Cognitive behaviour therapy for posttraumatic stress disorder

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Abstract

Following considerable empirical scrutiny, cognitive behaviour therapy (CBT) has proven to be a safe and effective treatment for posttraumatic stress disorder (PTSD). This article overviews the general principles of treatment and describes the components that comprise CBT for PTSD. We then move on to review the efficacy of CBT for the treatment of PTSD caused by various traumas, including assault, road traffic accident (RTA), combat, and terrorism. Recent advances in early intervention and in the treatment of disorders that are comorbid with PTSD are reviewed. Finally, future directions are discussed. In particular, it is proposed that randomised controlled trials (RCT) of CBT for PTSD must be conducted with enhanced methodological rigour and public health relevance.

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1. Introduction

The aim of this article is to review current approaches to the treatment of posttraumatic stress disorder (PTSD). The focus will be on cognitive behaviour therapy (CBT) because...
these interventions are the most thoroughly investigated and have proven to be safe and effective. We begin by outlining the general principles of CBT for PTSD and will then review evidence relating to the efficacy of this approach. Recent developments in the application of CBT soon after the trauma will be reviewed. Finally, we will outline the major challenges and future directions of CBT for trauma populations. While the emphasis of this chapter will be on CBT for adults, it should be noted that there is accruing evidence for the application of CBT to the treatment of children with PTSD (see Salmon & Bryant, 2002; Yule, 2001).

2. General principles of CBT for PTSD

The treatment components that typically constitute CBT for PTSD are psychoeducation, exposure, cognitive restructuring, and anxiety management. The basic components and the rationales for these interventions are described below.

2.1. Psychoeducation

Information about common symptoms following a traumatic event is given during the initial treatment session. This education session highlights the hallmark symptoms of the posttrauma response and discusses the way in which the core symptoms will be treated during the course of therapy. The aim is to legitimise the trauma reaction, to help the patient develop a formulation of their symptoms, and to establish a rationale for treatment.

2.2. Exposure

Prolonged imaginal exposure requires the individual with PTSD to vividly imagine the trauma for prolonged periods. The therapist assists the patient to provide a narrative of their traumatic experience in a way that emphasises all relevant details, including sensory cues and affective responses. In an attempt to maximise the sense of reliving the experience, the individual may be asked to provide the narrative in the present tense, speak in the first person, and ensure that there is focus on the most distressing aspects. Prolonged exposure typically occurs for at least 50 minutes, and is usually supplemented by daily homework exercises. Variants of imaginal exposure involve requiring clients to repeatedly write down detailed descriptions of the experience (Resick & Schnicke, 1993), listen to an audiotape of stimulus cues for exposure (Vaughan & Tarrier, 1992), and implementing exposure with the assistance of virtual reality paradigms implemented via computer-generated imagery (Rothbaum, Hodges, Ready, Graap, & Alarcon, 2001). Most exposure treatments supplement imaginal exposure with in vivo exposure that involves live graded exposure to the feared trauma-related stimuli. Other variants to exposure approaches include earlier work on systematic desensitisation (Wolpe, 1958) and eye movement desensitisation and reprocessing (EMDR) (Shapiro, 1995).
There is considerable debate concerning the change mechanisms operating during exposure (see Jaycox & Foa, 1996; Rothbaum & Mellman, 2001; Rothbaum & Schwartz, 2002). Possible mechanisms for the benefits of exposure are that it:

1. promotes habituation and therefore reduces anxiety.
2. promotes correction of the belief that anxiety remains unless avoidance occurs.
3. impedes negative reinforcement associated with fear reduction.
4. promotes the incorporation of corrective information into the trauma memory.
5. establishes the trauma as a discrete event that is not indicative of the world being globally threatening, and
6. enhances self-mastery through management of the exposure exercise.

2.3. Cognitive restructuring

Network models of PTSD posit that resolution of PTSD requires the integration of corrective information that is incompatible with the existing fear structures (Foa & Kozak, 1986). This perspective is consistent with models that emphasise the importance of appraisals in the aetiology and maintenance of PTSD (Ehlers & Clark, 2000). Cognitive restructuring involves teaching patients to identify and evaluate the evidence for negative automatic thoughts, as well as helping patients to evaluate their beliefs about the trauma, the self, the world, and the future (Marks, Lovell, Noshirvani, Livanou, & Thrasher, 1998).

2.4. Anxiety management training

Anxiety management training aims to provide individuals with coping skills to assist them to gain a sense of mastery over their fear, to reduce arousal levels, and to assist the individual when engaging in exposure to the traumatic memories. Anxiety management approaches often include stress inoculation training that follows Meichenbaum’s (1975) program of psychoeducation, relaxation skills, thought stopping, and self-talk. However, it should be noted that the use of thought stopping has been challenged (Rassin, Merckelbach, & Muris, 2000) because there is evidence that attempting to stop or suppress thoughts relating to a trauma may actually fuel these thoughts (Harvey & Bryant, 1998a).

2.5. Summary

The duration of CBT for PTSD varies across studies and trauma groups but is typically 9–12 sessions, each lasting between 60 and 90 minutes. We have presented the four treatment components as distinct entities, but in reality, there is often overlap. During any one session, a therapist may draw on several of the treatment components.
3. Efficacy of CBT in the treatment of PTSD

We now consider the efficacy of CBT for PTSD. As different types of traumatic events can vary in terms of chronicity, the degree of violation of an individual’s assumptions of safety, and the context in which the trauma and recovery occur, results based on one trauma type cannot be assumed to generalise to others. Accordingly, this review is structured according to trauma type.

