All-or-nothing thinking: The processing of emotional expressions in traumatized post-deployment soldiers

Claudia Gebhardt [a],[*], Christina Alliger-Horn [b], Kristin Mitte [c], Heide Glaesmer [a]

[a] Department of Medical Psychology and Medical Sociology, University Medical Center Leipzig, Germany
[b] German Armed Forces Center of Military Mental Health, Berlin, Germany
[c] University of Applied Sciences Jena, Germany

ABSTRACT

The exposure to trauma is a dramatic life event with complex consequences among those like changes in information processing. Dysfunctional cognitions like a negative interpretation of information are a risk factor for the development of trauma-related disorders. The aim of the present study was to test whether post-deployment soldiers with trauma differ in their interpretation of emotional expressions from member of a control group. Interpretation of emotional expressions was assessed in a sample of 106 males (n = 53 soldiers, n = 53 controls) with the Similarity Rating Task (simtask) and analyzed with a multidimensional scaling (MDS) approach. The findings suggest that individuals with war-related trauma tend to show a negative interpretation bias. Furthermore, traumatized individuals did not discriminate between different intensities of emotional expressions the way controls did. The findings are discussed in terms of the role of dysfunctional cognitions in the development and treatment of mental disorders.

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1. Introduction

Soldiers returning from war are at increased risk of developing mental disorders (Wittchen et al., 2013). During deployment they are frequently confronted with life-threatening events such as combat, attack, assault, injury, and death. Post-deployment soldiers are therefore especially prone to developing trauma-related disorders like posttraumatic stress disorder (PTSD), anxiety disorders (i.e. panic disorder), adjustment disorder, and depression or substance use disorder (Sareen et al., 2007; Seal, Bertenthal, Miner, Sen, & Marmar, 2007, Wittchen et al., 2013). A shared feature of these disorders is the way in which dysfunctional cognitions contribute to the development and maintenance of the disorder (e.g. Foa & Kozak, 1986; for review see Creamer, 1995 or Elwood, Hahn, Olatunji & Williams, 2007). Foa and Kozak (1986), for instance, have suggested that exposure to traumatic events results in the formation of a fear network. As such, trauma-survivors adopt negative cognitions about the world or the self that are in contrast to pre-existing functional schemata about their life. Daily interactions, in which individuals are not re-traumatized, should disconfirm these negative cognitions. Avoidance of thoughts or activities that are related to the trauma is problematic. This avoidance hinders individuals in modifying their dysfunctional cognitive strategies.

Cognitive theories of mental disorders, particularly emotional disorders like anxiety or depression, suggest that processes like biased attention, biased interpretation, and biased memories for disorder-congruent stimuli can act as key mechanisms for the onset and maintenance of the disorder (Beck, Emery, & Greenberg, 1985; Mogg & Bradley, 1998; Williams, Watts, MacLeod, & Mathews, 1997; Williams, Watts, MacLeod, & Mathews, 1988). Mathews and MacLeod (1994) suggested that biased interpretation in particular is common to most, if not all, emotional disorders. As such, the assumption is that traumatized individuals tend to interpret ambiguous situations in a negative rather than a neutral or positive way. As mentioned above, post-deployment soldiers are not a homogenous group in terms of their trauma-related disorder. Nevertheless, they share a background of war-traumata and are thus prone to interpreting trauma-related stimuli as a potential threat. Focusing on negative or trauma-related information further promotes feelings of distress and reinforces a perspective that the world is a dangerous place, thus further confirming and maintaining negative schemata.

There are many studies confirming attentional bias in traumatized individuals (for review see Buckley, Blanchard, & Neill, 2000). Findings show that facilitated attention towards trauma-related stimuli corresponds to symptoms of hypervigilance in

* Corresponding author at: Department of Medical Psychology and Medical Sociolog, University Medical Center Leipzig, Philipp-Rosenthal-Straße 55, 04103 Leipzig, Germany.
E-mail address: c.gebhardt@medizin.uni-leipzig.de (C. Gebhardt).

individuals with posttraumatic stress disorder (PTSD). By contrast, little is known about interpretation bias in traumatized individuals (for review see Constans, 2005). The processes of interpretation bias and attentional bias function in similar ways. Both describe an overly negative interpretation of ambiguous information due, at least in part, to disordered individuals paying disproportional attention to negative or threatening alternatives when attempting to solve an ambiguous situation. White, Suway, Pine, Bar-Haim, and Fox (2011) have suggested that both types of bias are therefore strongly related. Previous studies examining interpretation bias have used lexical stimuli and focused mostly on individuals suffering from PTSD (e.g. Kimble et al., 2002; for review see Constans, 2005). Kimble et al. (2002) found that veteran PTSD patients interpret the meanings of sentences in a more military way, a reaction also seen to be characteristic of those with attention bias. Elwood et al. (2007) presented a series of short positive, neutral, and threatening filmstrips of social situations with ambiguous endings to victims and non-victims of interpersonal trauma. The evidence of this study suggests that trauma-victims interpret threatening situations as being more predictable and dangerous than non-victims. As such, they overestimate the actual likelihood of a threatening social situation ending in the negative way they expect.

