

Brief report

A qualitative investigation of the organization of traumatic memories

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Objective. Previous research has indicated that cohesive organization of traumatic memories may be necessary for the processing and resolution of post-trauma symptoms. The present study aimed to evaluate the qualitative features of memory organization, dissociation and perception of threat in traumatic memories recalled by individuals with and without acute stress disorder (ASD).

Design. Survivors of motor vehicle accidents (MVA) with either ASD or no ASD participated in a study on traumatic memories within 12 twelve days of the MVA.

Method. Participants' audiotaped recollections of their memories of the MVA were coded in terms of disorganized structure, dissociative content and perception of threat.

Result. The recollections of ASD participants were characterized by disorganization and dissociation more than those of non-ASD participants.

Conclusion. The current findings suggest that disorganized memory structure may be one process that impedes access to, and modification of, trauma-related cognitive schema.

Acute stress disorder (ASD) is an acute form of post-traumatic stress disorder (PTSD) that occurs within 2 days and 4 weeks of a traumatic experience (American Psychiatric Association, 1994). In contrast to PTSD, a diagnosis of ASD requires that the individual experience at least three dissociative symptoms during or following the trauma. The emphasis on dissociation in the diagnostic criteria for ASD reflects its theoretical underpinnings. Specifically, it is argued that acute dissociation will be associated with ASD and PTSD because it precludes the integration and resolution of the trauma (Koopman, Classen, Cardena & Spiegel, 1995). Despite the considerable attention given to theoretical perspectives of acute dissociation, there has been relatively little experimental study of the role of

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dissociation in ASD. There is preliminary evidence that acute dissociative symptoms predict PTSD (Harvey & Bryant, 1998). Furthermore, it has been proposed that dissociative symptoms are indicative of a problem with the 'organisation or structure of mental contents' (Spiegel, 1996, p. 583). In one paradigm developed to investigate this prediction experimentally, detailed recollections of the trauma were recorded before and after exposure-based treatment for PTSD (Foa, Molnar & Cashman, 1995). An increase in the occurrence of organized thoughts and a decrease in fragmentation was associated with a reduction in PTSD symptoms. These results suggest that the cohesive organization of traumatic memories may be associated with resolution of post-trauma symptoms (Foa *et al.*, 1995). The present study aimed to extend previous work by evaluating the qualitative features of memory organization, dissociation and perception of threat in traumatic memories recalled by individuals with and without ASD.

Method

Participants

Fourteen ASD participants (ten female, four male) of mean age 35.93 years ($SD = 13.43$) and 15 non-ASD participants (five female, ten male) of mean age 33.53 years ($SD = 15.79$) were included in the study. Participants were successive volunteer inpatients who were admitted to a major trauma hospital after a motor vehicle accident (MVA). Presence of ASD was assessed using the Acute Stress Disorder Interview (ASDI; Bryant, Harvey, Dang & Sackville, 1998). This structured clinical interview is based on DSM-IV criteria, contains 19 dichotomously scored items that relate to ASD symptoms, and provides a total score of ASD severity (ASS; range 1–19). The ASDI possesses sound test–retest reliability ($r = .95$), sensitivity (92%) and specificity (93%). The mean trauma-assessment interval ranged from 2 to 12 days. The two groups did not differ in terms of age, trauma-assessment interval, or length of hospitalization.

Procedure

Following administration of the ASDI, the experimenter gave the following instructions (based on those used by Foa *et al.*, 1995): 'In a moment I will ask you to tell me all about your accident, how you felt, what you saw, everything. In other words, I am going to ask you to relive the trauma. I am going to ask you to recall your memory of the accident as vividly as possible. I would like you to describe the accident in the present tense, as if it were happening now, right here. I would like you to close your eyes and tell me what happened during the accident in as much detail as you remember. This includes details about the surroundings, your activities, how you felt and what your thoughts were during the accident.' Unlike the method used by Foa *et al.* (1995), no probing or time limit was imposed to permit access to as many traumatic memories as possible.

Data coding and analysis

The narratives were audiotaped and subsequently transcribed verbatim. The beginning of a narrative was defined as the first expression of danger and the end was defined as an expression that indicated that threat had terminated (Foa *et al.*, 1995). The narratives were divided into utterance units which were defined as a clause containing only one thought, action or idea. These were coded using the Non-numerical Unstructured Data Indexing Searching and Theorizing System (NUD.IST; Qualitative Solutions and Research, 1994; Richards & Richards, 1994). NUD.IST is a flexible computer package for the analysis of qualitative data.

The coding scheme is summarized in Table 1. Disorganization included disjointedness and confusion within the narrative or repetition of an utterance within close proximity. Following Foa *et al.* (1995), proximity was defined as five lines in either direction. Examples of disorganization included: 'I asked

the doctor knows a few things we got everything came back to me', 'I think I sat there for five minutes wondering what I should do', and 'finally the ambulance arrived finally the ambulance arrived': Dissociation included descriptions of numbing, detachment, reduced awareness, derealization, depersonalization, amnesia, and time distortion. Examples of dissociation included: 'I can't even recall the questions the policeman asked me', 'I seem to climb out of myself', and 'I am walking around and I don't feel any injuries at all'. Threat included descriptions of harm or impending harm. Examples of threat included; 'I can feel something really badly wrong at the base of my head', 'at that moment I knew it was serious' and 'I knew it was too late to do anything I knew I was going to hit him'.

