Australian Centre for Posttraumatic Mental Health

Summary of the Traumatic Stress Literature: 2003

Introduction

Purpose and Rationale

The volume of literature published in the field of traumatic stress makes it hard for the dedicated researcher – let alone the average clinician or researcher in related fields – to keep up to date. Thus, our aim is to provide a brief summary – around 5000 words (the length of a normal journal article) – of key literature in the field of PTSD and related conditions published during the calendar year of 2003. The aim was not to critically review the papers; indeed, we have largely chosen to avoid critique or editorial comment. Rather, the aim was simply to draw the reader's attention to a selection of articles that were published in 2003 and that we felt were important contributions. No doubt readers will have differing views about our selection and those papers that we have omitted. Since we do not provide a critique of the reported research, we strongly recommend that readers interested in a particular paper obtain a copy of the original and read the work for themselves.

This literature summary has been the source of considerable discussion within the Australian Centre for Posttraumatic Mental Health (ACPMH). Indeed, although the summary was completed in April 2004, our difficulty in resolving differences of opinion lead to a considerable delay in posting it on our website. Some personnel at the Centre have opposed release of the summary, describing it as unscientific, unsystematic, and potentially damaging. They have argued that the ACPMH, as a "Centre of Excellence" in the mental health effects of traumatic exposure, should not produce such a summary unless it provides a more rigorous and defensible systematic literature review. Others have argued to the contrary – that, as long as we are clear about the basis on which articles were chosen for inclusion, it provides a valuable resource for the busy clinician, as well as for researchers in related fields. We would be very interested in your feedback about the structure, content, and utility of this document. If you would like to comment, please email us at acpmh-info@unimelb.edu.au and put "2003 Literature Summary" in the subject line.

Depending on the feedback we receive, this may be either the first in a series of annual summaries of the traumatic stress literature produced by the ACPMH or simply an interesting experiment. Either way, we will try to do the 2004 version by around April 2005.

Search Strategy and Content Overview

The literature was sourced using standard scientific databases, notably Medline and PsychInfo, with four search descriptors: "posttraumatic stress disorder", "PTSD", "acute stress disorder", and "ASD". This strategy yielded a total of 1,283 papers published during 2003. Automatic downloads of these citations were received weekly and a proportion of those were selected for later inclusion in this annual summary. Most appeared in relatively prestigious journals, although a few are included from less established publications when appropriate. It is recognised that neurobiological research and childhood PTSD are both somewhat under-represented, a reflection of the Centre's current staffing and research interests. We hope that this will be resolved in future years. Although other

ACPMH staff suggested articles for inclusion and have made valuable changes to the final summary, Mark Creamer takes full responsibility for the content of this review.

A total of 67 articles are included in this year's summary. We have divided the literature into the following six areas although, of course, allocation to these categories was not always straightforward since papers often spanned more than one area:

1. Epidemiology (a broad spectrum of research including prevalence, course, and predictors)
2. Phenomenology
3. Assessment and diagnosis
4. Treatment
5. Theory
6. Neurobiology

Literature Summary

1. Epidemiology

1.1 An increasing body of research is providing evidence of pre-, peri-, and posttraumatic characteristics associated with poor adjustment following traumatic exposure.

- Ozer and her colleagues (Ozer, Best, Lipsey, & Weiss, 2003) conducted a meta-analysis of 68 studies from which they identified seven key factors that significantly predicted PTSD development: (a) prior trauma, particularly those involving interpersonal violence; (b) prior psychological adjustment, particularly depression; (c) family history of psychopathology – again, this was particularly true when the traumatic event involved interpersonal violence; (d) perceived life threat during the trauma; (e) posttrauma social support, an effect that became stronger as time since the trauma increased; (f) peritraumatic emotional responses, including fear, helplessness, horror, guilt, and shame; and (g) peritraumatic dissociation. Of those factors, peri- and posttraumatic variables were the strongest predictors, with the pretrauma characteristics having relatively low predictive value.

- In a useful summary paper, Bryant (2003) provided a review of the literature on early predictors of PTSD. Concluding that an ASD diagnosis does not have adequate predictive power, Bryant suggested that biological and cognitive mechanisms occurring in the acute posttraumatic phase may prove to be a more accurate means of predicting chronic PTSD.

- In an attempt to assess (and control for) preexising personality vulnerability, Englehard, van den Hout and Kindt (2003) tested the predictive value of pre-morbid neuroticism in a sample of 126 women after pregnancy loss. Pre-trauma neuroticism strongly predicted PTSD symptoms, particularly those of arousal, although this relationship was no longer significant when pre-trauma arousal levels were controlled. The authors suggest that PTSD arousal symptoms tap a specific aspect of neuroticism and that content overlap largely accounts for the relationship between neuroticism and PTSD symptoms.

- A national household survey of 4,023 adolescents aged 12-17 (Kilpatrick & Acierno, 2003) found 6-month PTSD prevalence of 3.7% for boys and 6.3% for girls. Risk factors for PTSD

included ethnicity and age (with, somewhat surprisingly, older age being associated with greater risk). Also surprisingly, traumatic events characterized by interpersonal violence were associated with higher levels of comorbidity (including depression and substance use) but not higher rates of PTSD alone.

- Higher rates in females compared to males of both ASD (23% vs. 8%; N=171) and 6-month PTSD (38% vs. 15%; N=134) were reported in motor vehicle accident (MVA) survivors (Bryant & Harvey, 2003a). Importantly, and consistent with previous research, females reported higher levels of peritraumatic dissociation. An ASD diagnosis (with its strong emphasis on peritraumatic dissociation) was a more accurate predictor of subsequent PTSD in females than in males: 92% of women but only 57% of men with ASD went on to develop PTSD.