3.1. Assault

Some of the earliest CBT studies of trauma-related anxiety involved assault victims. Frank et al. (1988) and Frank and Stewart (1983, 1984) investigated the efficacy of systematic desensitisation in a series of studies with female rape victims. Systematic desensitisation involved imagining the traumatic scenarios, combined with positive scenes. Participants received 14 sessions, and in 75% of cases, the participants voluntarily initiated in vivo exposure exercises. Treatment led to reduced fear and improved social adjustment. These studies were limited, however, by the absence of control groups and specific measures of PTSD. Another early study found that systematic desensitisation led to only modest symptom reduction for rape-related anxiety (Becker & Abel, 1981).

A rigorous investigation of the efficacy of prolonged exposure was conducted by Foa, Rothbaum, Riggs, and Murdock (1991). In this study, female victims of sexual or nonsexual assault were randomly assigned to prolonged exposure, stress inoculation training, supportive counseling, or a waitlist control group (Foa et al., 1991). Stress inoculation training comprised education, breathing retraining and muscle relaxation, thought stopping, cognitive restructuring, modelling, and role-plays. This study provided participants with nine twice-weekly sessions and included blind assessments at both the posttreatment and 3-month follow-ups. Whereas stress inoculation training resulted in greater gains than supportive counselling or waitlist control at posttreatment, the prolonged exposure condition led to greater reduction in PTSD symptoms at follow-up. The authors interpreted these findings as indicating that whereas stress inoculation training led to short-term symptom reduction, prolonged exposure resulted in longer-term benefits because the fear networks were activated and modified.

Foa et al. (1999) subsequently replicated this study in a design that randomised 96 assault victims to prolonged exposure, stress inoculation training, the combination of prolonged exposure and stress inoculation training, and a waitlist control condition. The hypothesis tested was that the combination treatment would be superior to either of its components administered alone. The treatment was administered in nine individual sessions spaced twice weekly. The three active treatments were associated with reduced PTSD and depression relative to controls. The intention-to-treat analysis indicated that prolonged exposure was superior to stress inoculation training and the combined treatment. That is, the main hypothesis of the study concerning the additive benefit of combined treatments was not supported. The authors suggested that this might have been because the session length was the same for all conditions and resulted in “information overload” (p. 199).
Resick, Nishith, Weaver, Astin, and Feuer (2002) and Resick and Schnicke (1992) have proposed cognitive processing therapy (CPT) as a structured combination of exposure and cognitive therapy that is based on five major cognitive themes that are suggested to be central to the cognitive schema of individuals who have been raped. The cognitive themes are safety, trust, power, esteem, and intimacy (Resick & Schnicke, 1992). One of the features of their approach is that exposure is achieved through repeatedly writing out an account of the trauma. In an initial comparison of CPT groups and waitlist controls, the mean symptom reduction on the SCL-90 was 40% compared to 1.5% for waitlist controls. This study was limited by the lack of blind evaluations and measures of PTSD. In addition, participants were not discouraged from seeking individual treatment, although the number who did so was not reported. In a methodologically improved study, Resick et al. compared CPT with Prolonged Exposure (PE) and a waiting minimal-attention condition. One hundred and seventy-one female rape victims were randomised into one of the three conditions and 121 patients completed treatment. The two active treatments consisted of 13 hours of therapy conducted twice per week. Both the intention-to-treat and treatment completer analyses indicated that active treatments were highly efficacious and superior to the waitlist condition. There were no differences between the active treatments, except that CPT produced greater reduction on measures of guilt.

3.2. Mixed trauma

Marks et al. (1998) randomly assigned 87 survivors of a variety of traumas to one of four treatment conditions: prolonged exposure alone, cognitive restructuring alone, combined cognitive restructuring and prolonged exposure, or relaxation without prolonged exposure or cognitive restructuring. Ten sessions of treatment were provided and patients were followed up at 6 months posttreatment. All sessions followed a 90-minute format except for the combined cognitive restructuring and prolonged exposure sessions, which took 105 minutes and were divided as follows: 45 minutes of imaginal exposure, 15 minutes break, and then 45 minutes of cognitive restructuring. Care was taken not to introduce any element of exposure in the cognitive therapy nor to challenge cognitions in the exposure therapy. The results indicated that prolonged exposure alone, cognitive restructuring alone, and the combined treatment produced similar outcomes. All of the conditions were superior to relaxation. As with the Foa et al. (1999) study, the full benefit of the combined treatment may not have been realised as the session duration may have been too short to allow the clients to master both the cognitive and exposure aspects of the treatment.

Tarrier, Sommerfield, Reynolds, and Pilgrim (1999) recruited chronic PTSD patients and asked them to monitor their symptoms on a daily basis for 4 weeks. Twelve patients improved over the monitoring period and did not receive any further treatment. These patients maintained their improvement at 3- and 12-month follow-up. Those 72 patients who remained PTSD cases at the end of the monitoring period were randomly allocated to either imaginal exposure or cognitive therapy. Patients who improved during monitoring alone scored significantly lower on all measures at the baseline assessment compared to those who remained PTSD cases after monitoring. Both imaginal exposure and cognitive therapy showed significant improvements with both treatments being equally effective at posttreat-
ment and at 6- and 12-month follow-up (Tarrier, Pilgrim, Sommerfield, et al., 1999; Tarrier, Sommerfield, Pilgrim, & Humphreys, 1999). As with the Marks et al. (1998) trial, care was taken not to introduce any element of exposure in the cognitive therapy nor to challenge cognitions in the exposure therapy. The results of both studies indicate that exposure is not necessary for successful treatment. Interestingly, a year after treatment, victims of crime displayed more symptomatology than victims of accidents (Tarrier, Sommerfield, Pilgrim, et al., 1999). It is also noteworthy that psychophysiological measures taken at baseline did not predict treatment response (Tarrier et al., 2002). Although there were no differences between the treatment groups at posttreatment and at 6- and 12-month follow-up, a significant difference did emerge at the 5-year follow-up. The group that had received cognitive therapy showed significantly lower PTSD symptoms and depression than the exposure therapy. In terms of the number of PTSD cases at 5 years, while none of the cognitive therapy group had PTSD, 29% had PTSD in the exposure group. However, it should be noted that the number of patients lost to 5-year follow-up was large (Tarrier, 2002; Tarrier & Sommerfield, 2003).

