Changes in intrusive memories associated with imaginal reliving in posttraumatic stress disorder

Anne E.M. Speckens [a,*], Anke Ehlers [a],
Ann Hackmann [b], David M. Clark [a]

[a] Department of Psychology, Institute of Psychiatry, De Crespigny Park, Centre for
Anxiety Disorders and Trauma, 99 Denmark Hill, London SE5 8AF, UK
[b] University Department of Psychiatry, Warneford Hospital, Oxford OX3 7JX, UK

Abstract

The study investigated changes in intrusive memories associated with imaginal reliving of traumatic events in posttraumatic stress disorder (PTSD). The study population comprised 44 patients treated with imaginal reliving in the context of cognitive therapy for PTSD [Behav. Res. Ther. 38 (2000) 319–345]. For most patients, imaginal reliving did not lead to exacerbations in intrusion frequency. The decrease in intrusion frequency after reliving was gradual, as was the decrease in their distress, vividness, and perceived "nowness." Poorer outcome, i.e., a smaller reduction in residual gain scores for intrusion frequency with reliving, was associated with greater initial PTSD severity, greater anger, greater perceived "nowness" of intrusive memories, and more negative interpretations of PTSD symptoms. The patient's anxiety, depression, self-blame, and dissociation were not predictive of response to reliving.
© 2005 Elsevier Inc. All rights reserved.

 * Corresponding author. Fax: +31 24 3540561.
   E-mail address: a.speckens@psy.umcn.nl (Anne E.M. Speckens).

1. Introduction

Intrusive memories are a core symptom of posttraumatic stress disorder (PTSD). They usually consist of relatively brief sensory fragments of the traumatic experience that occur in a stereotyped, repetitive way (e.g., Ehlers, Hackmann, & Michael, 2004; van der Kolk & Fisler, 1995). Recent research has pointed to several features of intrusive memories that may be of clinical and theoretical interest. First, emotions that accompany intrusive memories in PTSD are the same as those experienced at the time of the trauma (Brewin, Dalgleish, & Joseph, 1996; Foa & Rothbaum, 1998), and the sensory components of intrusive memories appear to be reexperienced as if they were features of something happening right now, rather than being aspects of memories from the past (Hackmann, Ehlers, Speckens, & Clark, 2004). Second, as Ehlers and Clark (2000) highlighted, the intrusive memories appear to lack a context of other relevant information, so that the intrusive memory is reexperienced even if the person later acquired new information that contradicted their original impression.

The relevance of the lack of time perspective and lack of context of intrusive memories in PTSD was supported by two studies by Michael, Ehlers, Halligan, and Clark (in press), who found that these intrusion characteristics distinguished between assault survivors with and without PTSD and predicted subsequent PTSD severity. Whether or not participants reported intrusive memories in the first few weeks after the assault only explained 9% of the variance of PTSD severity at 6 months after assault. Among survivors with intrusions, intrusion frequency only explained 8% of the variance of PTSD symptom severity at 6 months. Lack of time perspective (perceived ''nowness'' of the memories), distress and lack of context explained an additional 43% of the variance. These intrusion characteristics also predicted PTSD severity at 6 months over and above what could be predicted from PTSD diagnostic status at initial assessment. The present study investigated whether and how these intrusion characteristics change during treatment.

1.1. Change of intrusive memories with therapy

Prolonged imaginal and in vivo exposure has been established as an effective treatment for PTSD (Foa, Dancu, et al., 1999; Keane & Kaloupek, 1982; Marks, Lovell, Norshirvani, Livanou, & Trasher, 1998; Tarrier et al., 1999). In imaginal exposure (imaginal ''reliving''), patients are asked to relive the traumatic experience in the presence of the therapist, starting from the beginning and continuing to the point when they were safe again, while putting the experience into words (Foa & Rothbaum, 1998). In repeated relivings, the patients add more and more detail until all aspects of the traumatic memory are tolerated well. Sessions are audiotaped and patients are asked to listen to the tape for several times in between sessions.