- Similarly, Birmes et al. (Birmes et al., 2003) found that peritraumatic dissociation and acute stress symptoms correlated highly with later PTSD symptoms and diagnosis, accounting for 33% of the variance.

- A large epidemiological study of 2,509 adults from 4 Mexican cities (Norris et al., 2003) also indicated higher PTSD prevalence in females than males. The authors estimated a lifetime prevalence of exposure to trauma of 76%, with lifetime PTSD rates at 11.2%, in the sample as a whole. Risk factors for PTSD included lower socioeconomic status and traumas involving interpersonal violence.

- In a sophisticated analysis of a large sample (N=16,000), Pimlott-Kubiak and Cortina (2003) found no meaningful interactive effects of gender and interpersonal aggression on outcomes, once lifetime exposure to aggressive events was adequately taken into account. These findings suggest that increased vulnerability to PTSD among females may be predominantly a function of trauma exposure history.

1.2 With regard to military populations the findings of several studies in 2003 suggest that factors specific to the combat environment influence presentation of posttraumatic disorders.

- A meta-analysis of 20 studies revealed consistently higher rates of psychiatric disorders in Gulf War veterans than in matched controls (Stimpson, Thomas, Weightman, Dunstan, & Lewis, 2003).

- Expanding the traditional focus on PTSD, Kang et al. (Kang, Natelson, Mahan, Lee, & Murphy, 2003) found that Gulf veterans reported higher rates not only of PTSD, but also of chronic fatigue syndrome. Interestingly, while PTSD risk was associated with increasing stressor severity, chronic fatigue was more closely associated with low-level stressors suggesting that additional factors unique to the Gulf environment may have contributed to the risk of chronic fatigue among Gulf War veterans.

- In a study of 198 full-time operational members of the South African National Defence Force (Seedat, le Roux, & Stein, 2003), approximately 90% reported having experienced or witnessed trauma and 51% reported having inflicted trauma. Around 26% of members met diagnostic criteria for PTSD with 29% of those also reporting high levels of comorbid

depression, yet very few personnel sought professional help. Trauma type, particularly exposure to physical assault and infliction of life-threatening injury, was the best predictor of PTSD symptom severity.

1.3 It has long been known that social support is a salient protective factor following trauma and several studies published in 2003 contributed to our understanding of this area.

- In a 14 year longitudinal study of Vietnam veterans (N=1377), community involvement at Time 1 was found to be a protective factor (Koenen, Stellman, Stellman, & Sommer, 2003). PTSD chronicity was best predicted by high levels of combat exposure, with negative community attitudes at homecoming, minority race, Time 1 depressive symptoms, higher anger levels, and discomfort in disclosing Vietnam experiences also important.

- Consistent with the widely accepted position that sharing aspects of the traumatic experience with supportive others is beneficial, self-disclosure was found to be strongly related to posttraumatic adjustment and distress for 426 peacekeepers (Bolton, Glenn, Orsillo, Roemer, & Litz, 2003). Importantly, however, the reaction of significant others was crucial; there was little difference in outcome between nondisclosure and disclosure to non-supportive others.

- Similarly, a study of Dutch peacekeepers revealed that actively seeking social support was related to lower PTSD symptom severity (Dirkzwager, Bramsen, & van der Ploeg, 2003). In line with recent interest in the concept of "negative social support", those researchers also found that more negative social contacts and fewer positive social contacts were associated with higher PTSD severity.

- Finally, Zakin, Solomon, and Neria (Zakin, Solomon, & Neria, 2003) found that both hardiness and attachment style were inversely related to psychiatric symptomatology, serving to protect veterans 20 years following their involvement in the Yom Kippur war.

1.4 While cross-cultural epidemiological studies have suggested some heterogeneity in posttraumatic sequelae across countries and cultures, there may also be significant global similarities in the way people experience distress following a traumatic event.

- In a well-designed study of natural disaster, Cao, McFarlane and Klimidis (2003) estimated a PTSD prevalence of approximately 9% in 1294 individuals who experienced the Yun Nan earthquake in China, with prevalence rates increasing with proximity to the epicenter.

- The terrorist attacks of September 11th, 2001 provided a unique opportunity to investigate mental health reactions to trauma in a western culture. In a community sample of individuals across New York, Galea et al. (Galea et al., 2003) reported a decline in probable PTSD prevalence rates from 7.5% 1 month after September 11 to 0.6% 6 months later, suggesting rapid symptom resolution.

- Niles, Wolf and Cutter (2003) reported similar findings in a sample of Vietnam veterans following the 9/11 attacks: combat related PTSD symptoms increased immediately after September 11th, but returned to baseline levels several weeks later.

2. Phenomenology

2.1 Several studies published in 2003 contributed to our understanding of the phenomenology and clinical picture associated with PTSD.

- In a retrospective analysis of files, Jones et al. (2003) randomly selected a sample of UK servicemen awarded war pensions for post-combat disorders from conflicts dating from 1854. They reported that veterans of the 1991 Gulf War reported significantly more flashbacks than those from earlier conflicts who, in contrast, emphasized somatic symptoms. These findings are consistent with the notion that some of the characteristic PTSD symptoms may be culturally bound.

- Golier et al. (Golier et al., 2003) found that subjects with borderline personality disorder (compared to those without) had significantly higher rates of childhood/adolescent physical abuse (52.8% versus 34.3%). Although that relationship is predictable, the prevalence of childhood abuse is perhaps not as high as might have been expected. Compared to other personality disorders, borderline and paranoid personality disorders were associated with a higher rate of PTSD diagnosis. Not surprisingly, borderline personality disorder had the greatest degree of PTSD comorbidity.