While previous research focusing on lexical stimuli of emotional expressions has led to important insights into interpretation bias, to date, far too little investigation of this phenomenon has been done using visual stimuli. The use of visual versus lexical stimuli has a lot of advantages. Interpersonal threats are typically identified visually. Angry faces, for instance, represent a biologically salient threatening cue. Emotional images have also been shown to influence information processing more than emotional words do (Beall & Herbert, 2008). Furthermore, emotional expressions have a high ecological validity because emotional affect interpretation in social interactions is indispensible for evaluating different situations and understanding others' feelings or intentions (Ekman, 2003). Another advantage is their versatility. They vary in intensity in a natural way. Hence, emotional expressions can vary from neutral (0% intensity) to full-blown emotional expression (100% intensity). The latter are prototypical emotional expressions and are characterized by a lower degree of ambiguity. In contrast, expressions with only low to moderate intensity are characterized by strong ambiguity. Those stimuli should provoke more biased interpretations than stimuli with a lower degree of ambiguity (Mogg & Bradley, 1998).

The way individuals tend to resolve ambiguity is determined by their mental representations. Everyone has his or her own mental representations of threatening or non-threatening stimuli such as a very angry or a very happy person. This mental representation determines how we interpret the valence and intensity of emotional expressions. The Similarity Rating Task (simtask) is a paradigm for assessing individuals' mental representations of stimuli. The simtask has been applied to many research areas including: studies of face perception (Papesh & Goldinger, 2010), studies on affective experiences (Kring et al., 2003), and studies on cognitive information processing in eating disorders (Treat et al., 2002). Similarity ratings are an indirect way to assess the interpretation of stimuli and to help visualize the mental representation of them. The task is independent of reaction times and supports the use of picture stimuli. Viken et al. (2002) reported satisfactory psychometric properties like a retest reliability of 0.79 with a retest interval of 1 week. When doing the simtask, participants are confronted with pairs of pictures and asked to decide how similar the pictures of each pair are. The similarity ratings can be transferred to distances in a geometric space (cf. Borg & Groenen 2005). The geometric space is characterized by at least one dimension, the amount of dimensions is not determined (like it is in factor analysis). Stimuli that are closer together (e.g. two angry individuals) are more similar than

stimuli that are farther apart (e.g. an angry and a happy individual). Picture characteristics like the valence and the intensity of the expression should therefore determine the location of the stimulus in the depicted perceptual space.

In the present study, the task is designed to reveal whether or not traumatic events impact a person's mental representation of affect, and how individuals interpret emotional expressions. To do so, we compared war-traumatized soldiers and healthy controls in terms of location of emotional expressions on the affect dimension. On the basis of the above-mentioned theories and findings, we expected soldiers to show more negative interpretations of threatening stimuli with high ambiguity (mildly threatening emotional expressions) compared to controls. In other words, we thought soldiers would differentiate less between mild and serious threats than people in the control group would. We did not expect differences between soldiers and controls in the interpretation of positive stimuli with low (full-blown happy expressions) and mild to strong ambiguity (mild happy expressions), or threatening stimuli with low ambiguity (full-blown anger expressions).

This study aims to extend previous research in two ways. First, we investigated individuals who experienced war-related traumata. As such, the sample includes both PTSD patients and patients with other trauma-related mental disorders such as adjustment disorder, depression, or panic disorder. Second, we assessed interpretation bias by using pictures of emotional expressions and the implementation of similarity ratings, a new approach in this area of research.

2. Material and methods

2.1. Sample

A sample of 106 males aged 20–55 years ($M = 33.66$, $SD = 9.36$) was recruited. Half of the men ($n = 53$) were inpatients at the German Armed Forces Center of Military Mental Health. All of these patients received cognitive behavior therapy in the hospital. On average, they were 35.4 years old ($SD = 8.6$; range 24–55). Patients were diagnosed using Structured Clinical Interviews for DSM-IV Axis I and II Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1996; SCID-II; First, Gibbon, Spitzer, Williams, & Benjamin, 1997) during an initial diagnostic procedure. The interviews were conducted by a clinical psychologist. All patients fulfilled the DSM-IV trauma criteria A1 and A2 suggesting that they had been exposed to traumatic events whereby they had experienced death, injury, or threat to their physical integrity accompanied by intense feelings of fear, helplessness, or horror. They had also received trauma-related treatment diagnoses on Axis-I such as: posttraumatic stress disorder (63%), adjustment disorder (16%), depression (14%), or other anxiety disorders (7%). Thirty participants also had a secondary diagnosis on Axis-II like obsessive-compulsive or avoidant personality disorder.

The other half of the sample ($n = 53$) consisted of healthy males aged between 20 and 55 years old ($M = 32.0$, $SD = 9.8$). They were university students or employees who participated voluntarily. They stated that they not suffer from a mental disorder at the time of their participation. Additionally, we screened the control group for anxiety with the Tayler Manifest Anxiety Scale (MAS; Lück & Timaeus, 1969) to exclude candidates with clinically relevant symptoms of anxiety. Participants had to answer 23 items using a 7-point Likert Scale ranging from 1 (strongly disagree) to 7 (strongly agree). We only included participants with anxiety scores below 4.5. The mean anxiety score in the control group was 2.68 (SD = 0.62, range 1.48–4.22) suggesting overall low to normal anxiety scores. The clinical and the control group did not differ with respect to age, $t(104) = 1.891$, $p = 0.061$.