Bryant, Moulds, Guthrie, Dang, and Nixon (in press) randomly allocated survivors of road traffic accident (RTA) or nonsexual assault ($n = 58$) with chronic PTSD to imaginal exposure, imaginal exposure plus cognitive restructuring, or supportive counselling. Treatment involved eight individual weekly sessions with considerable homework. At 6-month follow-up, both active treatments resulted in reduced PTSD and depression compared to the supportive counselling condition. Moreover, participants in the combined treatment condition reported more reductions in PTSD and catastrophic cognitions at follow-up than those who only received exposure. The most likely reason that this study found an additive benefit for combined cognitive restructuring and exposure was that the exposure, similar to Tarrier, Sommerfield, Reynolds, et al. (1999), was limited to imaginal exposure. It is possible that if in vivo exposure was included (as done by Foa et al., 1999; Marks et al., 1998; Resick et al., 2002), the addition of cognitive restructuring may not have enhanced treatment outcome.

Finally, in a small crossover study ($n = 14$) of mixed trauma survivors, Richards, Lovell, and Marks (1994) provided participants with either four sessions of imaginal exposure followed by four sessions of in vivo exposure or four sessions of in vivo exposure followed by four sessions of imaginal exposure. Although both conditions led to marked symptom reduction, the in vivo exposure was associated with greater reductions in phobic avoidance, regardless of when it was provided. This study’s conclusions were limited, however, by the lack of control groups.

### 3.3. Terrorism

A treatment study of victims of a terrorist bomb attack in Omagh, Northern Ireland has been reported (Gillespie, Duffy, Hackmann, & Clark, 2002). In this study, 91 consecutive individuals with PTSD were given a cognitive therapy program that focused on imaginal and in vivo exposure, reappraising the event and its aftermath, and reducing unhelpful behavioural and cognitive strategies. This therapy approach differed from previous CBT protocols by intentionally structuring the reliving aspects of therapy to facilitate reappraisals of the experience (see Ehlers & Clark, 2000). A distinctive feature of this project was that it
accepted all potential participants and therapy was conducted by community counsellors who received relatively brief instruction in the cognitive therapy protocol. Following an average of eight sessions of treatment, there was marked improvement in PTSD symptoms in treated individuals. The results indicated an impressive effect size (2.47) at posttreatment on the Posttraumatic Diagnostic Scale (PDS) (Foa, Cashman, Jaycox, & Perry, 1997), although limited by the absence of a control group and follow-up assessments, the effect size has been replicated in a rigorous randomised controlled trials (RCT) (Ehlers et al., in press). In both studies, the effect size was calculated as follows: (mean PDS score pretreatment – mean PDS score posttreatment)/pooled S.D.

3.4. Road traffic accidents

Fecteau and Nicki (1999) randomly allocated 20 RTA survivors with PTSD to 8–10 hours of CBT or waitlist. CBT involved (1) education about the posttrauma reaction, (2) relaxation training, (3) exposure therapy with cognitive restructuring, and (4) instruction for in vivo exposure. The emphasis of the treatment was to promote habituation to the feared associations. At posttreatment, the CBT group had improved on a measure of PTSD, self-report questionnaires, and on a behaviour test (audio-taped description of the accident). These gains were maintained 6 months later.

Blanchard et al. (2003) randomly allocated 78 RTA survivors with chronic PTSD to CBT, supportive psychotherapy, or a waitlist condition. Therapy comprised 8–12 weekly sessions, and CBT included education, muscle relaxation, imaginal and in vivo exposure, cognitive therapy, positive event scheduling, and anger management. Intention-to-treat and completer analyses indicated that CBT led to greater reductions in PTSD symptoms, as well as comorbid depression and generalised anxiety disorder at posttreatment. These gains were maintained at the 3-month follow-up assessment.

In a recent study, Ehlers et al. (in press) recruited 97 patients who met criteria for PTSD within 6 months of an RTA. Based on Tarrier, Sommerfield, Reynolds, et al. (1999), these participants were required to complete a 3-week self-monitoring phase. Patients who did not recover (n = 85) were randomly assigned to cognitive therapy, a self-help booklet, or repeated assessment. The cognitive therapy intervention was the same as that provided by Gillespie et al. (2002). The self-help booklet involved the teaching of CBT principles. Intention-to-treat analyses indicated that cognitive therapy was more effective in reducing symptoms of PTSD, depression, anxiety, and disability than the self-help booklet or repeated assessments. In terms of PTSD diagnosis, fewer cognitive therapy patients (11%) suffered from PTSD at follow-up than those receiving the self-help booklet (61%) or repeated assessments (55%). The effect size for the cognitive therapy condition was 2.46. It should be noted that on two measures, outcome for the self-help group was poorer than for repeated assessment group.

