

Preliminary version of: van der Steen, M., Brinkman, W.-P., Vermetten, E., and Neerincx, M. (2010). Multi-modal memory restructuring for patients suffering from combat-related PTSD: a pilot study (extended abstract), *Journal of Cybertherapy & Rehabilitation*, vol. 3, no. 2, pp. 122-123.

Multi-Modal Memory Restructuring for Patients Suffering from Combat-Related PTSD: a Pilot Study

Matthew van den Steen^a, Willem-Paul Brinkman^a,
Eric Vermetten^{b,c} and Mark Neerincx^{a,d}

^a*Delft University of Technology, The Netherlands*

^b*Military Mental Health Research Center, Central Military Hospital, Utrecht, The Netherlands*

^c*Rudolf Magnus Institute of Neuroscience, University Medical Center, Utrecht, The Netherlands*

^d*TNO, Soesterberg, The Netherlands*

Abstract. The paper discusses the design and evaluation of a multimedia software application which can be used in the treatment of combat-related Post-Traumatic Stress Disorder. The application allows patients and therapist to visualize the patient's past experience using maps, personal photos, stories and self created 3D virtual worlds. The tool aims to allow patients to restructure and relearn about their past experience involving the problematic stressors.

Keywords. PTSD, trauma-focused psychotherapy, memory, multimedia

Introduction

Combat-related Post-Traumatic Stress Disorder (PTSD) is one of the health problems soldiers may face upon their return from deployment. As an increasing number of soldiers return from war situations such as Iraq and Afghanistan, the demand for PTSD treatment is also likely to increase. Supporting the treatment with computer assisted technology is not new; recently Virtual Reality Exposure Therapy (VRET) has been extended to the treatment of PTSD. VRET focuses on exposure with pre-defined scenarios. Instead of using prolonged exposure therapy, this paper explores the possibility of using computer assisted technology to support trauma-focused psychotherapy, to be used both in a group therapy setting as well as a single patient-therapist setting. The here proposed Multi-Modal Memory Restructuring (MMMR) system aims at giving the patient more flexibility to restructure and narrative about their deployment and to manage various deployment related memory elements themselves with the purpose to facilitate time sequencing of memory content, as well as adding narrative elements to visual content such as pictures.

MMMR system

Traditional treatment of veterans with deployment related PTSD is set within a group context as soldiers are often familiar to operate in a group. In these sessions, patients talk about their experiences, in an exposure based format, facilitated by the drawing of maps and other visual aids. Usually a flap-over as well as maps and photographs are

Preliminary version of: van der Steen, M., Brinkman, W.-P., Vermetten, E., and Neerincx, M. (2010). Multi-modal memory restructuring for patients suffering from combat-related PTSD: a pilot study (extended abstract), *Journal of Cybertherapy & Rehabilitation*, vol. 3, no. 2, pp. 122-123.

used to facilitate memory content. Often memory is compromised and due to memory distortions or amnesia for details these elements can be quite helpful. The MMR methodology takes this a few steps further. The MMR focus does not lay on direct exposure, but on the way patients facilitate and manage their memory to restructure and relearn about their past experience involving the problematic stressors. Patients are invited along a set timeline to sequentially add media and self-created virtual 3D worlds, patients are able to express and rethink about their experiences during their time of deployment. The MMR system provides contextual information in various modalities to these experiences. It is designed to run on a laptop with a projector displaying the computer screen on the wall for the group members to see. This in itself creates a safe zone, in which direct eye contact among members can be legitimately avoided; some patients do not like to be stared at during their exposure, and others do not want to look at someone in a potentially distressing state. Additionally, a camera is attached to the laptop allowing snapshots from photos or objects patients brought with them. The system support consists of several elements. (1) Information of patient is created, as a digital space or folder. (2) The session starts with a projection of a timeline set on the present day. From here the patient can move to a specific day of their deployment. To emphasize that this event has taken place in the past, the years and days from the present day to the selected day are counted back while showing photos of historical events of that time period. (3) Once the patient arrives at the specific day, they are asked to organize the event of that day by using their own photographic material, videos, or music, and by annotating this material using satellite based geographical maps. In addition, the patient can also use an easy-to-use 3D editor to recreate a specific scene. Using these facilities the patient can restructure the events and place them, together with narrative elements, on a chronological timeline. (4) This can be worked through, commented on back and forth. (5) The session ends again by visually moving back from the event in the past to the present day. A psycho-educational element of the system is also to display the past and coming treatment sessions on the timeline.

Design and Evaluation

The design of the system followed a situated cognitive engineering approach. This started with establishing an inventory of envisioned technology, relevant human factors, and operational (therapeutic) demands. This was done in close cooperation with a military psychiatrist experienced in treating PTSD patients. With this information scenarios and claims were specified, which resulted in three short films focusing on (1) personalization of the system (timeline, own text annotations, and 3D virtual world), (2) the use of the 3D editor (pausing and resuming editing work, and interaction with the therapist and other group members), and (3) the return to a previous session (amending and extending previous work). These films were used in a review with eight therapists. At the start of the in-depth interviews, the films were shown to the therapist, followed by an assessment of the underlying claims on the usability and support of the therapeutic process. Overall, therapists were very interested. A prototype was therefore implemented and used in a usability evaluation with 18 participants, and in a small case study with a single patient. Initial results suggest that the system can facilitate people in sharing and reappraising past experiences and in managing various autobiographic memory elements.