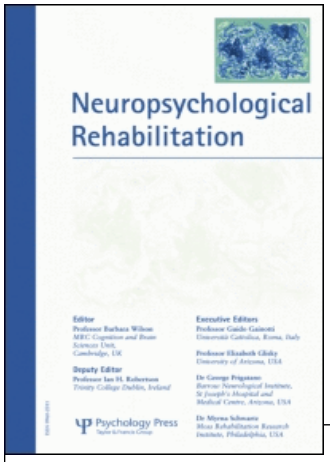

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Cognitive behaviour therapy for post-traumatic stress symptoms in the context of hydrocephalus: A single case

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There is limited information about anxiety disorders occurring in the context of the challenging condition of hydrocephalus. This paper describes the treatment, via trauma-focused cognitive behaviour therapy (TFCBT), of post-traumatic stress symptoms arising on account of hydrocephalus in a 23-year-old man. Specific components of the intervention included exposure, cognitive disputation, and relaxation training. The 20-session intervention appeared effective with decreases in anxiety (on the Hospital Anxiety and Depression Scale) and event impact (on the Impact of Events Scale) from clinical to sub-clinical levels. The main contributor to change appeared to be the exposure element of the treatment. The benefits of the intervention were maintained at one-, three-, and six-month follow-up.

Hydrocephalus is generally regarded as the abnormal build up of cerebrospinal fluid (CSF) that leads to increased pressure within the intracranial vault (Bergsneider et al., 2006). The clinical presentation of hydrocephalus usually occurs at the extremes of the life cycle (Black, 1980; Bret & Chazal, 1995),

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Code of Practice: As there exists the potential to exacerbate a condition if correct procedures are not followed, only those with appropriate training should carry out interventions such as that described in this article. Treatments should be conducted under guidelines for good practice such as the British Association for Behavioural and Cognitive Psychotherapy's *Guidelines for Good Practice of Behavioural and Cognitive Psychotherapy*, which are available on their website.

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such that the recognition and diagnosis of young- and middle-aged adult onset is less clear and can be under-detected and under-reported. To aid the identification of hydrocephalus within this age group, Cowan, McGirt, Woodworth, Rigamonti, and Williams (2005) proposed a new type of hydrocephalus called SHYMA: the syndrome of hydrocephalus in young and middle-aged adults. As SHYMA emerges there can be extremely stressful symptoms including complaints of headaches and impaired gait, cognition and bladder control (Cowan et al., 2005). The most common treatment for hydrocephalus is the surgical insertion of a shunt (Aschoff, Kremer, Hashemi, & Kunze, 1999). This system diverts the flow of CSF from a site within the central nervous system to another area of the body, such as the peritoneal cavity, where it is reabsorbed as part of the circulatory system. A valve along the catheter maintains one-way flow, which reduces the pressure and symptoms of hydrocephalus.

Post-traumatic stress disorder (PTSD) is an anxiety disorder that can follow exposure to an extreme traumatic stressor (American Psychiatric Association, 1994). It is characterised by a loss of the feeling of being in control of one's life, of construing the world as a dangerous place such that one lives in fear (with associated hyperarousal), and as a condition in which memory of the traumatic experience is so frightening anything that might trigger this is avoided. There are often intrusive thoughts, nightmares or flashbacks to the precipitating event. While hydrocephalus can cause significant distress and suffering, there is no record of post-traumatic stress symptoms arising in the context of hospitalisation and treatment for it. As a guide however it is known that PTSD may be encountered by up to 30% of persons following traumatic brain injury (Ashman, Spielman, Hibbard, Silver, Chandna, & Gordon, 2004) and up to 27% who experience intensive care (Shelling et al., 1998). A substantial number of people may also suffer significant post-traumatic stress symptoms regardless of whether they reach the requirement for categorisation under any particular diagnostic system (Bombardier et al., 2006). Clinically, individuals with such sub-criterion symptoms, present and are treated (Foa, 2007).

No work to date has documented the treatment of PTSD or significant post-traumatic stress symptoms arising as a response to hydrocephalus. There is, however, a large body of evidence supporting TFCBT (psychological treatments that predominantly use trauma-focused cognitive, behavioural or cognitive behavioural techniques, including exposure therapy) in the treatment of PTSD generally (Bisson & Andrew, 2007). Of relevance to SHYMA, such treatments have also been found useful for PTSD arising in medical settings (Harvey, Bryant, & Tarrier, 2003; Tedstone & Tarrier, 2003) and in the context of head injury that has included cognitive dysfunction (McMillan, Williams, & Bryant, 2003). On this account it would seem appropriate that such intervention would be useful in treating such symptoms in the milieu

of hydrocephalus. It was hypothesised that TFCBT for post-traumatic stress symptoms arising in the context of hydrocephalus and the insertion of a shunt would be of benefit to a recipient.