3.5. Combat veterans

In an early study of Vietnam veterans, Peniston (1986) compared EMG biofeedback-induced desensitization (n = 8) with a no treatment control (n = 8) in veterans with a 7-year
history of PTSD. Treatment involved three sessions of training in imagery and relaxation, followed by imaginal desensitisation based on a hierarchy of the 10 most stressful scenes. There were 48 sessions of 30 minutes each. Desensitisation led to greater reduction in muscle tension and PTSD symptoms.

Cooper and Clum (1989) treated Vietnam veterans with PTSD approximately 17 years after the Vietnam war. Imaginal exposure plus standard treatment \((n = 7)\) was compared with standard treatment alone \((n = 7)\). The imaginal exposure group received 6–14 sessions, with a maximum of nine sessions devoted to flooding. Imaginal exposure was associated with reductions in state anxiety, hypersensitivity to sound, and sleep disturbance.

Keane, Fairbank, Caddell, and Zimering (1989) improved on the previous study by employing a structured clinical interview to diagnose PTSD in 24 Vietnam veterans who were randomly allocated to 14–16 sessions of imaginal exposure or a waitlist control condition. At posttreatment and at 6-month follow-up, there was a greater reduction in PTSD symptoms in the treated group, especially in reexperiencing symptoms.

Boudewyns and Hyer (1990) and Boudewyns, Hyer, Woods, Harrison, and McCrane (1990) reported two studies of inpatient veterans who, in addition to the regular inpatient treatment program, received either flooding or individual counseling. Flooding involved twelve 50-minute sessions of exposure that included imaginal and in vivo exercises. The individual counseling was included as a control for therapist contact and involved a nondirective intervention. In both studies, there was greater reported improvement on general psychological functioning, although specific PTSD symptoms were not reported. It should be noted that each of the veteran studies reported so far was limited by the absence of blind posttreatment assessments of outcome. This factor raises the possibility that expectancy bias may have influenced the reporting of any clinical gains.

Glynn et al. (1999) compared 18 sessions of twice weekly exposure \((n = 12)\), 18 sessions of twice weekly exposure plus 16 sessions of behavioural family therapy \((n = 17)\), and a waitlist control \((n = 13)\). The exposure condition involved two introductory sessions followed by 13–14 sessions of exposure and cognitive restructuring. The session format was to review a specific trauma in intricate detail and complete six trials of exposure to each scene. Each session concluded with 15 minutes of cognitive restructuring of the memory. Both groups who received exposure exhibited more improvement compared to the waitlist group on reexperiencing and hyperarousal symptoms. The family therapy had no added benefit. These results were sustained at the 6-month follow-up.

There have been other attempts to address the PTSD reactions in war veterans. Many veterans’ agencies have instigated inpatient programs. Although strict control over the content of these programs is difficult to achieve, there is some evidence that these programs are not particularly successful (Creamer, Forbes, Biddle, & Elliot, 2002). In another attempt, the Israeli Defence Forces Medical Corps implemented the Koach project, which involved a 1-month intensive military camp for soldiers with war-induced psychopathology. Participants received instructions on goal setting, cognitive reframing, relaxation training, assertiveness training, self-reinforcement, and graded exposure to feared stimuli. It appears that soldiers were very strongly encouraged to participate and that a significant component was in vivo exposure to military equipment and salient reminders of their war experiences. Long-term follow-ups
indicated, however, that these soldiers displayed poorer outcomes than controls (Solomon et al., 1992). This failure was attributed, among other factors, to inappropriate provision of in vivo exposure strategies in which exposure was not conducted in a manner that ensured anxiety reduction and mastery of the experience (Bleich, Shalev, Shoham, Solomon, & Kotler, 1992).

3.6. Refugees

In the only RCT of CBT for refugees with PTSD, Paunovic and Öst (2001) compared CBT \((n = 7)\) and exposure therapy \((n = 9)\). CBT involved exposure, cognitive therapy, and training in controlled breathing. The duration of the therapy sessions was 60–120 minutes once a week for 16–20 sessions. Both treatments were associated with improvements in PTSD symptoms, generalised anxiety, and depression at posttreatment and 6-month follow-up. It is likely that this study was insufficiently powered to detect group differences.

3.7. Childhood abuse

Cloitre, Koenen, Cohen, and Han (2002) randomly assigned women with PTSD following childhood abuse to a skills training plus CBT treatment or to a waitlist. The active treatment comprised eight weekly sessions of affect and interpersonal skills training followed by eight weekly sessions of CBT. Patients in the active treatment showed significantly greater reduction in PTSD symptoms relative to the waitlist, a difference that was maintained at 3- and 9-month follow-up. While a waitlist control group is helpful for establishing that the results are not attributable to the passage of time, future research should include active treatment controls to determine the necessity of the skills training component of treatment.

3.8. Summary

This review indicates strong support for the efficacy of CBT for PTSD across a range of trauma groups. In particular, exposure therapy has proven to be a reliably effective and safe intervention. However, it is notable that relatively few RCTs of CBT for PTSD have been conducted and those that have been conducted are typically based on small samples.