Given the predictive power of intrusion characteristics for the persistence of PTSD (Michael et al., in press), one would expect that they change with successful treatment. A preliminary study of Hackmann et al. (2004) in 22 patients with PTSD supported this hypothesis. The authors found that frequency, distress, vividness and perceived ''nowness'' changed with imaginal reliving (delivered in the context of a cognitive therapy program) and that the change was gradual rather than abrupt. In accordance with earlier findings by Foa, Zoellner, Feeny, Hembree, and Alvarez-Conrad (2002), reliving of the traumatic event in the initial treatment sessions increased the frequency of intrusive memories in only a minority of patients.

1.2. Predictors of treatment outcome

Several studies have aimed to identify predictors of response to exposure-based PTSD treatments. Foa, Riggs, Massie, and Yarczower (1995) found that patients who showed anger rather than fear when reliving their traumatic event had a poorer treatment response. Van Minnen, Arntz, and Keijsers (2002) investigated predictors of treatment outcome in two groups of 59 and 63 PTSD patients with mixed traumas treated with prolonged imaginal exposure. The only stable predictor of outcome across the two groups, both post-treatment and at follow-up, was initial severity of PTSD symptoms. Use of benzodiazepines was also predictive of treatment outcome, but demographic variables, depression and general anxiety, personality, trauma characteristics, and feelings of anger, guilt, or shame were not. Blanchard et al. (2003) found that pretreatment severity of PTSD symptoms and functional impairment predicted outcome of treatment in 30 patients treated with a cognitive behavioral treatment for their PTSD. In a study of 50 people who received a cognitive behavioral treatment for PTSD following a road traffic accident, Taylor et al. (2001) also found that poor treatment outcome was related to lower levels of functioning, but also to greater numbing, anger, depression and pain. In 62 patients with PTSD treated with either cognitive therapy or prolonged exposure, Tarrier, Sommerfield, Pilgrim, and Faragher (2000) found that gender and suicide risk were associated with post-treatment outcome and comorbid generalized anxiety disorder and residential status with outcome at 6 months follow-up.

1.3. Other predictors of chronic PTSD

The search for predictors of treatment response may be informed by recent theoretical and empirical work on cognitive factors that predict chronic PTSD. For example, Ehlers and Clark (2000) developed a cognitive model of PTSD suggesting that PTSD becomes persistent when individuals process the trauma in a way that leads to a sense of serious, current threat. The sense of threat arises as a consequence of (1) a disturbance of the autobiographical memory for the trauma characterized by poor elaboration and conceptualization, and (2) excessively

negative appraisals of the trauma and/or its sequelae. Several studies supported the role of these memory and appraisal factors. For example, in a large prospective study of road traffic accident survivors, Ehlers, Mayou, and Bryant (1998) found that initial negative interpretation of intrusive memories, anger cognitions and dissociation during the accident predicted PTSD at 1 year. Similarly, Halligan, Michael, Clark, and Ehlers (2003) found in two studies of assault victims that negative interpretation of intrusive memories and dissociation were significantly correlated with both concurrent and subsequent PTSD severity. The present study investigated whether these cognitive factors are useful in predicting treatment response to imaginal reliving.

1.4. Aims of the study

The present study had two aims. First, we aimed to replicate the preliminary findings of Hackmann et al. (2004) about the changes in intrusive memories with imaginal reliving in a separate and larger sample of patients with PTSD. Second, we aimed to identify possible predictors of changes in intrusion frequency in response to imaginal reliving. The hypotheses were as follows:

(1) Decrease in frequency of intrusive memories after reliving will be gradual rather than sudden.
(2) Imaginal reliving will not lead to an increase in intrusive memories.
(3) The following factors will predict a smaller decrease in the frequency of intrusive memories after reliving: initial severity of PTSD symptoms, anxiety, depression, anger, dissociation, characteristics of intrusive memories and negative interpretation of PTSD symptoms.