Table 1. Summary of coding scheme

Narrative construct	Operationalized definition
Disorganization	Evidence of: (a) disjointedness; (b) confusion; (c) repetition of an utterance
Dissociation	Evidence of: (a) numbing; (b) detachment; (c) reduced awareness; (d) derealization; (e) depersonalization; (f) amnesia; (g) time distortion
Threat	Evidence of: (a) harm; (b) impending harm

Both raters had completed formal training courses in the use of NUD.IST. The first rater was blind to group status; this data served as the basis for analysis. A second rater coded the narratives of six ASD and six non-ASD participants; there was 79% inter-rater agreement. The mean kappa coefficient of reliability for the disorganization, dissociation and threat narrative constructs respectively were 0.82, 0.74, and 0.81. NUD.IST was employed to search for the data for frequency of each narrative construct under investigation. The total number of utterances in which each narrative construct was identified was summed and transferred to a statistical analysis package.

Results

The mean word count for the ASD group was 1362.25 (SD = 1504.51) and for the non-ASD group was 504.53 (SD = 393.28). The difference between groups in length of narrative was significant, $t(27) = 2.13$, $p < .05$. To control for group differences in narrative length all analyses were calculated based on the scores expressed as a percentage of the length of the narrative.

The ASD group was higher than the non-ASD group on the frequency of disorganization (ASD $M = 20.32\%$; non-ASD $M = 8.89\%$), dissociation (ASD $M = 6.85\%$; non-ASD $M = 0.67\%$) and threat (ASD $M = 4.34\%$; non-ASD $M = 3.60\%$). Analysis of variance (ANOVA) was conducted for each narrative construct to determine group differences. The Diagnosis main effect was significant, $F(3,25) = 4.67$, $p < .01$. The univariate test was significant for disorganization, $F(1,27) = 6.21$, $p < .05$, and dissociation, $F(1,27) = 13.58$, $p < .01$. In order to determine whether the observed group differences were owing to differences in ASD status rather than to number of males and females in each group, sex was entered as a covariate. The Diagnosis main effect remained significant, $F(3,24) = 3.39$, $p < .05$. In terms of the univariate tests, dissociation remained significant, $F(1,26) = 10.16$, $p < .01$, and disorganization was marginally significant, $F(1,26) = 3.85$, $p = .06$.

To explore relationships between the narrative constructs, ASD severity, and diagnostic criteria for Cluster A (fear/helplessness), B (dissociation), C (re-experiencing), D (avoidance), and E (anxiety) of the DSM-IV criteria for ASD, correlation coefficients were calculated (see Table 2). Significant positive correlations

were observed between ASD severity and the narrative constructs disorganization and dissociation. In addition, Cluster B (dissociation) and disorganization and dissociation were positively correlated. Meeting criteria for Cluster C (re-experiencing) and the narrative construct dissociation was positively correlated as was Cluster D (avoidance) and the narrative constructs disorganization and dissociation.

Table 2. Correlations between narrative constructs, ASD severity and ASD symptom clusters

	ASD Severity	A Stressor	B Dissociation	C Re-experiencing	D Avoidance	E Arousal
Disorganization	0.42**	− 0.01	0.38**	0.31	0.42**	0.16
Dissociation	0.52**	0.13	0.42**	0.41*	0.38*	− 0.20
Threat	0.05	− 0.15	0.29	− 0.05	0.01	− 0.05

* $p < .05$. ** $p < .01$.

Note. ASD diagnostic clusters coded 0 = did not meet criteria, 1 = met criteria.

Narrative constructs based on scores expressed as a percentage of narrative length.

Discussion

Disorganization within the narrative was observed more in ASD than non-ASD participants. Fragmented memories may impair an individual’s ability to coherently organize and retrieve their trauma memories. This interpretation is consistent with findings that impaired retrieval of trauma memories in the acute post-trauma phase is predictive of PTSD (Harvey, Bryant & Dang, 1998). It is also consistent with earlier qualitative findings that the degree of disorganization in trauma memories decreased following treatment (Foa *et al.*, 1995). Furthermore, the significant associations between disorganized structure, ASD severity, and meeting criteria for the dissociative symptom cluster of ASD accords with the proposition that poorly organized memories are involved in the acute trauma response as well as post-traumatic dissociative processes.

The recollections of the trauma provided by ASD participants included more descriptions of dissociation than did those of non-ASD participants, even after controlling for group differences in sex of the participant. Interestingly, the use of dissociative mechanisms by the ASD group to reduce awareness of the trauma did not reduce the length of description. It is possible that the longer descriptions given by ASD participants reflects the greater activation of traumatic memories in working memory (Foa & Hearst-Ikeda, 1996). Alternatively, the more expansive reports given may be evidence of overgenerality noted by previous researchers to function as a mechanism to control affect (Williams, 1996). The significant correlations between the narrative constructs dissociation and disorganization and meeting criteria for avoidance (Cluster D), along with the correlation between dissociation and meeting criteria for re-experiencing (Cluster C), accords with the possibility that dissociation and disorganization can be conceptualized as forms of avoidance that may be used

by trauma survivors to cut from and manage traumatic memories (Foa & Hearst-Ikeda, 1996).

It is acknowledged that the conclusions from this study cannot be generalized to other trauma populations, and that the potential influence of the uneven representation of males and females in the diagnostic groups need to be recognized. Nonetheless, recent information-processing theories of trauma response have suggested that impaired ability to access memories may interfere with modification of trauma-related cognitive schema (Foa & Hearst-Ikeda, 1996). The current findings suggest that disorganized memory structure may be one process that impedes modification of traumatic memories.

Acknowledgements

This research was supported by the National Health and Medical Research Council.

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Received 7 December 1998; revised version received 6 May 1999