4. Early intervention for PTSD

The notion that PTSD may be more difficult to treat when it becomes chronic has led to increased interest in developing early interventions that may limit the development of PTSD. Although there are some early reports of beneficial effects resulting from preventative treatments administered in the initial period after a trauma (Brom, Kleber, & Hofman, 1993; Viney, Clark, Bunn, & Benjamin, 1985), these were not well-controlled studies. One of the early controlled attempts to prevent PTSD involved a brief behavioural intervention that was provided to rape victims immediately after the assault (Kilpatrick & Veronen, 1983). Fifteen rape victims were randomly assigned to repeated assessment, delayed assessment, or the
active intervention. The intervention comprised a 4- to 6-hour treatment program aimed at preventing phobic reactions as well as other PTSD symptoms. Therapy involved imaginal reliving of the trauma, education about psychological responses to trauma, cognitive restructuring, and anxiety management. This study reported that the brief intervention was not more effective than the repeated assessments. This finding needs to be considered with recognition of the small sample sizes, the lack of rigorous application of exposure, and variable levels of posttraumatic stress in those treated. Importantly, the study design may have resulted in a potential confound between treatment effect and natural recovery (Kilpatrick & Calhoun, 1988).

A more rigorous study was conducted by Foa, Hearst-Ikeda, and Perry (1995) who provided a brief cognitive behavioural treatment program to sexual and nonsexual assault victims shortly after the assault. This study compared CBT (including exposure, anxiety management, in vivo exposure, and cognitive restructuring) with matched participants who received repeated assessments. Each participant received four sessions and was then assessed by blind assessors at 2 months posttreatment and 5-month follow-up. At 2 months, whereas 10% of the CBT group met criteria for PTSD, 70% of the control group met criteria. At 5 months, there were no differences between the groups, although the CBT group was less depressed. It should be noted that the results might have been influenced by the lack of random assignment and the possibility that natural remission may have contributed to the results.

A more recent approach to early intervention has attempted to focus on individuals who are at high risk for developing PTSD. A traditional obstacle for early intervention has been the documented recovery of most trauma survivors who initially display posttraumatic distress. For example, although in one study 70% of women and 50% of men were diagnosed with PTSD at an average of 19 days after an assault, the rate of PTSD at the 4-month follow-up dropped to 21% for women and 0 for men (Riggs, Rothbaum, & Foa, 1995). Similarly, whereas 94% of rape victims displayed PTSD symptoms at 2 weeks posttrauma, this rate dropped to 47% 11 weeks later (Rothbaum, Foa, Riggs, Murdock, & Walsh, 1992). In an attempt to identify the minority of people who will not remit and who will suffer longer-term PTSD, DSM-IV introduced the diagnosis of acute stress disorder (ASD). This diagnosis describes stress reactions in the initial month after a trauma and comprises dissociative, reexperiencing, avoidance, and arousal symptoms (Bryant & Harvey, 1997). Although ASD has been criticised on the grounds that its primary role is to predict another diagnosis and that it pathologises transient stress reactions (Harvey & Bryant, 2002), prospective studies indicate that approximately 80% of people who initially display ASD will subsequently develop PTSD 6-months later (Brewin, Andrews, Rose, & Kirk, 1999; Bryant & Harvey, 1998; Harvey & Bryant, 1998a, 1998b; Holeva, Tarrier, & Wells, 2001) and over 70% will still have PTSD 2 years later (Harvey & Bryant, 1999, 2000a, 2000b). These findings suggest that early intervention of people with ASD is a more rigorous means of evaluating the efficacy of early interventions that can prevent PTSD.

In an initial treatment study of ASD participants, Bryant, Harvey, Dang, Sackville, and Basten (1998) randomly allocated RTA or nonsexual assault survivors with ASD to either CBT or supportive counselling. Both interventions consisted of five 1.5-hour weekly individual therapy sessions. CBT included education about common posttraumatic reactions,
relaxation training, imaginal exposure to the traumatic event, graded in vivo exposure, and cognitive restructuring. The supportive counselling condition included trauma education and more general problem-solving skills training in the context of an unconditionally supportive relationship. At the 6-month follow-up, there were fewer participants in the CBT group (20%) who met diagnostic criteria for PTSD compared to supportive counselling control participants (67%). In a subsequent study that dismantled the components of CBT, 45 civilian trauma survivors with ASD were randomly allocated to five sessions of (a) CBT (prolonged exposure, cognitive therapy, anxiety management), (b) prolonged exposure combined with cognitive therapy, or (c) supportive counselling (Bryant, Sackville, Dang, Moulds, & Guthrie, 1999). This study found that at the 6-month follow-up, PTSD was observed in approximately 20% of both active treatment groups compared to 67% of those receiving supportive counselling.

Two recent additional studies have supported the utility of CBT for people with ASD. One study randomly allocated civilian trauma survivors (n = 89) with ASD to CBT, CBT plus hypnosis, or supportive counseling (Bryant, Moulds, Guthrie, Nixon, & Felmingham, in press). The hypnosis component was provided immediately before imaginal exposure in an attempt to facilitate emotional processing of the trauma memories. In terms of treatment completers, more participants in the supportive counselling condition (57%) met criteria for PTSD at the 6-month follow-up than those in the CBT (21%) or CBT plus hypnosis (22%) condition. Interestingly, participants in the CBT plus hypnosis condition reported greater reduction of reexperiencing symptoms at posttreatment than those in the CBT condition. Finally, a recent study replicated the original Bryant et al. (1998) study with a sample of ASD participants (n = 24) who had sustained mild traumatic brain injury following an RTA (Bryant, Moulds, Guthrie, & Nixon, in press). Following five sessions of CBT, fewer participants receiving CBT (8%) met criteria for PTSD at the 6-month follow-up compared to those receiving supportive counseling (58%).