METHOD

Participant

John (not his real name) was a 23-year-old man who had encountered congenital hydrocephalus as a neonate that remitted without treatment. The hydrocephalus had reoccurred with initial symptoms apparent just prior to John departing on a 12-month round-the-world trip. Unfortunately, three months after his departure, while travelling in Australiasia, symptoms intensified necessitating decompression of a chronic fourth ventricular hydrocephalus. He developed a respiratory arrest and was urgently intubated and taken to theatre while awaiting magnetic resonance imaging (MRI) with cerebrospinal fluid (CSF) flow study. A right ventriculoperitoneal (VP) shunt was inserted.

A follow-up computerised tomography (CT) scan showed the third and fourth ventricles within normal limits and no haemorrhage or posterior communicating artery (PCA) infarct. An MRI check on the upper spine was also reasonably within normal limits, excluding other possible causes of the hydrocephalus.

Upon repatriation, one month post-surgery, while a reasonable physical recovery had been made, balance was still altered necessitating physiotherapy and ophthalmology (on account of diplopia). Three months before the commencement of psychological treatment (two months post-surgery), John was assessed by the domiciliary occupational therapy service for cognitive and neurological function with the Chessington Occupational Therapy Neurological Assessment Battery (COTNAB; Tyerman, Tyerman, Howard, & Hadfield, 1986) and the Cognitive Assessment of Minnesota (CAM; Rustard et al., 1993). These assessments indicated, in particular, changes in John's judgement, abstract reasoning and his ability to problem solve. During the intervention outlined in this report, possible speech changes were suspected, and a speech and language therapist confirmed mild dysarthria.

Prior to the hydrocephalus John had been an active young man with many friends. He had recently completed a degree in engineering. At the time of intervention he was attempting a basic computer course and undertaking volunteer clerical work as part of vocational rehabilitation. Consistent with his cognitive disability both these activities required the use of cognitive strategies to enable him to perform.

Five months after John's surgery there was a marked behavioural change. The referral from John's general practitioner (GP) described acute anxiety,

agitation, low mood and anger. The anxiety had been so extreme that it prompted retching and vomiting to the extent that he was hospitalised for tests in order to refute the development of encephalitis or shunt blockage. All tests during the hospitalisation were in the normal range. John completed the Patient Health Questionnaire (PHQ; Spitzer, Kroenke, & Williams, 1999) with his GP, four weeks before his assessment by the psychology department, scoring 15. This placed him in the moderately severe depression range on this instrument. Based on the PHQ and clinical assessment by his GP, John was prescribed 20 mg of fluoxetine a day. He remained on this throughout the intervention and the follow-up sessions described here.

Initial psychological assessment identified specific anxiety in relation to the onset and treatment of the hydrocephalus. John reported recurrent intrusive recollections and nightmares about his hospitalisation. In particular he recalled the severe pain, despite major analgesia, and thinking how close he had come to death. He further reported having developed a specific anxiety in relation to his head being touched. He was extremely wary in case it was knocked; way out of proportion to the self-care medical advice. This had led him to avoid groups of people and to venture out less than he otherwise might. Generalised anxiety, irritability and despondency were also evident. These appeared related to three main views. Firstly John considered he must be as he was before, leading to unrealistic expectations of himself post-event and thus a sense of failure when the expectation was not met. Secondly, that he should be doing better, leading to self-deprecation: "I'm not trying hard enough" and "I'm no good". Thirdly, John considered recovery should proceed at the same rate as it had initially following surgery. There was also significant anger about his condition not being detected despite a number of medical reviews prior to departing on his year abroad.

As can be seen in Figures 1 and 2, scores on the anxiety sub-scale of the Hospital Anxiety and Depression Scale, (HADS; Zigmond & Snaith, 1983), and on the Impact of Events Schedule (IES; Horowitz, Wilner, & Alvarez, 1979) were in the clinical range. In the latter case, the score achieved on the intrusion sub-scale was the main contributor to this finding. On the basis of his presentation, while not meeting the full criteria for PTSD under a system such as the *Diagnostic and Statistical Manual of Mental Disorders* – 4th Edition (DSM-IV; American Psychiatric Association, 1994) John was considered to be encountering significant post-traumatic stress symptoms that warranted treatment.