2. Method

2.1. Study population

Patients were drawn from participants of two randomized controlled trials of cognitive therapy for PTSD (Ehlers, Clark, Hackmann, McManus, & Fennell, in press; Ehlers et al., 2003). The first trial (Ehlers et al., in press) included patients with chronic PTSD of 6 months or longer duration after a range of different traumas who were referred by their family doctors or community psychiatric services. The second trial recruited patients who had attended local Emergency Departments after a motor vehicle accident and scored at least 20 on the Posttraumatic Stress Diagnostic Scale between 3 and 6 months after the event (Foa, Cashman, Jaycox, & Perry, 1997). Inclusion criteria for both trials were (1) a diagnosis of PTSD as determined by the Structured Clinical Interview for the DSM-IV (SCID; First, Spitzer, Gibbon, & Williams, 1995), (2) the current episode of PTSD is linked to discrete traumatic events in adulthood, and (3) PTSD is the main problem.

Exclusion criteria were a history of psychosis; current alcohol or drug dependence (but not abuse); borderline personality disorder; severe depression needing immediate treatment in its own right (i.e., actively suicidal); unconsciousness during the trauma of 15 min or longer or no memory of the trauma; and treatment/ assessments cannot be conducted without the aid of an interpreter.

The present study population included all patients who (1) had completed treatment at the point of data entry, and (2) had not been included in the Hackmann et al. (2004) study. Sixteen patients had participated in the first trial. Eight (50%) of these had received treatment immediately after random allocation and 8 (50%) after a waiting list condition. Thirty-four patients had participated in the second trial. Eighteen (53%) of these had received treatment immediately, 7 (21%) after getting a self-help booklet, and 9 (26%) after repeated assessments. Six of the 50 eligible patients had to be excluded from the study because they had incomplete data on the intrusion measure. Of the 44 patients who were included, 39 had experienced a motor vehicle accident, one another accident, three had been assaulted, and one had been a witness at a scene of trauma.

2.2. Measures

2.2.1. Intrusion Questionnaire

At initial assessment, and before each treatment session, patients completed a short questionnaire about their main intrusive memory (i.e., the memory that bothered them the most). The questionnaire asked patients to indicate how often the intrusive memory had occurred in the previous week. In addition, they were asked to rate how distressing and vivid it had been, and the extent to which it seemed to be happening now instead of being something from the past, each on a scale from 0 ("not at all") to 100 ("very much"). The retest-reliability ranged between $r = .61$ and $r = .72$ for the 4 rating scales, respectively (1 week between session 1 and session 2). The correlations between the Intrusion Questionnaire scales and corresponding scales on an Intrusions Interview were: frequency $r = .94$, distress $r = .74$, vividness $r = .70$, nowness $r = .84$ (Hackmann et al., 2004).

2.2.2. Posttraumatic Diagnostic Scale (PDS)

The PDS is a self-report measure of the severity of PTSD symptoms (Foa et al., 1997). Patients are asked to rate how often they were bothered by each of the PTSD symptoms specified in the DSM-IV in the past month. The PDS demonstrated good internal consistency and test-retest reliability. Item 14 of the PDS, feeling irritable or having fits of anger, was used to measure degree of anger.

2.2.3. Beck Depression Inventory (BDI)

The BDI is a 21-item self-report measure of depression that has been shown in previous research to have good reliability and validity (Beck, Ward, Mendelsohn, Mock, & Erbaugh, 1961).

2.2.4. Beck Anxiety Inventory (BAI)

The BAI is a 21-item scale that measures the severity of self-reported anxiety (Beck & Steer, 1961). The BAI has a high internal consistency, test-retest reliability and convergent validity.

2.2.5. Trait Dissociation Questionnaire (TDQ)

The TDQ (Murray, Ehlers, & Mayou, 2002) was used to assess patients' general tendency to have dissociative experiences and contained 38 items. The internal consistency of the total score was $\alpha = .93$ and the test-retest reliability over a 2-month period was $r = .86$. Students with high scores on the TDQ were more likely to experience intrusive memories of an unpleasant videotape than those with low scores.