Although these studies suggest that the early provision of CBT for recently traumatised people who are at high risk for developing PTSD is effective, the current evidence suggests that there are limitations to their effectiveness. A recurrent finding in early intervention studies is the proportion of participants who drop out of treatment. For example, in the Bryant et al. (1999), Bryant, Moulds, Guthrie, Dang, et al. (in press), Bryant, Moulds, Guthrie, and Nixon, (in press), Bryant, Moulds, Guthrie, Nixon, et al. (in press) studies, 20% of participants dropped out of treatment. Although these drop-out rates are not inconsistent with drop-out rates in treatment studies of more chronic PTSD, they do suggest that current approaches can be improved by reducing drop-out. Current studies have also employed exclusion criteria that may limit the applicability of these findings to some trauma populations. It appears that there is a need to develop interventions that are efficacious and generalisable, as well being manageable for a greater proportion of recently traumatised people.

It must be emphasised that the early intervention described here differs substantially from “debriefing” interventions (see Bisson, 2003, this issue, for a review). The early intervention is five to six sessions of CBT that are administered individually and only to highly symptomatic people (those with ASD), whereas debriefing intervention typically involves one session, is given to all trauma survivors, and is administered in a group format. The early
intervention typically commences at 2 weeks posttrauma and includes exposure, cognitive therapy, and anxiety management. In contrast, debriefing typically occurs within 72 hours of the trauma and the emphasis is on providing education and a forum to “ventilate.”

5. Comorbidity

Traumatic events give rise to psychological disorders, and the psychiatric diagnosis of PTSD covers only one aspect of that distress. Victims also suffer anger, depression, anxiety disorders, and substance abuse (Blanchard & Hickling, 1997). Accordingly, recent approaches have focused on the role of comorbid conditions in treatment response.

In an investigation conducted by Tarrier, Sommerfield, Pilgrim, and Faragher (2000) of factors associated with outcome, longer duration of therapy (i.e., more missed sessions), male gender, and higher suicide risk over treatment were associated with poorer outcome at posttreatment. Further, more missed therapy sessions, living alone, and co-morbid generalised anxiety disorder was associated with poorer outcome at 6-month follow-up. Taylor et al. (2001) were able to distinguish different patterns associated with patients who responded to CBT (n = 30) and those who were partial responders (n = 20). Specifically, prior to treatment, partial responders had more severe numbing, depression, pain, and anger. Such studies are very helpful for identifying those patients who are likely to need an upgraded version of CBT for PTSD.

It is important to note that in the Gillespie et al. (2002) study, already described, 53% of patients had an Axis I disorder, in addition to PTSD. Specifically, 47% patients had depression, 5.5% had alcohol abuse/dependence, and 4% had panic disorder and/or agoraphobia. Although individuals with a comorbid disorder were given more therapy sessions compared to those without, the striking finding was that comorbidity was not associated with poorer outcome.

Chemtob, Novaco, Hamada, and Gross (1997) randomly allocated Vietnam War veterans with PTSD and comorbid severe anger to either 12 sessions of anger management (n = 8) or routine clinical care (n = 7) (Chemtob et al., 1997). Anger management involved recording anger situations and responses, constructing a hierarchy of anger situations, arousal-reduction techniques, cognitive restructuring, role-plays, and communications skills. The anger management protocol resulted in reduced anger reactions at posttreatment and at 18-month follow-up.

6. Eye movement desensitisation and reprocessing

It is beyond the scope of this article to conduct a detailed review of EMDR. However, given the ongoing debate this treatment has triggered, it is important to summarise the core issues. EMDR has been proposed as a highly effective intervention that reduces the reexperiencing and anxiety features of PTSD. EMDR requires the patient to focus their attention on a traumatic memory while simultaneously visually tracking the therapist’s finger as it moves across their visual field and then to engage in restructuring of the memory.
A major difficulty with studies of EMDR is that many of them are flawed by significant methodological problems (for reviews, see Cahill, Carrigan, & Frueh, 1999; Herbert et al., 2000; Lohr, Lilienfeld, Tolin, & Herbert, 1999; McNally, 1999). In a review of 17 RCTs of the effectiveness of EMDR, Lohr et al. (1999) concluded that (1) the effects of EMDR are based on self-report and (2) eye movements do not appear to be necessary for improvement (see also Cahill et al., 1999; McNally, 1999). Overall, EMDR does appear to be more effective than no treatment, supportive listening, and relaxation (see McNally, 1999). In terms of EMDR’s effectiveness relative to established CBT, one study randomly allocated civilian trauma survivors to nine sessions of either CBT or EMDR (Devilly & Spence, 1999). Although this study found that both treatment groups improved at posttreatment, the gains made by participants in the CBT group were greater than those made by participants receiving EMDR. Further, whereas those in the CBT condition maintained their treatment gains over the following 3-months, those in the EMDR group tended to relapse. In a comparison of prolonged exposure, relaxation training, and EMDR for a mixed trauma sample, all treatments were associated with symptom reduction. However, exposure therapy resulted in greater reduction in avoidance and reexperiencing symptoms and a larger number of patients who no longer met criteria for PTSD, relative to EMDR and relaxation (Taylor et al., in press). The evidence against considering EMDR as a treatment of choice for PTSD is further supported by a recent 5-year follow-up of patients treated with EMDR (Macklin et al., 2000). This study found that treatment gains displayed initially after treatment did not maintain in this sample. The current status of EMDR is probably best summed up in the statement that “what is effective in EMDR (imaginal exposure) is not new, and what is new (eye movements) is not effective” (McNally, 1999, p. 2).