Formulation

John's stress reaction appeared to have developed as a response to an extremely painful frightening hospitalisation following intensification of

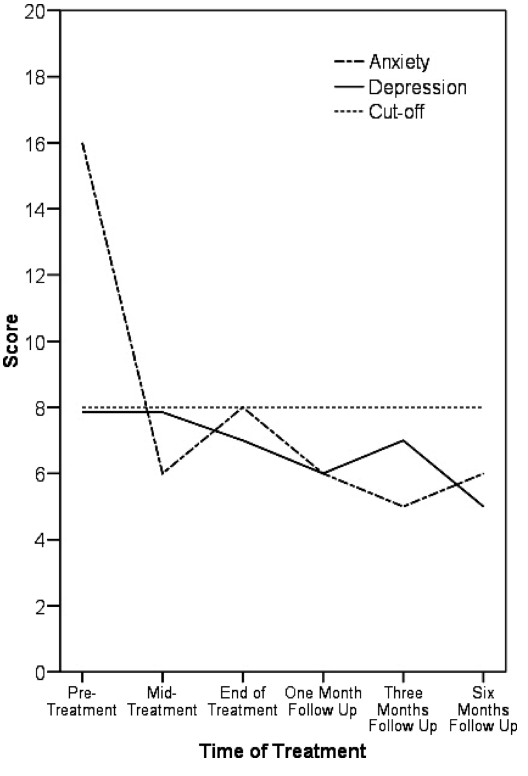

Figure 1. HADS (Hospital Anxiety and Depression Scale) scores over the period of study.

hydrocephalus: a development that threatened his life. It was characterised by intrusive recollection with concomitant anxiety alongside avoidance in relation to his head. The difficulty appeared to be maintained by continued avoidance and the likely relief he felt when he did manage to avoid. While John's lack of confidence had a reality base in that he was not as intellectually astute as he once was, John's emotional distress also appeared maintained by his unrealistic expectations of himself and of his recovery. Anger about his condition not being diagnosed earlier was seen as a further contributor to John's difficulties.

It is worthy of note that the cognitive changes identified in John may not have been entirely due to the impact of hydrocephalus. Post-traumatic stress symptoms have been associated with executive (Kanagagaratnam & Asbjornsen, 2007: Leskin & White, 2007), attentional and immediate memory problems (Horner & Hamner, 2002). A contradiction to this however was considered to be that, at the time of the cognitive assessment, the stress symptoms that became a concern were not evident. Conversely