2.2.6. Self-blame

Self-blame was assessed with the Posttraumatic Cognitions Inventory (PTCI; Foa, Ehlers, Clark, Tolin, & Orsillo, 1999). The items are rated on a 7-point Likert scale varying from 1 (totally disagree) to 7 (totally agree). The PTCI consists of three factors: negative cognitions about self, negative cognitions about the world, and self-blame. The three factors showed good internal consistency and good test-retest reliability. They correlated moderately to strongly with measures of PTSD severity, depression, and general anxiety and discriminated well between traumatized individuals with and without PTSD. The factor self-blame consists of the following five items: "The event happened because of the way I acted," "The event happened to me because of the sort of person I am," "Somebody else would have stopped the event from happening," "Somebody else would not have gotten into this situation," and "There is something about me that made the accident happen." The internal consistency of the self-blame scale was $\alpha = .79$ in the current sample.

2.2.7. Negative interpretation of PTSD symptoms

The 6-item scale consists of relevant items of the PTCI (Foa, Dancu, et al., 1999; Foa, Ehlers, et al., 1999) and assesses negative appraisals of initial posttrauma symptoms: "My reactions since the accident mean that I am going crazy," "If I think about the accident, I will not be able to handle it," "I will not be able to control my anger and do something terrible," "My reactions since the event show I am a lousy coper," "If will not be able to tolerate my thoughts about the event and I will fall apart," and "I will not be able to control my emotions, and something terrible will happen." The internal consistency of the scale was $\alpha = .83$ in the current sample.

2.3. Procedure

In the assessment interview, information was gathered on sociodemographic variables and the traumatic event. PTSD and comorbid psychiatric disorders were

diagnosed with the SCID. In addition, the PDS, Intrusion Questionnaire, BDI, BAI, PTCI and TDQ were administered. At each treatment session, patients completed the PDS, Intrusion Questionnaire, BDI, and BAI.

2.4. Treatment

Patients received a course of 12 sessions of cognitive therapy for PTSD (Ehlers & Clark, 2000; Ehlers et al., in press, 2003). The first treatment session involved discussion of the patients' symptoms and goals, a brief description of the traumatic event, assessment of factors maintaining the disorder as specified in the Ehlers and Clark (2000) model, and treatment rationale. In the second and third treatment session, imaginal reliving was conducted. For a few patients reliving started in third session. For this minority of patients, data from the corresponding sessions were used for data analysis.

The use of imaginal reliving in the cognitive therapy program is somewhat different from that in the Prolonged Exposure treatment program (Foa & Rothbaum, 1998). After a reliving following the guidelines of Foa and Rothbaum (1998), therapist and patient identify the most distressing moments during the trauma (''hot spots'') and discuss what they meant for the patient. For each of the hot spots, information that updates its meaning is identified and incorporated into the memory with verbal or imagery techniques. The updating information represents either information that became available to the patient at a later point in time during the trauma or its aftermath (i.e., the moment ''I thought I'd lost my legs'' is linked with the final outcome ''I now know that I could actually move my toes and realized shortly afterwards that I was in one piece and would be able to walk'') or new conclusions that are the result of cognitive restructuring. For those patients who believe that they would go crazy, fall apart, lose control or die when thinking about the trauma in detail, reliving is used as a behavioral experiment to test this interpretation. In contrast to the Prolonged Exposure program, imaginal reliving in the cognitive therapy program is only used in a few of the therapy sessions, as the meaning of the problematic moments is changed with other methods. In the trials analyzed for the purposes of this paper, a mean of 3.0 (S.D. = 1.4) sessions (Ehlers et al., in press) or 3.3 (S.D. = 1.4) sessions (Ehlers et al., 2003) contained some imaginal reliving. The present paper therefore concentrates on the first few sessions following imaginal reliving.

2.5. Data analysis

Paired *t* tests compared the frequency and characteristics of intrusive memories between the initial assessment and the first reliving session, and between the first reliving session and the following four sessions. Further sessions were not included in the analysis as too few patients still reported intrusions (50% or less), and as reliving was rarely done in these sessions. Response to imaginal reliving was operationalized by calculating standardized residual gain scores, a well-

validated measure of change (e.g., Mintz, Luborsky, & Christoph, 1979; Williams, Zimmerman, Rich, & Steed, 1984), for the change in intrusion frequency. These scores are the residuals of the regression of initial intrusion frequency before treatment on intrusion frequency after reliving, and thus represent the variation in the severity of reexperiencing symptoms that is not explained by initial severity. The relationship of the predictor variables measured at the beginning of treatment and residual gain scores were calculated with Pearson correlations. Significance levels are two-tailed.