7. Methodological issues

One of the striking features of the RCTs reviewed in this article is that, relative to current standards, the methodology employed by many studies is poor. This pattern is of concern because RCTs that are low in methodological quality are open to bias and unsafe conclusions. In two studies reported in the medical literature, the assessment of trial methodology included in meta-analyses indicated that treatment effects were inflated by between 30% and 41% in the poorer quality trials. This was mainly due to poor allocation concealment (Moher et al., 1998; Schulz, Chalmers, Hayes, & Altman, 1995). Furthermore, the inconsistencies in the reporting of trials have made the assessment of methodological quality and comparison of results across trials difficult. The CONSORT statement (Consolidated Standards of Reporting Trials; Begg et al., 1996) has outlined the requirements for conducting and reporting clinical trials. The statement provides a checklist, presented in Table 1, which details instructions to describe the study’s method and design, assignment and randomisation, masking (blinding), participant flow, follow-up, and analysis (Begg et al., 1996, Moher, Schultz, & Altman, 2001). These aim to ensure that the method and reporting of RCTs reveal the extent to which the study provides results that can be relied upon (Altman, 1996). Unfortunately, few trials of psychological treatments of PTSD...
Table 1
Checklist of items to include when reporting RCTs

<table>
<thead>
<tr>
<th>Section and topic</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title and abstract</strong></td>
<td>How participants were allocated to interventions (e.g., “random allocation,” “randomised,” or “randomly assigned”)</td>
</tr>
<tr>
<td><strong>Introduction</strong></td>
<td>Scientific background and explanation of rationale</td>
</tr>
<tr>
<td><strong>Methods</strong></td>
<td></td>
</tr>
<tr>
<td>Participants</td>
<td>Eligibility criteria for participants and the settings and locations where the data were collected</td>
</tr>
<tr>
<td>Interventions</td>
<td>Precise details of the interventions intended for each group and how and when they were actually administered</td>
</tr>
<tr>
<td>Objectives</td>
<td>Specific objectives and hypotheses</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Clearly defined primary and secondary outcome measures and, when applicable, any methods used to enhance the quality of measurements (e.g., multiple observations, training of assessors)</td>
</tr>
<tr>
<td>Sample size</td>
<td>How sample size was determined and, when applicable, explanation of any interim analyses and stopping rules</td>
</tr>
<tr>
<td><strong>Randomisation</strong></td>
<td></td>
</tr>
<tr>
<td>Sequence generation</td>
<td>Method used to generate the random allocation sequence, including details of any restriction (e.g., blocking, stratification)</td>
</tr>
<tr>
<td>Allocation concealment</td>
<td>Method used to implement the random allocation sequence (e.g., numbered containers or central telephone), clarifying whether the sequence was concealed until interventions were assigned</td>
</tr>
<tr>
<td>Implementation</td>
<td>Who generated the allocation sequence, who enrolled participants, and who assigned participants to their groups</td>
</tr>
<tr>
<td>Blinding (masking)</td>
<td>Whether or not participants, those administering the interventions, and those assessing the outcomes were blinded to group assignments; if done, how the success of blinding was evaluated</td>
</tr>
<tr>
<td>Statistical methods</td>
<td>Statistical methods used to compare groups for primary outcome(s); methods for additional analyses, such as subgroup analyses and adjusted analyses</td>
</tr>
<tr>
<td><strong>Results</strong></td>
<td></td>
</tr>
<tr>
<td>Participant flow</td>
<td>Flow of participants through each stage (a diagram is strongly recommended); specifically, for each group report the numbers of participants randomly assigned, receiving intended treatment, completing the study protocol, and analysed for the primary outcome; describe protocol deviations from study as planned, together with reasons</td>
</tr>
<tr>
<td>Recruitment</td>
<td>Dates defining the periods of recruitment and follow-up</td>
</tr>
<tr>
<td>Baseline data</td>
<td>Baseline demographic and clinical characteristics of each group</td>
</tr>
<tr>
<td>Numbers analysed</td>
<td>Number of participants (denominator) in each group included in each analysis and whether the analysis was by “intention-to-treat.” State the results in absolute numbers when feasible (e.g., 10/20, not 50%)</td>
</tr>
<tr>
<td>Outcomes and estimation</td>
<td>For each primary and secondary outcome, a summary of results for each group, and the estimated effect size and its precision (e.g., 95% confidence interval)</td>
</tr>
<tr>
<td>Ancillary analyses</td>
<td>Address multiplicity by reporting any other analyses performed, indicating those prespecified and those exploratory</td>
</tr>
<tr>
<td>Adverse events</td>
<td>All important adverse events or side effects in each intervention group</td>
</tr>
</tbody>
</table>
achieve the strict methodological criteria set out by the CONSORT statement. It is appreciated, however, that trials of psychological treatments in mental health pose particular problems that are not necessarily encountered in other areas of health care. For example, outcomes in mental health can be complex and subject to loss of participants at follow-up because they usually require the patient to be interviewed. In contrast, for example, in cancer treatment studies outcomes are simple (e.g., mortality rates) and are more easily collected on the total sample.

We suggest that future trials of CBT for PTSD could be enhanced by addressing all of the recommendations for RCTs as outlined by CONSORT. Drawing on the CONSORT guidelines as well as Foa and Meadows’ (1997) article, there are several issues that are particularly problematic in the context of trials of CBT for PTSD.