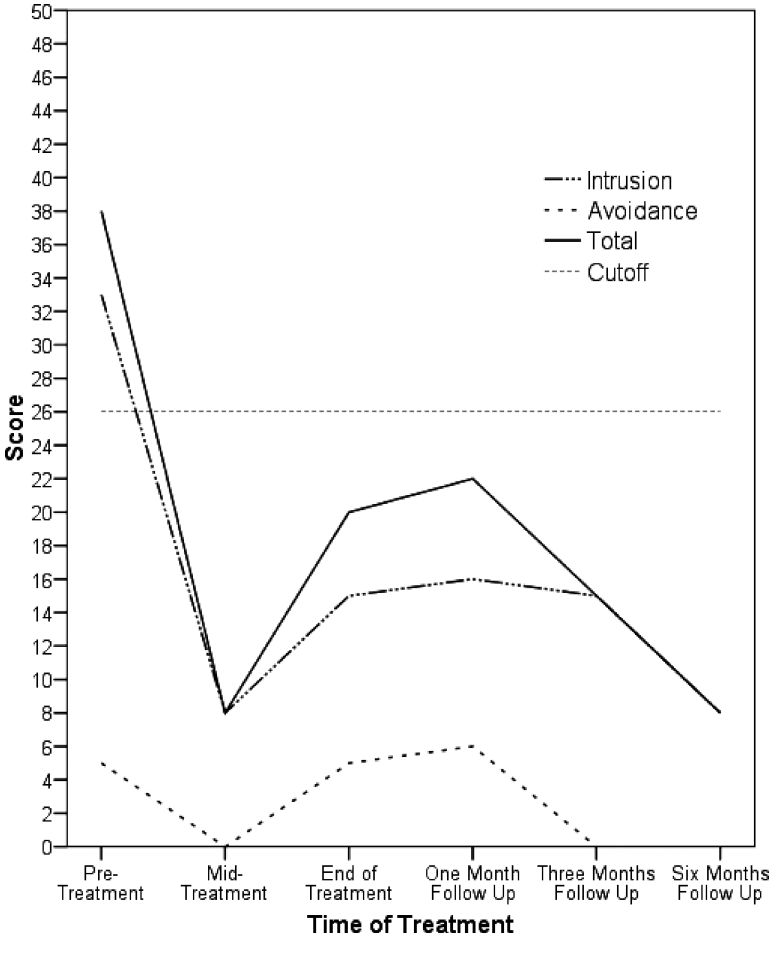

Figure 2. IES (Impact of Events Schedule) scores over the period of study.

executive changes may have contributed to stress symptoms such as anger/irritability (Paschall & Fishbein, 2002).

Measures

The HADS (Zigmond & Snaith, 1983) is a self-report 14-item scale developed to assess anxiety and depression in two sub-scales in medical populations. It consists of items that make it less likely results will be influenced by physical symptoms. The HADS has previously been used to consider emotional outcomes of intensive care (Rattray, Johnston,

&Wildsmith, 2005) and is a recommended measure for evaluating PTSD (Turner & Lee, 1998). The anxiety scale of the HADS taps the general anxiety and increased arousal that occurs in PTSD and the depression scale rates depressive symptoms that often accompany such disorders (e.g., Bombardier et al., 2006). The cut-off recommended by the test developers for possible clinical anxiety and depression is $\geq$ 8 on each sub-scale.

The IES (Horowitz et al., 1979) is a 15-item self-report scale with two sub-scales: intrusion and avoidance, which are major symptoms of post-traumatic stress. The scale is probably the most widely used self-report measure in the evaluation of and interventions for responses to trauma (Bradley, Greene, Russ, Dutra, & Westen, 2005; Turner & Lee, 1998). There is no widely accepted cut-off for clinical disorder on this measure but a total score of $\geq$26 has been suggested as an indicator of "significant symptoms" (DeVilly, 2005).

The HADS and the IES were administered prior to treatment, approximately mid-treatment, post-treatment and at 1-, 3- and 6-month follow-up.

Intervention

Following two assessment sessions, 20 treatment sessions were held which ranged from 45 minutes to a maximum of 75 minutes. A consultant clinical psychologist with 20 years of experience administered the main sessions. Figure 3 displays a summary of the session and homework content.

Initial components of treatment included education about post-traumatic stress, and the basis of cognitive behavioural intervention for it. Following this, treatment concentrated on exposure to the traumatic memory. This took the form of John writing, in detail, a description of the events and the emotions attached for the prelude, the hospitalisation and its consequences. This writing was revised on a daily basis as a homework task to incorporate those aspects previously forgotten. John then made an audio recording of the final version to listen to for further exposure. Writing and listening to audio presentations have been demonstrated as effective exposure treatments for PTSD (Resick, Nishith, Weaver, Astin, & Feurer, 2002; Resick & Schnicke, 1992; Vaughan & Tarrier, 1992).

Subsequent cognitive therapy dealt with the three main views that appeared to maintain John's difficulty. Firstly the view "I must be as I was before" was countered by acceptance that it was unrealistic for him to expect as much of himself as previously, given he had encountered an acute episode of hydrocephalus, which required surgery, and this had significantly changed him. Secondly, his view that "I should be doing better", leading to self-deprecation: "I'm not trying hard enough" and "I'm no good" was countered by evidence he was doing what he could, indeed more than he gave himself credit for and was not "no good", and that he was trying hard enough, with more than adequate evidence to attest to this. Thirdly, the view that the process of recovery should proceed at