3. Results

3.1. Study sample

The sample consisted of 12 (27%) male and 32 (73%) female patients. The mean age was 39.4 (S.D. = 11.3) years. Twenty-five (57%) of the patients were married or co-habiting, 14 (32%) were single, 4 (9%) divorced and 1 (2%) widowed. The majority of the patients were employed ($N = 37$, 84%, including patients on sick-leave), 3 (6%) were students, 2 were homemakers (5%), and 2 (5%) were unemployed. Fourteen (32%) had professional jobs, 14 (32%) white collar, and 12 (27%) blue collar jobs.

Twelve patients (27%) were using psychotropic medication, mostly tricyclic antidepressants ($N = 7$, 16%) or selective serotonin re-uptake inhibitors ($N = 4$,

Table 1

Severity of symptoms, intrusion characteristics, and other predictor variables at initial assessment; and their association with changes in intrusion frequency

	Mean (S.D.), $N = 44$	Correlation with residual gain scores[a]
Posttraumatic symptoms (PDS)	25.9 (8.0)	.47[**]
Anxiety (BAI)	20.0 (9.2)	.11
Depression (BDI)	18.6 (6.5)	.16
Main intrusive memory		
Frequency (week)	5.38 (5.69)	N/A
Vividness	76.8 (20.3)	.20
Distress	67.9 (24.3)	.14
Nowness	57.2 (26.1)	.36[*]
Self-blame (PTCI)	11.8 (7.1)	.06
Negative interpretation of symptoms (PTCI)	15.5 (6.3)	.31[*]
Anger (PDS)	2.3 (.9)	.34[*]
Dissociation (TDQ)	50.0 (25.0)	.03

PDS: Posttraumatic Diagnostic Scale, PTCI: Posttraumatic Cognitions Inventory, BAI: Beck Anxiety Inventory, BDI: Beck Depression Inventory, TDQ: Trait Dissociation Questionnaire, N/A: not applicable.

[a] Greater scores reflect poorer outcome (smaller decreases in intrusion frequency).

[*] $P < .05$, two-tailed.

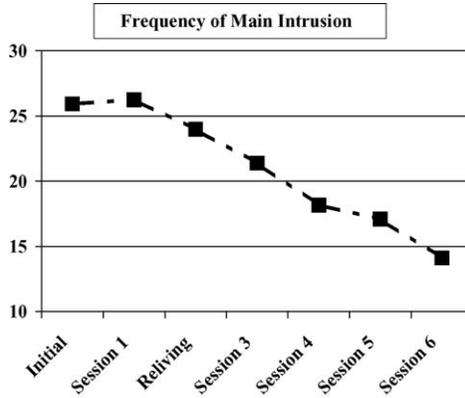[**] $P < .001$, two-tailed.

Fig. 1. Session-to-session changes in the mean frequency of the patients' main intrusive memory.

9%). Patients had to be on a stable dose for 2 months before the first treatment session to be included in the trials. Medication was not related to outcome. The severity of symptoms at the beginning of treatment is shown in Table 1.

3.2. Course of intrusive memories

The frequency of the patients' main intrusive memory from the assessment prior to treatment to the fourth session after reliving is shown in Fig. 1. The frequency did not change between initial assessment (mean = 5.5 per week, S.D. = 5.8) and the first reliving session (mean = 4.9, S.D. = 4.1, $P > .57$), or between the first reliving session and the following session (mean = 5.0, S.D. = 6.0, $P > .86$). By the second session after reliving, frequency declined significantly to a mean of 3.0 (S.D. = 3.1, $P < .005$) and remained significantly decreased for the following sessions (all P's $< .001$).

