al., 2008) have highlighted the importance of examining in detail the component procedures – both active ingredients and common factors – of any particular treatment (Ehlers et al., 2010; Hoge, 2011; Wampold et al., 2010) in order to distinguish *necessary* and *facilitative* conditions for the treatment of PTSD from *sufficient* conditions (see Foa et al., 2009 for a discussion). Doing so could allow for the streamlining of treatments and deincentivize the conceptualization of treatment research as a horse race between brand names. When elements of practice are not well-described or understood, treatment risk is miscategorized in meta-analyses. This miscategorization can inappropriately feed the extant partisanship about evidence-based treatments and detract from the effort to develop sound treatments. Furthermore, the process of categorization tends to reify packaged treatments as if their active ingredient were as pure and isolated as a pharmacologic intervention. The guidelines may well contribute to this reification in the area of psychotherapy research. In addition, the categorization process may inappropriately and unnecessarily limit the range of conceptualizations of the etiology of PTSD. If the effectiveness of prolonged exposure stems not so much from the specific exposure procedures, but more from the common ingredients of most psychosocial treatments, then continuing to limit the conceptualization of PTSD to the domain of a conditioned fear response would not be justified. In fact, the controlled trial that is touted as one of the strongest demonstrations of the superiority of prolonged exposure (Schnurr et al., 2007) and is used to bolster the position that PTSD is best understood from the perspective of conditioned fear, also showed that a present-centered non-exposure psychotherapy is almost as effective in female veterans with military sexual trauma among other exposure. This is not consistent with the position that an explicit form of attention to conditioning must occur for improvement.

Although it is difficult to extrapolate treatment recommendations from this limited evidence base, there is some overlap between the descriptions of psychosocial treatments as reported in the two RCTs. Both the modified version of Bryant et al.'s (1999) manual used in the Difede, Malta, et al. (2007) study and the BEP used in the Gersons et al. study are frequently categorized as CBT in reviews (e.g., Bisson & Andrew, 2007) and treatment guidelines (e.g., National Institute for Health and Clinical Excellence, 2005): both comprise techniques commonly used in cognitive-behavioral treatment protocols, including psychoeducation, imaginal exposure, homework tasks and cognitive restructuring. There are, however, also obvious differences. As instantiated in the Difede, Malta, et al. (2007) study, CBT involved fewer (12 vs 16) but longer (75 min vs 60 min) sessions than BEP. BEP includes focal psychodynamic techniques with a farewell ritual, while CBT includes gradual in vivo exposure and relapse prevention. The very limited evidence available for first responders supports current treatment guidelines recommending CBT as a first-line treatment for PTSD. Unlike current treatment guidelines, similar levels of evidence exist in support of BEP as a first-line treatment in police officers. Unfortunately, our detailed review of the treatment presentation was unable to determine the relative contribution of the CBT interventions, psychodynamic interventions, and the standard aspects of the therapeutic alliance that Frank (1961) described five decades ago in his classic *Persuasion and Healing*. For CBT, however, it is also not clear how much the nonspecific factors such as the alliance were key in producing the positive outcomes.

The differences between the specific techniques involved in the CBT and BEP studies may be even more substantial: the term "imaginal exposure" is used to describe what are likely different procedures (Marks, Fullana, & Holmes, 2011). For CBT, imaginal exposure leads to symptom reduction because prolonged activation of the traumatic memories leads to emotional processing of the affective information, habituation of anxiety, and integration of corrective information (Foa & Hearst-Ikeda, 1996), and, as noted above, is based on a conditioned fear model (e.g., Davis, Myers, Ressler, & Rothbaum, 2005). Alternately, from a focal psychodynamic perspective (represented in BEP), "the underlying reason for imaginal exposure in the BEPP [sic] is based not on habituation of anxiety, but on emotional catharsis and on changing the meaning of the trauma and its consequences" (Gersons, Nijdam, Meewisse, & Olff, 2010, p. 29). The differences between these two treatments are both broad and deep, and therefore, not appropriately grouped together as CBT treatments (e.g., Bisson & Andrew, 2007). As studies on the treatment of PTSD in first responders accrue, it will be increasingly important for reviewers to attend to both theoretical and operational differences associated with "active ingredients" that share common names in order to "reduce confusion and speed psychotherapy's evolution into a science" (Marks & Dar, 2000).

3.5. Future directions

The treatment literature on first responders is heavily weighted toward law enforcement, both in the case studies and the formal treatment trials, two of which are focused exclusively on police officers and the remaining two likely had some police officers in the sample (see Table 2). The wide range of prevalence rates of PTSD across first-responder professions exposed to potentially traumatic events (e.g., Perrin et al., 2007) suggests the presence of other group-level differences which may differentially effect treatment engagement and response. As the research portfolio of treatment studies of PTSD in first responders grows, authors should make efforts to include other subgroups in addition to law enforcement, including non-traditional first responders such as telecommunicators (Lily & Pierce, 2012).

As additional studies are conducted, it is important that the duty status of participants both during and post-treatment is assessed and included in analyses. Occupational exposure to traumatic stress does not necessarily end when treatment begins. Re-exposures (or new exposures) which occur during treatment for PTSD may complicate treatment and attenuate outcomes, as may exposure that occurs soon after treatment terminates. Only three of 17 studies reviewed in this paper, however, were conducted with active-duty personnel, making even preliminary conclusions regarding the impact of duty status on outcomes difficult to reach. Similarly, whether active duty or not at the time of treatment, many first responders will return posttreatment to the environment in which the exposure occurred. Re-exposure to subsequent critical incidents brings an additional factor for first responders that could blunt the effect of prior treatment as well as complicate long-term follow-up results. Fewer than half of the studies reviewed here involved first responders who returned to active duty. Of those studies that did, only two included follow-up

beyond 6 months (see Table 2), making preliminary conclusions regarding the impact of returning to duty post-treatment difficult to assess. Investigation of formally-scheduled periodic assessment or maintenance contact with providers is needed to help determine the optimal career-long treatment regimen; it may well be that some ongoing intervention is helpful in the context of secondary prevention.

Additional treatment studies of PTSD in first responders are sorely needed. Setting the priority for where to begin is not self-evident. Our recommendation is to begin with those treatments that have the strongest preliminary evidence for efficacy with this population: CBT and BEP. Second, those psychosocial (i.e., EMDR, VR, PE) and pharmacological (e.g., prazosin) treatments identified in case studies and controlled trials should be tested in RCTs. Third, those psychosocial and pharmacological treatments represented in current treatment guidelines for PTSD need to be studied, especially those validated with active duty military personnel (i.e., CPT, PE), a subject group that has many similarities to first responders.

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