- Oquendo and colleagues (Oquendo et al., 2003) found that both PTSD and personality disorder were independently related to suicidality. A combined diagnosis of depression and PTSD, however, was associated with the greatest likelihood of past suicide attempts, particularly for women.

- In a theoretical article with a strong clinical focus, Kubany and Watson (2003) propose the existence of five primary components of guilt and eight contextual variables that promote distress and activate guilt cognitions.

2.2 It is well known that PTSD is associated with a range of psychosocial and health sequelae.

- A prospective study by Kuhn, Blanchard and Hickling (2003) demonstrated that MVA survivors who developed PTSD had poorer psychosocial functioning than those without. Numbing symptoms, in particular, emerged as the most consistent predictor of psychosocial function.

- Asmundson, Stein and McCreary (2003) demonstrated that PTSD symptoms directly influenced the health of male peacekeepers, regardless of deployment status, and exerted an indirect negative effect on health through depression. Interestingly, increased alcohol use did not contribute to poorer health beyond the contribution of PTSD symptoms alone.

- Consistent with earlier work on changes in traumatic memory over time, Wessely et al. (2003) assessed 2370 UK military personal at two time points and found that perception of worsening health between Time 1 and Time 2 was associated with increased Time 2 reporting (retrospectively) of exposure to both traumatic and ‘toxic’ hazards. Forgetting

previously reported exposures was associated with improved perceive health. This relationship was present only for Gulf veterans, however, and not for those deployed to Bosnia.

2.3 Although sleep disturbance is one of the diagnostic criteria for PTSD, the picture is not always a simple one. The relationship between PTSD and sleep was further explored in several papers in 2003.

- In a comprehensive review paper, Harvey, Jones and Schmidt (2003) explored the association between sleep and PTSD. They critically reviewed literature on the prevalence and treatment of sleep disturbance in ASD and PTSD, drawing together several disparate theoretical perspectives.

- Although sleep disturbance is often thought to be a key feature of PTSD, research (particularly laboratory based) is conflicting. In a prospective study of MVA survivors, Klein et al. (Klein, Koren, Arnon, & Lavie, 2003) found that 12-month PTSD was related to negative perceived sleep quality, but not to objective measures of sleep, when compared with non-PTSD respondents.

- Although nightmares are also thought to be a core feature of the re-experiencing component of PTSD, surprisingly little research literature exists on the phenomenology of this symptom. In a sample of burns patients assessed a mean of 11 years posttrauma, however, Low et al (2003), found that 43% reported nightmares, with a higher prevalence in females than males. Increased nightmare frequency was associated with the size of the burn, trait anxiety, and use of avoidant coping strategies.

3. Assessment and diagnosis

3.1 It is sometimes feared (particularly by Ethics Committees and IRBs) that the process of simply undergoing an assessment may be damaging for trauma survivors, leading to increased distress and the potential for retraumatisation.

- In an interesting study examining responses to the assessment process, Griffin et al., (Griffin, Resick, Waldrop, & Mechanic, 2003) found no evidence to support those concerns. On the contrary, assessment was well tolerated by most participants, with many viewing the process as an interesting and valuable experience. The findings suggest that trauma survivors are not too fragile to participate in trauma research even in the acute aftermath of a traumatic experience.

- Similarly, Carlson et al. (Carlson et al., 2003) examined the effect of trauma assessment on psychiatric inpatients and found that 70% reported low levels of distress and over half found participation to be useful.

3.2 Growing speculation regarding the exploitation of PTSD for personal gain has resulted in research designed to examine the extent of the problem, as well as in attempts to develop measures that may identify malingering.

- A thorough and useful review of this area was provided in 2003 by Guriel and Fremouw (2003). Overall, however, the findings remain conflicting.

- Bryant and Harvey (2003b) found that compensation settlements in MVA survivors did not influence reported levels of 6-month or 2-year PTSD.

- Conversely Frueh et al. (Frueh et al., 2003), in a retrospective review using MMPI-2 validity scales, found that compensation-seeking veterans tended to overreport or exaggerate symptoms.

3.3 Researchers continue to investigate the use of screening questionnaires following traumatic exposure.

- Investigating the capacity of screening questionnaires to predict psychiatric morbidity 18 months after MVAs, Silove and colleagues (Silove et al., 2003) found that a combination of the Impact of Event Scale and the Beck Depression Inventory yielded a specificity of 95%, and high positive (89%) and negative (91%) predictive indices. They argue that the findings strengthen the case for routine screening of MVA survivors to allow ongoing monitoring and selective early interventions for the high-risk subgroup.

- While few new assessment tools appeared in 2003, work continued to be published on existing measures. Creamer, Failla and Bell (2003), for example, reported on one of the few studies to investigate the psychometric properties of the revised version of the Impact of Event Scale (IES-R).

4. Treatment

Psychotherapy

4.1 It is generally accepted that cognitive behavioural therapy (CBT) has accumulated the greatest empirical support in the treatment of PTSD and associated sequelae of trauma.

- A review of the components and principles that comprise this approach was provided in 2003 by Harvey, Bryant, and Tarrier (2003).

- In a randomized controlled trial (RCT) of mixed trauma survivors with PTSD, Steve Taylor (Taylor et al., 2003) compared EMDR, relaxation therapy, and imaginal exposure in the treatment of PTSD. Exposure was associated with the largest reductions in reexperiencing and avoidance symptoms, the shortest time to therapeutic efficacy, and the greatest reduction in posttreatment PTSD. Treatments did not differ in attrition or, interestingly, in their effects on numbing and hyperarousal symptoms. EMDR and relaxation did not differ in efficacy or length of time to improvement.