The decline of vividness, distress and nowness is shown in Fig. 2. Only patients who still reported to have intrusive memories were included in this analysis, i.e.,
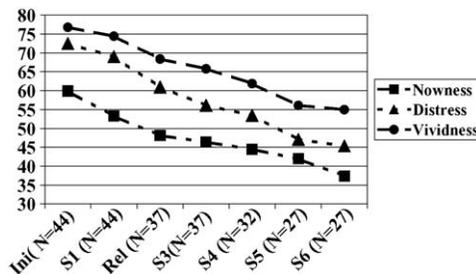

Fig. 2. Vividness, distress and perceived nowness of the patients' main intrusive memory (for patients who still report intrusive memories at each time point).

37 by session 2, 32 by session 4 and 27 by session 5. Even though they still reported to have intrusive memories, the vividness, distress and nowness gradually declined over the course of treatment.

3.3. Prediction of outcome

Table 1 shows the correlations between the predictor variables before treatment and the patients' response to reliving in terms of residual gain scores for intrusion frequency. Low initial PTSD symptom severity, low nowness of the intrusive memory, low negative interpretations of PTSD symptoms and low anger were predictive of greater decreases in intrusion frequency.

4. Discussion

4.1. Change of intrusive memories with reliving

In accordance with the previous reports by Foa et al. (2002) and Hackmann et al. (2004), the present study found that imaginal reliving of traumatic events did not lead to increases in the frequency of intrusive memories or the distress associated with them. The pattern of change seemed gradual rather than abrupt for the majority of patients. Vividness, distress and nowness of intrusions also decreased gradually. These results show that even for those patients who still reported intrusions, intrusions became less problematic as treatment progressed.

4.2. Predictors of change of intrusive memories

One of the most consistent predictors of treatment outcome reported in the literature, initial PTSD symptom severity (Blanchard et al., 2003; Van Minnen et al., 2002), was significantly related to the degree of change in intrusive memories with reliving in the context of cognitive therapy. In accordance with Van Minnen et al. (2002), we did not find any association between response to imaginal reliving and initial anxiety, depression, dissociation and self-blame.

The association between depression and treatment outcome reported by Blanchard et al. (2003) and Taylor et al. (2001) was not replicated in the present study. A possible reason for this discrepancy is that the present analysis focused on changes in intrusive memories, rather than the change in the whole range of PTSD symptoms included in the previous studies, and depression may be more predictive of symptoms other than intrusions.

One may have expected people high in dissociation to benefit less from reliving as dissociation has been shown to predict chronic PTSD (Ehlers et al., 1998; Halligan et al., 2003; Murray et al., 2002) and poor treatment outcome (Taylor et al., 2001). It is possible that other aspects of dissociation such as peritraumatic dissociation (Ozer, Best, Lipsey, & Weiss, 2003) or dissociation during reliving

(Holmes et al., 2005) would have been more predictive. On the other hand, the effects of dissociation may have been reduced as the treatment protocol took dissociative tendencies into account when conducting the reliving (e.g., by keeping eyes open and using grounding objects to stay aware of current reality when doing the reliving).

In line with previous findings of Foa et al. (1995) and Taylor et al. (2001), but contrary to the findings of Van Minnen et al. (2002), patients who reported high anger about the traumatic event responded less well to reliving than those with less anger. This suggests that additional treatment strategies may be indicated for this patient group.

In terms of characteristics of intrusive memories, the feeling that the sensations experienced in the intrusive memory were happening in the present rather than being something from the past ("nowness," lack of time perspective) predicted a poorer response to imaginal reliving. This pattern of findings parallels those of the naturalistic follow-up study of assault survivors by Michael et al. (in press) who found that this characteristic of intrusive memories predicted persistence of PTSD. Ehlers et al. (2004) and Ehlers and Clark (2000) have highlighted the disjointedness of trauma memories and their poor incorporation with other autobiographical memories as core features of PTSD. The sense of "here and now" that accompanies intrusive memories is seen as an indicator of this poor incorporation.

Negative interpretation of PTSD symptoms was associated with a smaller reduction in intrusion frequency. Patients who think that their reactions since the traumatic event mean that they are going crazy or that they will fall apart if they start thinking about the event may be more reluctant to engage in reliving, and thus show a poorer response.

