



## Social cognition disorders in military police officers affected by posttraumatic stress disorder after the attack of An-Nasiriyah in Iraq 2006

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### ABSTRACT

Emotional numbness in individuals affected by posttraumatic stress disorder (PTSD) may be a result of the depletion of emotional capacities. The ability to process emotions in a social context is a part of social cognition, which is still an under-explored topic in PTSD. The present study investigated deficits in social cognition, such as emotion recognition and theory of mind, and their relationship to emotional numbing in 35 military police officers who were in Iraq in April 2006 during a terrorist attack in An-Nasiriyah. Our results indicated that individuals suffering from PTSD showed deficits in social cognition when compared with healthy subjects. These disorders seemed to involve emotional numbing rather than clinical symptoms such as anxiety and depression. Future research directions are suggested to improve the measurement of emotional functioning in PTSD.

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### 1. Introduction

Posttraumatic stress disorder (PTSD) is a complex syndrome that includes such symptoms as anxiety, hyperarousal and dissociative disturbances. In particular, individuals with PTSD experience feelings of detachment from others, lack of interest in once pleasurable activities, and restricted ranges of emotion, a class of problems referred to as “emotional numbing” (American Psychiatric Association, 2000).

Emotional numbing is one of the central symptoms in PTSD (Horowitz, 1986), and it plays an integral role not only in the development and maintenance of posttraumatic symptomatology (Harvey et al., 1998), but also in the disability of emotional regulation (Lanius et al., 2010; Nietlisbach et al., 2010). Recent studies have revealed a close relationship between this emotional-affective paralysis and the reduction of social and occupational functioning (Riggs et al., 1998; Riggs et al., 2003; Cook et al., 2004). Experimental studies have confirmed not only a reduced pain sensitivity in patients with PTSD (Kraus et al., 2009), but also positive experiences associated with emotional numbing in subjects affected by this disturbance (Kashdan et al., 2007). Previous empirical research has demonstrated relationships among trauma exposure, PTSD, and emotion (Amdur et al., 2000) in a variety of traumatized samples (Badura, 2003).

Emotional processing ability is one of the most studied features in the context of psychiatric disorders (Amdur et al., 2000), as part of a more complex cognitive system defined as social cognition (Adolphs et al., 2001). There is a rich literature on social cognition that mainly

focuses on schizophrenia and autism disorders (Roncone et al., 2002; Brüne, 2003; Mazza et al., 2003; Abdi and Sharma, 2004; Brüne, 2005a,b; Achim et al., 2011). Specifically, the concept of social cognition refers to a relatively large number of psychological constructs that range from complex concepts, such as theory of mind (ToM), to more elementary concepts, such as emotion perception (EP), processing of social cues or social perception (SP), and empathic ability (Brunet-Gouet and Decety, 2006). In particular, ToM is a mental mechanism that allows people to understand and interpret both their own and other people's mental states, and hence ToM makes it possible to predict and explain behavior (Frith, 1979; Frith and Corcoran, 1996; Baron-Cohen et al., 2000). Empathic ability is another construct that entails both affective (sharing an emotional experience) and cognitive components (understanding the feelings of others) (Decety and Jackson, 2004). This is a research area that requires further investigation because of the lack of significant findings about the hypothesized relationship between emotional disorders, symptoms such as anxiety and depression, and ToM (Frewen et al., 2008). Nietlisbach et al. (2010) found in trauma survivors with PTSD a lower empathic resonance, thus showing that traumatic experiences alter the basic empathy processes and the ability to share affective, emotional, or cognitive states. However, in PTSD research, social cognition and its components remain an underexplored field. The examination of social cognition is of interest in PTSD research because deficits in this function may explain the symptoms of emotional numbing and also the neuro-functional changes highlighted by neuroimaging studies, such as heightened activation in brain areas involved in emotional processing.