- Surprisingly little controlled treatment outcome research on children with PTSD has been published. Positive outcomes, however, were reported in 2003 following a 10-session school based CBT program for sixth grade students with clinical levels of PTSD, the first

randomized controlled trial conducted with adolescents (Stein et al., 2003). Three-month assessment indicated significant improvements in PTSD severity, depression and psychosocial function for the treatment group relative to wait-list control, although teacher-rated classroom problems did not differ between groups.

- As CBT treatments become more accepted, it is becoming increasingly important to conduct component analysis and combination studies. In an example of such research, Bryant et al. (Bryant, Moulds, Guthrie, Dang, & Nixon, 2003) investigated the extent to which providing cognitive restructuring (CR) with prolonged imaginal exposure (IE) would lead to greater symptom reduction than providing IE alone for participants with PTSD. The combination condition produced the greatest improvements, although imaginal exposure alone was also associated with positive outcomes.

- One criticism often leveled at CBT for PTSD is that it is appropriate only for "simple" clinical presentations and would not be effective for those with more chronic and complex presentations. A mounting body of research evidence, however, suggests that this is not the case. Resick, Nishith, and Griffin (2003), for example, reported on the efficacy of CBT in patients with complex PTSD. Rape victims who had participated in a RCT comparing cognitive-processing therapy with prolonged exposure were divided according to history of child sexual abuse. Both groups showed similar improvements with regard to symptoms of PTSD, depression and broader issues associated with complex PTSD.

- Another criticism leveled particularly at exposure treatments has been that of high drop out rates. A meta-analysis by Foa's group (Hembree et al., 2003), however, found no difference in dropout rates between exposure therapy, cognitive therapy, stress inoculation training, or EMDR.

- Somewhat less optimistic in terms of outcome is a landmark RCT conducted by Paula Schnurr and colleagues investigating the efficacy of group-based CBT in reducing PTSD symptoms and associated sequelae in Vietnam veterans (Schnurr et al., 2003). Using "intent to treat" analyses, they found little difference in outcome between trauma-focused group psychotherapy and "present-centered" treatment (a problem solving approach), with both groups showing small improvements. While trauma-focused group therapy produced slightly better outcomes among treatment completers, drop-out was higher for this intervention.]

4.2 Other issues addressed in the PTSD treatment literature in 2003 included how and when to address comorbidity, its impact on treatment outcome, continuity of care, the management of physical symptoms, and post-disaster intervention.

- Ouimette, Moos, and Finney (2003) reported on male veterans with PTSD and comorbid substance abuse. Those who received PTSD treatment in the first 3 months following substance use treatment (SUD) were more likely to be functioning well at 5-year follow-up. The authors suggest that PTSD treatment delivered directly after SUD treatment may enhance long term remission, although the study did not directly address sequencing effects (i.e., whether treating the PTSD before, or concurrently with, treatment for the substance use produced improved outcomes).

- In an important series of papers, researchers from the ACPMH examined treatment outcome in veterans with PTSD, concluding that comorbidity (notably anger) and personality style (notably social alienation) at intake were important predictors of subsequent treatment response (Forbes et al., 2003a; 2003b; 2003c).

- The benefits of continuity of care (COC) in the management of chronic mental health conditions is widely accepted. Somewhat surprisingly, however, Greenberg, Rosenheck and Fontana (2003) found that, among veterans diagnosed with PTSD, COC measures were not significantly associated with any desirable outcome.

- Although not directly related to PTSD, the outcome of a veteran health study is worthy of note. Donta et al., (2003) compared the effectiveness of CBT, exercise, and a combination of both for improving physical functioning and reducing symptoms of persistent pain, fatigue, and cognitive symptoms in Gulf War veterans. Results suggested that CBT, ideally in combination with exercise, can provide modest relief for some symptoms of what has become colloquially known as "Gulf War Syndrome".

- Disasters provide obvious logistical difficulties for intervention, particularly around the provision of services to large numbers of people. Basoglu et al. (2003), however, found that a modified 1 or 2 session behavioral intervention administered to 231 survivors of an earthquake in Turkey produced clinically significant post-treatment improvements on all measures of psychiatric sequelae, including PTSD and depressive symptom. The intervention, provided at around 13 months posttrauma, emphasized instructions for self-exposure based on a rationale for enhanced self-control rather than habituation. The cumulative portion of improved cases was 76% after one session and 88% after two sessions, suggesting the effective and practical nature of this intervention for large scale disasters.

4.3 Early intervention following trauma may help to prevent the development and chronicity of PTSD and related conditions, with several publications addressing this area in 2003.

- Ehlers and Clarke (2003) provide a review of the early intervention literature in PTSD.

- The same group also report on an influential study comparing early cognitive therapy, a self-help booklet, and repeated assessment in the prevention of PTSD (Ehlers et al., 2003). They found cognitive therapy to be more effective in reducing symptoms than the self-help booklet or repeated assessments.

- Bryant et al. (Bryant, Moulds, Guthrie, & Nixon, 2003) were able to demonstrate that early CBT treatment was associated with improved outcome even among those with mild head injury.

- The same group also published a four-year follow-up of their earlier studies comparing CBT to supportive counseling (SC) in preventing subsequent PTSD (Bryant, Moulds, & Nixon, 2003). They showed that the initial gains had largely been maintained, with only 8% of CBT patients meeting criteria for PTSD at four years, compared with 25% of the SC group.

