PERGAMON

Behaviour Research and Therapy 40 (2002) 995–1002

BEHAVIOUR RESEARCH AND THERAPY

www.elsevier.com/locate/brat

The nature of intrusive memories after trauma: the warning signal hypothesis

Anke Ehlers [a,*], Ann Hackmann [b], Regina Steil [b], Sue Clohessy [b], Kerstin Wenninger [b], Heike Winter [b]

[a] *Department of Psychology, Institute of Psychiatry, King's College London, De Crespigny Park, London SE5 8AF, UK*

[b] *Department of Psychiatry, Oxford University, Oxford, UK*

Accepted 11 July 2001

Abstract

Individuals who had experienced a range of different traumas were asked to describe the quality and content of their intrusive memories. Visual intrusions were the most common, and thoughts were uncommon. Intrusion quality varied little with type of trauma. Intrusive memories commonly consisted of stimuli that were present immediately before the traumatic event happened or shortly before the moments that had the largest emotional impact (i.e., when the meaning of the event became more traumatic). It is suggested that intrusive memories are about stimuli that through temporal association with the trauma acquired the status of warning signals, i.e., stimuli that if encountered again would indicate impending danger. This explains why intrusive memories are accompanied by a sense of serious current threat. The warning signal hypothesis may be useful in guiding therapists in identifying the moments with the largest emotional impact that will need reprocessing in treatment, and in educating patients about the nature of reexperiencing symptoms.

Although intrusive memories are a core symptom of posttraumatic stress disorder (PTSD), relatively little is known about their nature and content (for reviews, see Reynolds & Brewin 1998, 1999). Preliminary research suggested that intrusive memories mainly consist of sensory fragments of the traumatic experience (Ehlers & Steil, 1995; Mellman & Davis, 1985; Van der Kolk & Fisler, 1995). It remains as yet unclear *which* of the sensory impressions from a trauma will be reexperienced. One hypothesis is that the most traumatic aspects of the event should be remembered best, e.g., somatosensory sensations when assaulted. In line with this hypothesis,

* Corresponding author. Tel.: +44-20-7848-5032; fax: +44-20-7848-0591.
E-mail address: a.ehlers@iop.kcl.ac.uk (A. Ehlers).

0005-7967/02/$ - see front matter
PII: S0005-7967(01)00077-8

laboratory studies on memory for upsetting events have demonstrated that central cues are usually well remembered, whereas memory for peripheral details is poor (Christianson, 1992a). A possible mechanism for this effect is a narrowing of attention in traumatic situations (Christianson, 1992b). Similarly, Foa and Riggs (1993) suggested that high anxiety and arousal may lead rape victims to focus their attention on central aspects such as the assailant's knife and may make it impossible for them to fully process the situation, leading to fragmented memories.

To test the hypothesis that intrusive trauma memories represent the most traumatic aspects of the ordeal, we asked individuals who had experienced a range of traumas to describe the quality of their intrusive memories. If intrusive memories are a representative fragment of the traumatic experience, one would expect the quality of the intrusion to vary with the nature of the trauma. For example, one may expect that people who witness traumatic events as part of their profession (e.g., ambulance service staff) will reexperience relatively few somatosensory sensations and mainly visual, acoustic or olfactory sensations representing their traumatic impressions during the exposure to the traumatic scene. In contrast, one would expect people who experienced physical or sexual assault to have a high proportion of somatosensory intrusions. The results are described in Part 1 of this paper.

To further our understanding of the content of intrusive memories, we interviewed patients with PTSD who had experienced a range of different traumas to describe the content of their intrusive memories. The results are described in Part 2.

1. Part 1

1.1. Method

1.1.1. Participants

1.1.1.1. Childhood sexual abuse study Thirty-five female survivors of childhood sexual abuse were recruited from a study of Wenninger and Ehlers (1998). Mean age was 36 years (SD=8.7). Eighty-six percent met DSM-IIIR symptom criteria for PTSD, as determined by the Posttraumatic Stress Symptom Scale (PSS-SR; Foa, Riggs, Dancu, & Rothbaum, 1993).

1.1.1.2. Ambulance service staff study Fifty-six paramedics and technicians from the Oxfordshire Ambulance NHS Trust (77% men) were recruited from a study of Clohessy and Ehlers (1999). Mean age was 35 years (SD=8.7). Twenty-one percent met DSM-IIIR symptom criteria for PTSD, as determined by the PSS-SR.

1.1.1.3. Road traffic accident study 1 Sixty-four survivors of road traffic accidents (36% men) were recruited from a study of Winter (1996). Mean age was 43 years (SD=12.4). Sixty-four percent met DSM-IIIR symptom criteria for PTSD, as determined by the PSS-SR.

1.1.1.4. Road traffic accident study 2 One-hundred and fifty survivors of road traffic accidents (41% men) were recruited from a study of Steil and Ehlers (2000). Mean age was 43 years