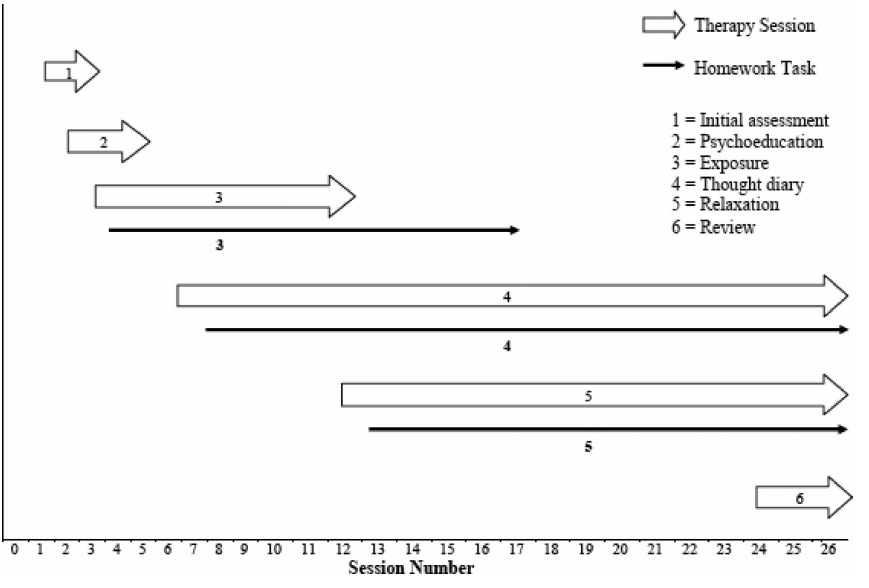

Figure 3. Summary of sessions (initial assessment, intervention and review) and homework tasks completed by John.

the same rate as it had initially following surgery was challenged by identifying this demand as also unrealistic, as checked by neurosurgical consultations and advice from rehabilitation staff.

Since high arousal had been a significant feature of initial presentation relaxation training was undertaken separately, just after the main sessions, with an assistant clinical psychologist. John was trained in progressive muscle relaxation, and a three-part, yoga-type breathing technique (Winkler, James, Fatovich, & Underwood, 1982). During the course of the intervention John also commenced a regular yoga class and chose this as one of his relaxation options.

It is important to note that at no point in therapy was it suggested that John's emotional reaction to the events and loss was unwarranted, rather considerable time was spent on having John accept that given the events that had occurred, while he may be able to manage them, it was understandable that he would have periods of grief and despondency. John's anger was not directly targeted for intervention as he felt it was appropriate to events and was not causing him difficulty.

In light of John's cognitive problems, written instructions were used to support his undertaking between-session homework. Thought records were also introduced in a simpler format, and then developed to full records that allowed more opportunity to record disputes. At one point, as it appeared

John may have been losing concentration and not fully attending to the material within exposure trials, he was asked to read the exposure material at the same time as listening to it.

RESULTS

Figure 1 summarises the changes on the anxiety and depression sub-scales of the HADS over the course of the intervention and at the three subsequent follow-up sessions. Similarly, Figure 2 summarises these for the IES: intrusion, avoidance and total scale scores. A reduction to sub-clinical levels over the period during which the exposure component of the intervention took place was evident on the anxiety sub-scale of the HADS and for the total impact score of the IES. This was maintained over the course of the cognitive intervention and the relaxation training, as well as at follow-up.

Other indicators of change included reports about emotional responding identified by homework records of events, thoughts and affective responses. This demonstrated John's ability to consider his thought processes and develop more adaptive approaches to stressful events. Examples of change include his reactions to poor performance in tests evaluating computer literacy. During the assessment phase John reported one incident where he failed to pass a test, he thought himself "a failure" and became extremely despondent. This can be compared to a later time when something similar occurred and instead he accepted the failure, considered it was likely due to cognitive change post-hydrocephalus, and while unfortunate, was unsurprising. On this account he had a dramatically different (reduced) emotional response (disappointment) and resolved to retake the exam after only a brief delay, with greater resolution to use the cognitive compensation strategies in which he had been trained by occupational therapy staff. John passed this subsequent test.

No direct attention was required to John's avoidance in relation to his head. Following education about PTSD John himself initiated going out more, both to football matches and rock music performances, where there would be large numbers of people. He reported realising he had substantially overcome this concern when a young nephew was pulling his hair and he had not paid attention to it, except upon reflection.

John commented that the cognitive restructuring (the thought diaries) and relaxation aspects of the intervention were the most useful aspects of therapy. It is interesting to note this observation, because psychometrically the greatest benefit was evident from the exposure to the trauma.

Not apparent from psychometric results is the fact that John became quite despondent at one point over Christmas. He was able to identify with his

therapist that a likely contributor was periods of inactivity, which allowed him to dwell at length upon his losses.