Recent studies that investigated subjects who survived earthquakes in China detected functional and structural alterations in

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frontal-limbic structures (Sharot et al., 2007; Lui et al., 2009) showing, in particular, heightened activation in the amygdala and the insula, together with reduced activation in the prefrontal cortex. These studies suggest that close personal experience may be critical in engaging the neural mechanisms that underlie the emotional modulation of memory, which is not supported by the controlling frontal system, and thus in producing the vivid recollections known as “flash bulb memory” (Sharot et al., 2007; Lui et al., 2009). Neuroimaging and neuropsychological studies suggest that emotional processing and, more generally, social cognition involve brain systems including the amygdala, the temporo-parietal junction, the orbital frontal cortex and, in particular, the medial frontal lobes (Frith and Frith, 2003). A recent review (Olsson and Ochsner, 2007) has shown that social cognition and emotion engage overlapping regions of the brain, thus disclosing the close functional relationship between social cognition and emotional regulation. In particular, the role of social cognition in emotional processing has been explained in terms of three related, but distinct, dimensions of functional-anatomic organization including subcortical and cortical regions (Olsson and Ochsner, 2007).

The purpose of the current study was to examine the relationship between deficits in social cognition and PTSD symptoms, mainly focusing on emotional numbing in people suffering from PTSD. On the basis of neuroimaging evidence, it is possible to hypothesize in individuals with PTSD some deficits in social cognition that may explain their difficulties in social interaction. The first goal of this research was to investigate the presence of deficits in social cognition such as emotion recognition, ToM, and empathy in a group of military police officers who were in Iraq from 2003 to 2006 for the “Ancient Babylon” mission, and who were in Iraq during a major attack in April 2006. Our second goal was to examine the association between emotional numbing symptoms, clinical symptoms (e.g. anxiety and depression), and social cognition (Feeny et al., 2000), as well as to collect important information about the cognitive consequences of PTSD, to estimate its severity, to predict its prognosis, and to plan targeted interventions.

## 2. Methods

### 2.1. Participants

The study group comprised 35 military police officers who participated in the “Ancient Babylon” mission in Iraq, April 2006. All participants provided informed consent to participate in the study, which had previously been approved by the Ethics Committee of the Military Police Officers of Rome.

Participants completed the following two self-administered scales: (1) The Italian translation of the Mississippi Scale (MSS) (Keane et al., 1988) is an instrument of high reliability and validity in the assessment of the severity of PTSD symptoms. (2) The Davidson Trauma Scale (DTS-Italian version) (Davidson et al., 1997) was developed as a measure of the severity and frequency of those symptoms defined by DSM-IV (American Psychiatric Association, 2000) as characteristic of PTSD, and the scale is also useful to assess patients' response to treatment. The scale demonstrated good internal consistency.

Internal consistency, or the extent to which tests or procedures assess the same characteristic, skill or quality, was evaluated using Cronbach's alpha coefficient. Both test-retest reliability (the administration of the same test to the same sample on two different occasions) and convergent and discriminant validity were assessed using Pearson product-moment correlations.

Factorial validity was examined by using exploratory factor analyses. The DTS, which is well suited to assess symptom severity and treatment outcome, as well as to serve as a screening instrument for the diagnosis of PTSD, showed good reliability and validity.

After preliminary screening with the self-report measures, all participants were evaluated with the well-known Clinician Administered PTSD Scale-CAPS (Version DX) (Blake et al., 1995).

Participants were assigned to the PTSD group if they met PTSD current DSM-IV criteria, according to CAPS 1–2 scoring rules, which consider a symptom suitable if it was endorsed with at least occasional frequency and moderate intensity, and which assign a diagnosis only if a significant impairment was reported as well. Test-retest reliability ranged from 0.77 to 0.96 for each symptom cluster, and 0.98 for all 17 items. Internal consistency (Cronbach's alpha coefficient) for the severity scores (frequency + intensity) of each of three DSM-IV symptom clusters ranged from 0.85 to 0.87, while internal consistency for all 17 items was 0.94.

The sample was divided into the following two groups: 20 military police officers affected by PTSD who had experienced traumata in Iraq (PTSD Military Police group), and 15 unaffected individuals (NO-PTSD Military Police group) who were in Iraq during the mission but did not match full or partial DSM-IV criteria for PTSD. None of the participants in either group reported psychotic symptomatology.

Comorbid psychopathology was assessed with the Structured Clinical Interview for DSM-IV (SCID), axis 1. Participants were questioned about current and past symptomatology, and were given a diagnosis based on DSM-IV criteria. The SCID has been shown to be a reliable and valid instrument to diagnose both depression and anxiety (First et al., 1995).