4.3. Limitations of the study

The study had several limitations. Although the study population was larger than the previous study of Hackmann et al. (2004), the sample size was still modest, which might have hampered the identification of other possible predictive factors. Patients included in the study were a subgroup of participants of two different trials of cognitive therapy for PTSD who had completed their treatment at the time the data were entered. As the studies were restricted to patients who had experienced discrete traumatic events in adulthood, the findings may not generalize to all trauma survivors with PTSD.

Imaginal reliving in the present study was used in the context of cognitive therapy for PTSD. Cognitive therapy relies less than exposure treatments on the repeated administration of imaginal reliving and more on cognitive interventions to change meanings and update the trauma memory. Thus, the predictors studied in this paper may reflect response to other treatment techniques besides reliving. However, some of the predictors have also been shown to predict response to exposure treatments in other studies, and thus appear to apply more generally.

4.4. Implications for further research

The present study is one of the first that explored the course of intrusive memories after imaginal reliving and examine possible predictive factors of the response to reliving, and remains preliminary. More research is needed to examine the phenomenology and possible neural correlates of intrusive memories in PTSD, both before and after treatment. Moreover, intrusive memories in PTSD (i.e., intrusive *reexperiencing* of what happened at the time) do not represent the only form of intrusions. Further research is also needed to study changes in intrusive thoughts *about* the trauma such as *evaluative thoughts* (Reynolds & Brewin, 1998, 1999), and *rumination* (Mayou, Bryant, & Ehlers, 2001).

Acknowledgments

References

Beck, A. T., & Steer, R. A. (1993). *Beck Anxiety Inventory: Manual*. San Antonia: The Psychological Corporation.

Beck, A. T., Ward, D. H., Mendelsohn, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry, 4*, 561–571.

Blanchard, E. B., Hickling, E. J., Malta, L. S., Jaccard, J., Devineni, T., Veazey, C. H., et al. (2003). Prediction of response to psychological treatment among motor vehicle accident survivors with PTSD. *Behavior Therapy, 34*, 351–363.

Brewin, C. R., Dalgleish, T., & Joseph, S. (1996). A dual representation theory of posttraumatic stress disorder. *Psychological Review, 103*, 670–686.

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy, 38*, 319–345.

Ehlers, A., Clark, D. M., Hackmann, A., McManus, F., & Fennell, M. (in press). Cognitive therapy for PTSD: Development and evaluation. *Behaviour Research and Therapy*.

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

Ehlers, A., Hackmann, A., & Michael, T. (2004). Intrusive reexperiencing in posttraumatic stress disorder: Phenomenology, theory, and therapy. *Memory, 12*, 403–415.

Ehlers, A., Mayou, R. A., & Bryant, B. (1998). Psychological predictors of chronic posttraumatic stress disorder after motor vehicle accidents. *Journal of Abnormal Psychology, 107*, 508–519.

First, B. M., Spitzer, R. L., Gibbon, M., & Williams, J. B. (1995). *User's guide for the structured clinical interview for DSM-IV Axis I disorders: SCID-I clinical version*. Washington, DC: American Psychiatric Press.

Foa, E. B., Cashman, L., Jaycox, L. H., & Perry, K. (1997). The validation of a self-report measure of PTSD: The PTSD Diagnostic Scale (PDS). *Psychological Assessment, 9*, 445–451.

Foa, E. B., Dancu, C. V., Hembree, E. A., Jaycox, L. H., Meadows, E. A., & Street, G. P. (1999a). A comparison of exposure therapy, stress inoculation training, and their combination for reducing post-traumatic stress disorder in female assault victims. *Journal of Consulting and Clinical Psychology, 67*, 194–200.

Foa, E. B., Ehlers, A., Clark, D. M., Tolin, E. F., & Orsillo, S. F. (1999b). The Posttraumatic Cognitions Inventory (PTCI): Development and validation. *Psychological Assessment, 11*, 303–314.

Foa, E. B., Riggs, D. S., Massie, E. D., & Yarczower, M. (1995). The impact of fear activation and anger on the efficacy of exposure treatment for posttraumatic stress disorder. *Behavior Therapy, 26*, 487–499.

Foa, E. B., & Rothbaum, B. O. (1998). *Treating the trauma of rape. Cognitive-behavior therapy for PTSD*. New York: Guilford.