DISCUSSION

Trauma-focused cognitive behavioural therapy, including the elements of exposure, cognitive disputation and relaxation training appeared effective in dealing with post-traumatic stress symptoms occurring after medical intervention for hydrocephalus. The majority of the gains, evident on psychometrics, were encountered in the first period of the intervention when exposure was the key procedure in use. Change occurred in cognitive (attitudinal) responses, from less to more adaptive over the course of the intervention, although these appeared not to be linked to changes on assessment measures. Of note, the avoidance initially apparent was not identified on the measure designed to assess this, the IES. This supports the importance of interview information in a comprehensive evaluation of post-traumatic stress symptoms. Subjectively, from John's Christmas experience, it seemed likely, consistent with behavioural theory (Lewinsohn, 1974), that behavioural activity was also an important determinant of mood.

As John remained on anti-depressant medication throughout the intervention and follow-up, a contribution of this to the benefits evident cannot be ruled out. However, given the main effects of this medicine are usually revealed within four weeks of commencement (Zhou, Huang, Kecojevic, Welsh, & Koliatsos, 2006), and this was the period of time before his first assessment by the psychology department, we consider this unlikely. Indeed, the substantial changes evident with TFCBT, that did not occur earlier with the medication, support a specific effect for the psychological treatment.

This case study supports the benefits of TFCBT even when there may be cognitive impairment. It is consistent with findings as to the efficacy of TFCBT treatment for PTSD following head injury (McMillian et al., 2003) and adds to the literature on the applicability of psychological interventions to those who are neurologically challenged. Controlled research with others similarly affected after hydrocephalus is indicated.

REFERENCES

American Psychiatric Association (1994). *Diagnostic and Statistical Manual of Mental Disorders* (4th edn.). Washington, DC: American Psychiatric Association.

Aschoff, A., Kremer, P., Hashemi, B., & Kunze, S. (1999). The scientific history of hydrocephalus and its treatment. *Journal of Neurosurgical Review*, *22*, 67–93.

Ashman, T. A., Spielman L. A., Hibbard, M. R., Silver, J. M.,, Chandna, T., & Gordon, W. A. (2004). Psychiatric challenges in the first 6 years after traumatic brain injury: A cross-sectional analyses of Axis 1 disorders. *Archives of Physical Medicine and Rehabilitation*, *85*(Suppl 2), S36–S42.

Bergsneider, M., Egnor, M., Johnston, M., Kranz, D., Madsen, J. R., McAllister, J. P., et al. (2006). What we don't (but should) know about hydrocephalus. *Journal of Neurosurgery: Pediatrics*, *104*, 157–159.

Bisson, J., & Andrew, M. (2007). Psychological treatment of post-traumatic stress disorder (PTSD). *Cochrane Database of Systematic Reviews* (Issue 3), Art. No.: CD003388. DOI: 10.001002/14651858.CD003388.pub3.

Black, P. M. (1980). Idiopathic normal-pressure hydrocephalus: Results of shunting in 62 patients. *Journal of Neurosurgery*, *52*, 371–377.

Bombardier, C. H., Fanne, J. R., Temkin, N., Esselman, P. C., Pelzer, E., Keough, B. S., & Dikmen, S. (2006). Post-traumatic stress disorder symptoms during the first six moths after traumatic brain injury. *Journal of Neuropsychiatry and Clinical Neurosciences*, *18*, 501–508.

Bradley, R., Greene, J., Russ, E., Dutra, L., & Westen, D. (2005). A multidimensional meta-analysis of psychotherapy for PTSD. *American Journal of Psychiatry*, *162*, 214–227.

Bret, P., & Chazal, J. (1995). Chronic normal pressure hydrocephalus in childhood and adolescence. A review of 16 cases and reappraisal of the syndrome. *Child's Nervous System*, *11*, 687–691.

Cowan, J. A., McGirt, M. J., Woodworth, G., Rigamonti, D., & Williams, M. A. (2005). The syndrome of hydrocephalus in young and middle-aged adults (SHYMA). *Neurological Research*, *27*, 540–547.

DeVilly, G. J. (2005). *Impact of Events Scale (IES).* Retrieved 12 October, 2006, from http://www.swin.edu.au/victims/resources/assessment/ptsd/ies.html

Foa, E. B. (2007). *The Phenomenology, Theory and Treatment of Post-Traumatic Stress Disorder*. Paper presented at the World Congress of Behavioural and Cognitive Psychotherapy, July 2007, Barcelona, Spain.