We established the following exclusion criteria: history of head injury associated with a loss of consciousness lasting more than 15 min, overnight hospitalization, and current use of psychotropic medication.

A second comparison group comprised 15 military police officers, who were education-, age- and sex-matched with our sample but who had never participated in military missions. Table 1 presents the demographic and baseline clinical characteristics of the three groups.

### 2.2. Clinical measures

#### 2.2.1. Davidson Trauma Scale (DTS)

This DTS closely reflects DSM-IV PTSD symptoms (Davidson et al., 1997) and has specifically been designed to evaluate them in subjects with a history of one or more severe traumatic events. The main purposes of the DTS are not only to measure the frequency and the severity of symptoms, taking into account the week that precedes the evaluation, but also to assess the response to treatment.

The DTS consists of 17 items, each corresponding to one of the 17 DSM-IV PTSD symptoms, that can be divided as follows: items 1–5, criterion B (intrusive type of experience); items 6–12, criterion C (avoidance and numbing); and items 13–17, criterion D (hyperarousal). Each item is scored from 0 to 4 both for frequency and severity of symptoms.

The total score can vary, therefore, from 0 to 68 for both the frequency and the severity of the disorder and overall from 0 to 136. The scale is accompanied by a score sheet that allows the clinician to evaluate separately the different subtotals. Internal consistency (Cronbach's alpha coefficient) for the 17 frequency and severity items was 0.99; alpha coefficients were 0.97 for the 17 frequency items alone and 0.98 for the severity items alone, respectively. The test-retest reliability coefficient was 0.86 ( $p < 0.001$ ).

#### 2.2.2. Mississippi Scale (MSS)

The MSS was created by Keane and collaborators (Keane et al., 1988) and by the group in the Posttraumatic Stress Disorder Center, Veterans Administration Medical Center, in Boston. The scale (self-report format) is aimed at assessing the symptoms associated with PTSD, and is composed of 35 items divided into the following four categories (the first three of them closely correlated with the DSM IV-R for PTSD diagnostic criteria): repetition of the experience and avoidance of the situation – 11 items; post-ing and attenuation of general responsiveness – 11 items; manifestations of hypervigilance and lack of control – 8 items; and artifact – 5 items. Analysis of the MSS focuses on the present period; therefore, it is suitable for repeated administration over time, and is very useful to evaluate the outcome of treatment.

The scale was developed to assess the symptoms of subjects who had experienced a severe trauma and were suffering from PTSD, but it is not indicated for diagnosis. The items are rated on a 5-point scale, where scores have different meanings depending on the contents of the item (e.g.: 1 = not at all true and 5 = very true; 1 = never true and 5 = always true, 1 = never and 5 = very often, 1 = highly improbable and 5 = extremely likely). Ten items (2, 6, 11, 17, 19, 22, 24, 27, 30 and 34) are expressed in a positive way (e.g.: “I am able to be emotionally close to others”); the individual scores have to be reversed before making the sum to obtain the total score, which can vary

**Table 1**  
Between-group differences for demographic, clinical and social cognition measures.

Criterion	PTSD (n = 20)	No PTSD (n = 15)	No mission (n = 15)
Age, years	41.13 (4.81)	36.83 (6.44)	41.93 (4.92)
Educ.	15.32 (2.31)	11.6 (2.11)	14.5 (1.25)
Number of day of mission	118	120	
DTS total score	127.65 (49.67)	2.33 (2.55)	5.8 (13.37)**
DTS re-experiencing	37.60 (19.45)	1.67 (1.87)	2.27 (2.81)**
DTS avoidance and numbing	54.55 (26.95)	0.13 (0.51)	1.20 (4.12)**
DTS hyperarousal	37.60 (8.9)	0.53 (1.35)	2.33 (6.96)**
Mississippi scale	51.90 (8.44)	5.47 (2.61)	4.7 (0.04)**
ToM advanced	8.20 (3.60)	9.80 (3.23)	9.5 (3.13)
Emotion recognition	32.40 (6.92)	44.2 (5.42)	44.07 (5.54)**
Eyes Task	17.20 (4.41)	26.9 (2.82)	26.3 (4.01)**
Empathy Quotients	32.70 (14.05)	50.8 (8.36)	48.67 (8.57)**

\*\*  $p < 0.01$ .

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