Foa, E. B., Zoellner, L. A., Feeny, N. C., Hembree, E. A., & Alvarez-Conrad, J. (2002). Does imaginal exposure exacerbate PTSD symptoms? *Journal of Consulting and Clinical Psychology, 70*, 1002–1028.

Hackmann, A., Ehlers, A., Speckens, A., & Clark, D. M. (2004). Characteristics and content of intrusive memories in PTSD and their changes with treatment. *Journal of Traumatic Stress, 17*, 211–240.

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 and Clinical Psychology, 71*, 419–431.

Holmes, E. A., Brown, R. J., Mansell, W., Fearon, R. P., Hunter, E. C. M., Frasquilho, F., et al. (2005). Are there two qualitatively distinct forms of dissociation? A review and some clinical implications. *Clinical Psychology Review, 25*, 1–23.

Keane, T. M., & Kaloupek, D. G. (1982). Imaginal flooding in the treatment of post-traumatic stress disorder. *Journal of Consulting and Clinical Psychology, 50*, 138–140.

Marks, I., Lovell, K., Noshirvani, H., Livanou, M., & Trasher, S. (1998). Treatment of post-traumatic stress disorder by exposure and/or cognitive restructuring. A controlled study. *Archives of General Psychiatry, 55*, 317–325.

Mayou, R. A., Bryant, B., & Ehlers, A. (2001). Predictors of psychiatric morbidity 1 year after motor vehicle accidents. *American Journal of Psychiatry, 158*, 1231–1238.

Michael, T., Ehlers, A., Halligan, S., & Clark, D. M. (in press). Unwanted memories of assault: What intrusion characteristics are associated with PTSD? *Behaviour Research and Therapy*.

Mintz, J., Luborsky, L., & Christoph, P. (1979). Measuring the outcomes of psychotherapy: Findings from the Penn Psychotherapy Project. *Journal of Consulting and Clinical Psychology, 47*, 319–334.

Murray, J., Ehlers, A., & Mayou, R. A. (2002). Dissociation and posttraumatic stress disorder: Two prospective studies of motor vehicle accident survivors. *British Journal of Psychiatry, 180*, 363–368.

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

Reynolds, M., & Brewin, C. R. (1998). Intrusive cognitions, coping strategies and emotional responses in depression, post-traumatic stress disorder and a non-clinical population. *Behaviour Research and Therapy, 36*, 135–147.

Reynolds, M., & Brewin, C. R. (1999). Intrusive memories in depression and posttraumatic stress disorder. *Behaviour Research and Therapy, 37*, 201–215.

Tarrier, N., Pilgrim, H., Sommerfield, C., Faragher, B., Reynolds, M., Graham, E., et al. (1999). A randomized trial of cognitive therapy and imaginal exposure in the treatment of chronic post-traumatic stress disorder. *Journal of Consulting and Clinical Psychology, 67*, 13–18.

Tarrier, N., Sommerfield, C., Pilgrim, H., & Faragher, B. (2000). Factors associated with outcome of cognitive-behavioral treatment of chronic post-traumatic stress disorder. *Behaviour Research and Therapy, 38*, 191–202.

Taylor, S., Fedoroff, I. C., Koch, W. J., Thordarson, D. S., Fecteau, G., & Nicki, R. M. (2001). Posttraumatic stress disorder arising after road traffic collisions: Patterns of response to cognitive-behavior therapy. *Journal of Consulting and Clinical Psychology, 69*, 541–551.

van der Kolk, B. A., & Fisler, R. (1995). Dissociation and the fragmentary nature of traumatic memories: Overview and exploratory study. *Journal of Traumatic Stress, 8*, 505–525.

Van Minnen, A., Arntz, A., & Keijsers, G. P. J. (2002). Prolonged exposure in patients with chronic PTSD. Predictors of treatment outcome and dropout. *Behaviour Research and Therapy, 40*, 439–457.

Williams, R. H., Zimmerman, D. W., Rich, J. M., & Steed, J. M. (1984). Empirical estimates of the validity of four measures of change. *Perceptual and Motor Skills, 58*, 891–896.