4.4 While no "PTSD-specific" medication is yet available, pharmacotherapy remains an important component of treatment in the field of posttraumatic mental health. SSRIs remain as the first line of treatment for the disorder, with research published in 2003 generally supporting that position.

- An excellent overview of the area to date was provided by Friedman, Donnelly, and Melman (2003).

- In a more focused review of pharmacological approaches, Davidson (2003) noted the benefits of paroxetine.

- A large, multi-site RCT by Brady and colleagues (Brady & Clary, 2003) reported the benefits of sertraline.

- With regard to more acute presentations, and the potential to prevent subsequent PTSD, Morgan, Krystal, and Southwick (2003) reviewed potential applications of pharmacotherapy to treat symptoms of extreme acute arousal or dissociation. They note, however, that there is almost no empirical data on effective pharmacologic interventions in the immediate aftermath of trauma and acknowledge that much of their review is speculative in nature.

- In line with findings that acute arousal may mediate the subsequent development of PTSD, and building on the earlier work of Roger Pitman, Vaiva et al. (2003) administered propranalol to a small group of volunteers for one week after a traumatic event. Those who took the beta-blocker reported a lower incidence of PTSD and severity of symptoms relative to a comparison group, although the non-randomised design raises questions about interpretation of these results.

5. Theory

Key papers in this area during 2003 have added to our understanding of cognitive models and the role of learning principles in the development and maintenance of PTSD.

- In an important review of cognitive approaches to the understanding of PTSD, Brewin and Holmes (Brewin & Holmes, 2003) evaluated and compared the three current dominant paradigms: emotional processing theory, dual representation theory, and cognitive theory.

- In support of their cognitive model as applied to children involved in MVAs, Ehlers and colleagues (Ehlers, Mayou, & Bryant, 2003) found that the addition of cognitive variables to other predictors such as gender and stressor severity increased the prediction of 6-month PTSD from 14% to around 50% of the variance. Cognitive variables included data-driven processing during the accident, negative interpretation of intrusive memories, alienation from other people, anger, rumination, thought suppression and persistent dissociation.

- Similarly, using both cross-sectional and prospective designs, Halligan et al. (Halligan, Michael, Clark, & Ehlers, 2003) found that assault severity measures explained 22% of symptom variance, while measures of cognitive processing, memory disorganization, and

appraisals increased prediction accuracy to over 70%. The difficulty with these designs, of course, is that many of these early cognitive variables may simply be "proxies" for initial symptoms which then predict later severity.

- An interesting review paper by Richard McNally (2003) looked at mechanisms of acute response and concluded that acute dissociative symptoms and negative cognitive appraisal (of the event and of acute symptoms) reliably predicted subsequent PTSD across several prospective studies. Lower pretrauma intelligence and negative personality traits were also predictive. McNally suggested that individual characteristics may affect appraisal of posttrauma symptoms in the acute aftermath of trauma and that a negative assessment may increase the likelihood of developing chronic PTSD morbidity. Pretrauma characteristics may also render an individual more vulnerable to PTSD by increasing the likelihood that they are exposed to a traumatic event.

- Finally, in an interesting review paper that crosses the boundaries between theory and treatment, Rothbaum and Davis (2003) provide a discussion of the application of learning principles to the treatment of PTSD. Emphasising the failure of physiological and psychological reactions to extinguish in PTSD, they use learning theory to explain why some early one-session interventions may impede extinction, whereas interventions delivered over more than one session several weeks after the trauma seem to be effective in preventing the development of PTSD.

6. Neurobiology

Although a considerable body of research investigated the neurobiology of PTSD during 2003, this review reports on only a small sample of that work. A few of the studies that were published include:

- An important study by Scott Orr and his colleagues investigated psychophysiological responses associated with exaggerated startle response. Following previous work suggesting that high acute arousal may mediate, or contribute to, the development of subsequent PTSD, Orr et al. (2003) tested this hypothesis by looking at heart rate (HR) response to loud tones in monozygotic twins discordant for Vietnam service. They found increased HR responses in PTSD-diagnosed Vietnam veterans in response to loud tones. These larger responses were not shared by their non-combat-exposed co-twins, whose responses were similar to those of the non-PTSD combat veterans and their non-combat-exposed co-twins. This finding remained significant even after adjusting for several potentially confounding factors. These results have important implications for our understanding of the mechanisms underlying the development of PTSD, since they suggest that larger HR responses to sudden, loud tones represent an acquired sign of PTSD rather than a familial vulnerability factor.

- In a provocative preliminary study, Chemtob et al. hypothesized that deviations from normal hemispheric dominance may increase risk (Chemtob & Taylor, 2003). They examined hand preference in 118 right-handed male veterans. PTSD prevalence was lowest for respondents reporting a consistent hand preference and right handed parents (44%) and highest for those reporting both mixed laterality and a left handed parent (100%). Moderately high PTSD rates were observed in veterans reporting either a mixed lateral preference or left handed parent (70%). These findings suggest that an imbalance in hemispheric dominance for

processing threatening and/or emotional information may increase vulnerability to PTSD following trauma.

- Although research into differential cortisol levels in PTSD has received considerable attention in recent years, it is becoming increasingly clear that the findings may not be as consistent as originally proposed. In a prospective study of cortisol in recent trauma survivors with PTSD, Bonne et al. (2003) found that, contrary to expectation, plasma cortisol levels obtained from 21 patients at 1 week following the trauma did not predict 6-month PTSD levels.

Conclusions

The amount of literature published in the field of posttraumatic stress continues to grow, and 2003 was no exception. Each reader will form their own opinions regarding which papers discussed in this review (or, indeed, missed from this review) are the most important contributions to the field. In general, the literature has tended to confirm existing research, building on an increasingly firm base from which to develop our understanding of these complex conditions.