1. Reliable and valid measures must be employed. Large batteries of assessments should be avoided as analyses of these are prone to Type 1 errors and the results are potentially difficult to interpret. Further, excessive use of measures risks “assessment fatigue” and attrition of participants. Johnson (1998) recommends the collection of minimal outcome measures with the selection of those that represent the most important outcome.

2. The blind evaluators must be trained and supervised throughout the course of the treatment. Supervision is important to prevent drift over the course of the study (Resick et al., 2002). Importantly, treatment studies should need to operationalise and demonstrate blindness. For example, investigators could obtain estimates from blind assessors about the treatment condition that they believed the participant was allocated to.

3. Independent checks of treatment fidelity ensures that each treatment was administered in full and that the components of one treatment were not accidentally included when implementing another treatment. Treatment fidelity can be checked by blind reviews of a random selection of taped sessions.

4. In addition to random assignment to groups, the sequence of allocation must be unpredictable and hidden from the investigator enrolling patients (Altman et al., 2001).

5. Treatment adherence should be indexed. Lichstein, Riedel, and Grieve (1994) have outlined three levels of adherence to treatment. First, the treatment must be proven to

<table>
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<th>Table 1 (continued)</th>
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<tr>
<td><strong>Discussion</strong></td>
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<td><strong>Section and topic</strong></td>
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<td>Interpretation</td>
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<tr>
<td>Generalizability</td>
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<tr>
<td>Overall evidence</td>
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</table>

be delivered in a pure form with no input from other treatment approaches. Second, checks must be included to ensure that the treatment was received by the patient. Finally, checks of enactment ensure that the patient has applied the treatment outside of the session.

6. Participant samples should be generalisable to the population suffering from the disorder by having less reliance on samples of convenience and volunteers. Highly selected samples are more likely to suffer bias because they have characteristics that may aid treatment response (Tarrier, 2001).

7. Adequate sample sizes need to be recruited to permit optimal testing of potential treatments. Kazdin and Bass (1989) recommend a minimum sample size of 27 per group to detect a large treatment difference and 70 per group to detect a smaller difference. Johnson (1998) recommends at least 100 patients per group, recruited from different sites. The majority of published trials on PTSD have small sample sizes, yet typically attempt to compare relative efficacy between active treatments for which they are probably underpowered.

8. There is a need for multisite studies that can demonstrate the generalisability of findings across treatment sites. At this point, many of the CBT studies of PTSD have emerged from a small pool of specialist treatment centres. The extent to which these outcomes can be translated to other sites would be clarified by conducting large multisite studies that would have the added bonus of increasing sample size and power.

9. Statistical analyses of outcome should be appropriate to the data and the main analysis be performed on an intention-to-treat basis. This means that all patients who have been randomised should be included in the analysis, not just those available for follow-up. Where patients are lost to follow-up, and this is a common problem in mental health research, an a priori strategy to deal with missing data should be formulated during the design of the trial (see Everitt, 1998; Everitt & Pickles, 1999). For example, Marks et al.’s (1998) 6-month follow-up data were based on only 45% of the sample. It is difficult to know whether the same results would have been found if the full sample had been assessed at this time point. It could be that those who have not responded well to treatment or who are less satisfied with their treatment are more likely to refuse follow-up assessment.

10. The results should be interpreted based on their clinical importance and not solely on their statistical significance. Perusal of the trials cited indicate that a not insignificant number of treated patients remain PTSD cases. For example, Foa et al. (1999) reported that at 12-month follow-up 40% of those treated with exposure, 58% of those treated with stress inoculation, and 60% of those treated with the combined treatment retained the PTSD diagnosis. Similarly, Tarrier, Pilgrim, Sommerfield, et al. (1999b) found that 39% of their sample were PTSD cases at 12-month follow-up. A related issue is the proportion of those who, following treatment, no longer meet criteria for PTSD that have persistent residual symptoms.

11. Drop-out rates, long-term sustained improvement, change to comorbid disorders, and treatment acceptability are important additional variables to report.
8. Future directions

A number of major challenges currently face the field of PTSD treatment. Although there is demonstrated efficacy for the use of CBT in the treatment of acute and chronic PTSD, there is an important need to increase treatment effectiveness. It is encouraging to note that recent trials have made considerable progress toward this goal (Ehlers et al., in press; Gillespie et al., 2002). Future studies need to implement and evaluate strategies that provide interventions that can benefit the widest range of trauma survivors. Relatedly, there is the need to test CBT interventions with populations that have, to date, not been studied. For example, although active military and emergency service personnel are probably the most high-risk populations because of their recurrent exposure to trauma, there are currently no RCTs of CBT for PTSD in these populations. The extent to which CBT can effectively reduce PTSD in these populations remains unknown. Finally, there is a need to develop techniques to disseminate therapy strategies to large numbers of people when entire communities are subjected to trauma. The terrorist attack on the World Trade Center highlighted the need for effective interventions that can be provided to thousands of people. Existing therapies have only been studied through one-to-one delivery, typically by expert treatment centres. The capacity for existing approaches to be implemented in large community samples should be evaluated in communities who have been affected by large-scale trauma (e.g., Gillespie et al., 2002). A related issue is whether treatments can be designed that mobilise natural resources such as facilitating or improving social support (Tarrier & Humphreyes, in press). There is a pressing need for a broader evidence base to direct clinical interventions for people affected by trauma. It is imperative that researchers answer these community needs by designing treatment studies that are characterised by their relevance and methodological rigour.

References


randomized controlled trial of cognitive therapy, self-help booklet, and repeated assessment as early interventions for posttraumatic stress disorder. *Archives of General Psychiatry.*