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

Horner, M. D., & Hamner, M. B. (2002). Neurocognitive functioning in posttraumatic stress disorder. *Neuropsychology Review*, *12*, 15–30.

Horowitz, M. J., Wilner, N., & Alvarez, W. (1979). Impact of Event Scale: A measure of subjective stress. *Psychosomatic Medicine*, *41*, 209–218.

Kanagagaratnam, P., & Asbjornsen, A. E. (2007). Executive deficits in chronic PTSD related to political violence. *Journal of Anxiety Disorders*, *21*, 510–525.

Leskin L. P., & White, P. M. (2007). Attentional networks reveal executive function deficits in posttraumatic stress disorder. *Neuropsychology*, *21*, 275–284.

Lewinsohn, P. M. (1974). A behavioural approach in depression. In R. J. Friedman & M. M. Katz (Eds.), *The Psychology of Depression: Contemporary Theory and Research* (pp. 157–185). Washington, DC: Winston.

McMillian, T. M., Williams, W. H., & Bryant, R. A. (2003). Post-traumatic stress disorder and traumatic brain injury: A review of causal mechanisms, assessment, and treatment. *Neuropsychological Rehabilitation*, *13*, 149–164.

Paschal, M. J., & Fishbein, D. H. (2002). Executive cognitive functioning and aggression: A public health perspective. *Aggression and Violent Behavior*, *7*, 215–235.

Rattray, J. E., Johnston, M., & Wildsmith, J. A. W. (2005). Predictors of emotional outcomes of intensive care. *Anaesthesia*, *60*, 1085–1092.

Resick, P. A., Nishith, P., Weaver, T. L., Astin, M. C., & Feurer, C. A. (2002). A comparison of cognitive-processing therapy with prolonged exposure and a waiting condition for the treatment of chronic posttraumatic stress disorder in female rape victims. *Journal of Consulting and Clinical Psychology*, *70*, 867–879.

Resick, P. A., & Schnicke, M. K. (1992). Cognitive processing therapy for sexual assault victims. *Journal of Consulting and Clinical Psychology*, *60*, 748–756.

Rustard, R. A., DeGroot, T. L., Jungkunz, M. L., Freeberg, K. S., Borowick, L. G., & Wanttie, A. M. (1993). *The Cognitive Assessment of Minnesota*: San Antonio, TX: The Psychological Corporation.

Shelling, G., Stoll, C., Haller, M., Briegal, J., Manert, W., Hummel, T., Lenhart, A., Heyduck, M., Polasek, J., Meier, M., Preub, U., Bullinger, M., Schuffel, W., & Peter, K. (1998). Health-related quality of life and post-traumatic stress disorder in survivors of the acute respiratory distress syndrome. *Critical Care Medicine*, *26*, 651–659.

Spitzer, R. L., Kroenke, K., & Williams, J. B. W. (1999). Validation and utility of a self-report Version of PRIME-MD: The PHQ Primary Care Study. *Journal of the American Medical Association*, *282*, 1737–1744.

Tedstone, J. E., & Tarrier, N. (2003). Posttraumatic stress disorder following medical illness and treatment. *Clinical Psychology Review*, *23*, 409–448.

Turner, S., & Lee, D. (1998). *Measures in Post Traumatic Stress Disorder (PTSD): A Practitioner's Guide*. Windsor, UK: NFER-Nelson.

Tyerman, R., Tyerman, A., Howard, P., & Hadfield, C. (1986). *Chessington Occupational Therapy Neurological Assessment Battery*. Nottingham, UK: Nottingham Rehab Supplies.

Vaughan, K., & Tarrier, N. (1992). The use of image habituation training with post-traumatic stress disorders. *British Journal of Psychiatry*, *161*, 658–664.

Winkler, R., James, R., Fatovich, B., & Underwood, P. (1982). *Migraine and Tension Headaches: A Multi-Modal Approach to the Prevention and Control of Headache Pain*. University of Western Australia: Self-Care Research Team.

Zhou, L., Huang, K.-X., Kecojevic, A., Welsh, A. M., & Koliatsos, V. E. (2006). Evidence that serotonin reuptake modulators increase the density of serotonin innervation in the forebrain. *Journal of Neurochemistry*, *96*, 396–406.

Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica*, *67*, 361–370.

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