References

Asmundson, G. J. G., Wright, K. D., McCreary, D. R., & Pedlar, D. (2003). Post-traumatic stress disorder symptoms in United Nations peacekeepers: An examination of factor structure in peacekeepers with and without chronic pain. *Cognitive Behaviour Therapy, 32*(1), 26-37.

Basoglu, M., Livanou, M., Salcioglu, E., & Kalender, D. (2003). A brief behavioural treatment of chronic post-traumatic stress disorder in earthquake survivors: results from an open clinical trial. *Psychological Medicine, 33*(4), 647-654.

Birmes, P., Brunet, A., Carreras, D., Ducasse, J. L., Charlet, J. P., Lauque, D., et al. (2003). The predictive power of peritraumatic dissociation and acute stress symptoms for posttraumatic stress symptoms: A three-month prospective study. *American Journal of Psychiatry, 160*(7), 1337-1339.

Bolton, E. E., Glenn, D. M., Orsillo, S., Roemer, L., & Litz, B. T. (2003). The relationship between self-disclosure and symptoms of posttraumatic stress disorder in peacekeepers deployed to Somalia. *Journal of Traumatic Stress, 16*(3), 203-210.

Bonne, O., Brandes, D., Segman, R., Pitman, R. K., Yehuda, R., & Shalev, A. Y. (2003). Prospective evaluation of plasma cortisol in recent trauma survivors with posttraumatic stress disorder. *Psychiatry Research, 119*(1-2), 171-175.

Brady, K. T., & Clary, C. M. (2003). Affective and anxiety comorbidity in post-traumatic stress disorder treatment trials of sertraline. *Comprehensive Psychiatry, 44*(5), 360-369.

Brewin, C. R., & Holmes, E. A. (2003). Psychological theories of posttraumatic stress disorder. *Clinical Psychology Review, 23*(3), 339-376.

Bryant, R. A. (2003). Early predictors of posttraumatic stress disorder. *Biological Psychiatry, 53*(9), 789-795.

Bryant, R. A., & Harvey, A. G. (2003a). Gender differences in the relationship between acute stress disorder and posttraumatic stress disorder following motor vehicle accidents. *Australian & New Zealand Journal of Psychiatry, 37*(2), 226-229.

Bryant, R. A., & Harvey, A. G. (2003b). The influence of litigation on maintenance of posttraumatic stress disorder. *Journal of Nervous & Mental Disease, 191*(3), 191-193.

Bryant, R. A., Moulds, M., Guthrie, R., & Nixon, R. D. (2003). Treating acute stress disorder following mild traumatic brain injury. *American Journal of Psychiatry., 160*(3), 585-587.

Bryant, R. A., Moulds, M. L., Guthrie, R. M., Dang, S. T., & Nixon, R. D. V. (2003). Imaginal exposure alone and imaginal exposure with cognitive restructuring in treatment of posttraumatic stress disorder. *Journal of Consulting & Clinical Psychology, 71*(4), 706-712.

Bryant, R. A., Moulds, M. L., & Nixon, R. V. D. (2003). Cognitive behaviour therapy of acute stress disorder: A four-year follow-up. *Behaviour Research & Therapy, 41*(4), 489-494.

Cao, H., McFarlane, A. C., & Klimidis, S. (2003). Prevalence of psychiatric disorder following the 1988 Yun Nan (China) earthquake. The first 5-month period. *Social Psychiatry & Psychiatric Epidemiology, 38*(4), 204-212.

Carlson, E. B., Newman, E., Daniels, J. W., Armstrong, J., Roth, D., & Loewenstein, R. (2003). Distress in response to and perceived usefulness of trauma research interviews. *Journal of Trauma & Dissociation, 4*(2), 131-142.

Chemtob, C. M., & Taylor, K. B. (2003). Mixed lateral preference and parental left-handedness possible markers of risk for PTSD. *Journal of Nervous and Mental Disease, 191*(5), 332-338.

Creamer, M., Bell, R., & Failla, S. (2003). Psychometric properties of the Impact of Event Scale - Revised. *Behaviour Research and Therapy, 41*(12), 1489-1496.

Davidson, J. R. (2003). Treatment of posttraumatic stress disorder: the impact of paroxetine. *Psychopharmacology Bulletin, 37*(Suppl 1), 76-88.

Dirkzwager, A. J. E., Bramsen, I., & van der Ploeg, H. M. (2003). Social support, coping, life events, and posttraumatic stress symptoms among former peacekeepers: a prospective study. *Personality and Individual Differences, 34*(8), 1545-1559.

Donta, S. T., Clauw, D. J., Engel, C. C., Jr., Guarino, P., Peduzzi, P., Williams, D. A., et al. (2003). Cognitive behavioral therapy and aerobic exercise for Gulf war veterans' illnesses: A randomized controlled trial. *JAMA: Journal of the American Medical Association, 289*((11), 1396-1404.

Ehlers, A., & Clark, D. (2003). Early psychological interventions for adult survivors of trauma: a review. *Biological Psychiatry, 53*(9), 817-826.

Ehlers, A., Clark, D. M., Hackmann, A., McManus, F., Fennell, M., Herbert, C., et al. (2003). A randomized controlled trial of cognitive therapy, a self-help booklet, and repeated assessments as early interventions for posttraumatic stress disorder. *Archives of General Psychiatry, 60*(10), 1024-1032.

Ehlers, A., Mayou, R. A., & Bryant, B. (2003). Cognitive predictors of posttraumatic stress disorder in children: results of a prospective longitudinal study. *Behaviour Research & Therapy., 41*(1), 1-10.

Engel, C. C., Jr. (2004). Somatization and multiple idiopathic physical symptoms: Relationship to traumatic events and posttraumatic stress disorder. In P. P. Schnurr & B. L. Green (Eds.), *Trauma and health: Physical health consequences of exposure to extreme stress* (pp. 191-215). Washington, DC: American Psychological Association.

Engelhard, I. M., van den Hout, M. A., & Kindt, M. (2003). The relationship between neuroticism, pre-traumatic stress, and post- traumatic stress: a prospective study. *Personality and Individual Differences, 35*(2), 381-388.

Forbes, D., Creamer, M., Allen, N., McHugh, A., Debenham, P., & Hopwood, M. (2003a). MMPI-2 as a predictor of change in PTSD symptom clusters following treatment: A re-analysis of the Forbes et al., 2002 data. *Journal of Personality Assessment, 81*, 183-186.

Forbes, D., Creamer, M., Hawthorne, G., Allen, N., & McHugh, T. (2003b) Comorbidity as a predictor of symptom change following treatment in combat-related posttraumatic stress disorder. *Journal of Nervous and Mental Disease. 191*, 93-99.

Forbes, D., Creamer, M., Allen, N., Elliott, P., McHugh, T., Debenham, P., & Hopwood, M. (2003c). MMPI-2 based subgroups of veterans with combat-related PTSD: Differential patterns of symptom change following treatment. *Journal of Nervous and Mental Disease. 191*, 531-537.

Friedman, M. J., Donnelly, C. L., & Mellman, T. A. (2003). Pharmacotherapy for PTSD. *Psychiatric Annals, 33*(1), 57-62.

Frueh, B. C., Elhai, J. D., Gold, P. B., Monnier, J., Magruder, K. M., Keane, T. M., et al. (2003). Disability compensation seeking among veterans evaluated for posttraumatic stress disorder.[comment]. *Psychiatric Services, 54*(1), 84-91.

Galea, S., Vlahov, D., Resnick, H., Ahern, J., Susser, E., Gold, J., et al. (2003). Trends of probable post-traumatic stress disorder in New York City after the September 11 terrorist attacks. *American Journal of Epidemiology, 158*(6), 514-524.

Golier, J. A., Yehuda, R., Bierer, L. M., Mitropoulou, V., New, A. S., Schmeidler, J., et al. (2003). The relationship of borderline personality disorder to posttraumatic stress disorder and traumatic events. *American Journal of Psychiatry, 160*(11), 2018-2024.

Greenberg, G. A., Rosenheck, R. A., & Fontana, A. (2003). Continuity of care and clinical effectiveness: treatment of posttraumatic stress disorder in the Department of Veterans Affairs. *Journal of Behavioral Health Services & Research., 30*(2), 202-214.

Griffin, M. G., Resick, P. A., Waldrop, A. E., & Mechanic, M. B. (2003). Participation in trauma research: Is there evidence of harm? *Journal of Traumatic Stress, 16*(3), 221-227.

Guriel, J., & Fremouw, W. (2003). Assessing Malingered Posttraumatic Stress Disorder: A Critical Review. *Clinical Psychology Review, 23*(7), 881-904.

Halligan, S. L., Michael, T., Clark, D. M., & Ehlers, A. (2003). Posttraumatic stress disorder following assault: The role of cognitive processing, trauma memory, and appraisals. *Journal of Consulting & Clinical Psychology, 71*(3), 419-431.

Harvey, A. G., Bryant, R. A., & Tarrier, N. (2003). Cognitive behaviour therapy for posttraumatic stress disorder. *Clinical Psychology Review, 23*(3), 501-522.

Harvey, A. G., Jones, C., & Schmidt, D. A. (2003). Sleep and posttraumatic stress disorder: a review. *Clinical Psychology Review, 23*(3), 377-407.

Hembree, E. A., Foa, E. B., Dorfan, N. M., Street, G. P., Kowalski, J., & Tu, X. (2003). Do patients drop out prematurely from exposure therapy for PTSD? *Journal of Traumatic Stress, 16*(6), 555-562.

Jones, E., Vermaas, R. H., McCartney, H., Beech, C., Palmer, I., Hyams, K., et al. (2003). Flashbacks and post-traumatic stress disorder: the genesis of a 20th-century diagnosis.[comment]. *British Journal of Psychiatry, 182*, 158-163.

Kang, H. K., Natelson, B. H., Mahan, C. M., Lee, K. Y., & Murphy, F. M. (2003). Post-traumatic stress disorder and chronic fatigue syndrome-like illness among Gulf War veterans: a population-based survey of 30,000 veterans. *American Journal of Epidemiology, 157*(2), 141-148.

Kilpatrick, D. G., & Acierno, R. (2003). Mental health needs of crime victims: Epidemiology and outcomes. *Journal of Traumatic Stress, 16*(2), 119-132.

Klein, E., Koren, D., Arnon, I., & Lavie, P. (2003). Sleep complaints are not corroborated by objective sleep measures in post-traumatic stress disorder: a 1-year prospective study in survivors of motor vehicle crashes. *Journal of Sleep Research., 12*(1), 35-41.

Koenen, K. C., Stellman, J. M., Stellman, S. D., & Sommer, J. F., Jr. (2003). Risk Factors for Course of Posttraumatic Stress Disorder Among Vietnam Veterans: A 14-Year Follow-Up of American Legionnaires. *Journal of Consulting & Clinical Psychology, 71*(6), 980-986.

Kubany, E. S., & Watson, S. B. (2003). Guilt: Elaboration of a multidimensional model. *Psychological Record, 53*(1), 51-90.

Kuhn, E., Blanchard, E. B., & Hickling, E. J. (2003). Posttraumatic stress disorder and psychosocial functioning within two samples of MVA survivors. *Behaviour Research & Therapy, 41*(9), 1105-1112.

Low, J. F. A., Dyster-Aas, J., Willebrand, M., Kildal, M., Gerdin, B., & Ekselius, L. (2003). Chronic nightmares after severe burns: Risk factors and implications for treatment. *Journal of Burn Care & Rehabilitation, 24*(4), 260-267.

McNally, R. J. (2003). Psychological mechanisms in acute response to trauma. *Biological Psychiatry, 53*(9), 779-788.

Morgan, C. A., Krystal, J. H., & Southwick, S. M. (2003). Toward early pharmacological posttraumatic stress intervention. *Biological Psychiatry, 53*(9), 834-843.

Niles, B. L., Wolf, E. J., & Kutter, C. J. (2003). Posttraumatic Stress Disorder Symptomatology in Vietnam Veterans Before and After September 11. *Journal of Nervous & Mental Disease, 191*(10), 682-684.

Norris, F. H., Murphy, A. D., Baker, C. K., Perilla, J. L., Rodriguez, F. G., & Rodriguez, J. D. (2003). Epidemiology of trauma and posttraumatic stress disorder in Mexico. *Journal of Abnormal Psychology, 112*(4), 646-656.

Oquendo, M. A., Friend, J. M., Halberstam, B., Brodsky, B. S., Burke, A. K., Grunebaum, M. F., et al. (2003). Association of comorbid posttraumatic stress disorder and major depression with greater risk for suicidal behavior. *American Journal of Psychiatry., 160*(3), 580-582.

Orr, S. P., Metzger, L. J., Lasko, N. B., Macklin, M. L., Hu, F. B., Shalev, A. Y., et al. (2003). Physiologic responses to sudden, loud tones in monozygotic twins discordant for combat exposure: Association with posttraumatic stress disorder. *Archives of General Psychiatry, 60*(3), 283-288.

Ouimette, P., Moos, R. H., & Brown, P. J. (2003). Substance use disorder-posttraumatic stress disorder comorbidity: A survey of treatments and proposed practice guidelines. In P. Ouimette & P. J. Brown (Eds.), *Trauma and substance abuse: Causes, consequences, and treatment of comorbid disorders* (pp. 91-110). Washington, DC: American Psychological Association.

Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2003). Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. *Psychological Bulletin, 129*(1), 52-73.

Pimlott-Kubiak, S., & Cortina, L. M. (2003). Gender, victimization, and outcomes: Reconceptualizing risk. *Journal of Consulting & Clinical Psychology, 71*(3), 528-539.

Resick, P. A., Nishith, P., & Griffin, M. G. (2003). How well does cognitive-behavioral therapy treat symptoms of complex PTSD? An examination of child sexual abuse survivors within a clinical trial. *Cns Spectrums., 8*(5), 340-355.

Rothbaum, B. O., & Davis, M. (2003). Applying learning principles to the treatment of post-trauma reactions. *Annals of the New York Academy of Sciences, 1008*, 112-121.

Schnurr, P. P., Friedman, M. J., Foy, D. W., Shea, M. T., Hsieh, F. Y., Lavori, P. W., et al. (2003). Randomized trial of trauma-focused group therapy for posttraumatic stress disorder -

Results from a Department of Veterans Affairs Cooperative Study. *Archives of General Psychiatry, 60*(5), 481-489.

Seedat, S., le Roux, C., & Stein, D. J. (2003). Prevalence and characteristics of trauma and post-traumatic stress symptoms in operational members of the South African National Defence Force. *Military Medicine., 168*(1), 71-75.

Silove, D., Blaszczynski, A., Manicavasager, V., Tyndall, K., Petridis, A., & Hillman, K. (2003). Capacity of screening questionnaires to predict psychiatric morbidity 18 months after motor vehicle accidents. *Journal of Nervous and Mental Disease, 191*(9), 604-610.

Stein, B. D., Elliott, M. N., Tu, W., Jaycox, L. H., Kataoka, S. H., Fink, A., et al. (2003). School-Based Interventions for Children Exposed to Violence: Reply. *JAMA: Journal of the American Medical Association, 290*(19), 2542.

Stimpson, N. J., Thomas, H. V., Weightman, A. L., Dunstan, F., & Lewis, G. (2003). Psychiatric disorder in veterans of the Persian Gulf War of 1991. Systematic review. *British Journal of Psychiatry., 182*, 391-403.

Taylor, S. (2003). Anxiety Sensitivity and Its Implications for Understanding and Treating PTSD. *Journal of Cognitive Psychotherapy. Special Issue on Posttraumatic Stress Disorder, 17*(2), 179-186.

Vaiva, G., Ducrocq, F., Jezequel, K., Averland, B., Lestavel, P., Brunet, A., et al. (2003). "Immediate Treatment with Propranolol Decreases Posttraumatic Stress Disorder Two Months after Trauma": Erratum. *Biological Psychiatry, 54*(12), 947-949.

Wessely, S., Unwin, C., Hotopf, M., Hull, L., Ismail, K., Nicolaou, V., et al. (2003). Stability of recall of military hazards over time - Evidence from the Persian Gulf War of 1991. *British Journal of Psychiatry, 183*, 314-322.

Zakin, G., Solomon, Z., & Neria, Y. (2003). Hardiness, attachment style, and long term psychological distress among Israeli POWs and combat veterans. *Personality & Individual Differences, 34*(5), 819-829.