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Research Paper

Attentional bias in post-traumatic stress symptoms or anxiety

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ABSTRACT

Many studies provided the existence of attentional bias in individuals with post-traumatic stress-symptom (PTSS) or students with anxiety. However, results remain unclear concerning the type of alteration (vigilance or disengagement) and specificity of attentional bias (for negative information or trauma-related information). To address these issues, 131 students completed a visual search task with a lexical decision component and clinical scales (for PTSS and anxiety). Attentional bias (vigilance and disengagement) and word valences (neutral words, negative words and trauma-related words) were controlled. Three groups were distinguished: no symptom, PTSS and anxious groups. No symptom group was characterized by facilitation in the attentional treatment for negative information. PTSS group presented a disengagement bias for negative and trauma-related information. When anxiety symptoms were associated with PTSS, in this group, it led to difficulties in vigilance. The anxious group showed difficulties only for negative words in vigilance. These data suggest that sub-clinical PTSS and anxiety symptoms altered differently information processing. These findings highlight the need for research on trauma populations and anxiety, and to pursue studies on comorbidity in PTSS.

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1. Introduction

Information processing may be altered by two types of difficulties: vigilance or disengagement biases (Koster, Crombez, Verschuere, Van Damme, & Wiersema, 2006). The vigilance bias is an increasing of the sensitization to threat within their environment. During experiments, participants processed negative information faster than neutral information (Koster, Crombez, Verschuere, & De Houwer, 2004). This bias can be considered as an “automatic” bias because it takes place in a pre-attentional stage and is activated automatically (Mogg & Bradley, 1998). Disengagement bias has been illustrated in recent studies as another type of attentional bias. Individuals may be slower to respond to negative stimuli (Mogg, Holmes, Garner, & Bradley, 2008). This attentional bias may reflect a difficulty to disengage attention allocated to negative stimuli. Together, these findings suggest modulation of attentional bias by anxious disorders. Among these disorders, post-traumatic stress symptoms (PTSS) and anxious symptoms are the most frequent (Lépine et al., 2005). Moreover, according to Eysenck's theory, anxiety symptoms lead to hypervigilance toward threat-related information, which allows for better detection of

threatening stimuli (Eysenck, Derakshan, Santos, & Calvo, 2007). Nevertheless, several authors have postulated that in addition to hypervigilance, anxiety disorders are characterized by strategic alterations (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & Van Ijzendoorn, 2007). According to these authors, following the enhanced detection of threat, anxious individuals establish avoidance strategies toward such information (Bar-Haim et al., 2007). This hypervigilance may be due to a state of intense apprehension in the absence of an immediate threat (Bar-Haim et al., 2007).

According to the DSM, PTSS corresponds to the three principal symptoms of post-traumatic stress disorder (intrusive memories, avoidance, and hyperarousal, American Psychology Association, 2000) but under the clinical critical threshold (North & Oliver, 2012). Attentional bias has been observed in individuals with PTSS (Bardeen & Orcutt, 2011; Pineles, Shipherd, Mostoufi, Abramovitz, & Yovel, 2009; Pineles, Shipherd, Welch, & Yovel, 2007; Vrana, Roodman, & Beckham, 1995). Results showed altered attentional processing for negative words, revealing a disengagement bias for PTSS participants. This alteration may be generalized to all negative stimuli, like stimuli related to threat, fear or anger (Bardeen & Orcutt, 2011). However, studies using negative information and trauma-related information have revealed disengagement bias only for trauma-related information (Pineles

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et al., 2007, 2009; Vrana et al., 1995). Indeed, all these authors reported that response times specifically increased for trauma-related information. For Cassiday, McNally and Zeitlin (1992), this bias may reflect that cognitive representations in relation to this traumatic event are partially activated in memory. Recently, a disengagement bias has been suggested as predicting PTSS development or PTSS severity (Aupperle, Melrose, Stein, & Paulus, 2011). However, attentional impairment for neutral stimuli had been found in PTSS individuals (Leskin & White, 2007; Twamley et al., 2009), with increasing mistakes and higher response times. Conversely, some studies did not find difference between PTSS and control individuals (Bryant & Harvey, 1997; Twamley, Hami, & Stein, 2004). Facing these inconsistent data, Fleurkens, Rinck and van Minnen (2011) suggested that the level of symptoms severity may act as a moderator of attentional impairments. They found that moderate symptoms had an attentional bias to threat-related stimuli, while high-level symptoms had an attentional bias for all kinds of negative stimuli.

Anxiety is defined as a subjective feeling of threat, associated with appropriate physiological and behavioral modifications. From a cognitive point of view, anxiety is defined as the tendency to perceive threatening and ambiguous stimuli as more dangerous than do non-anxious individuals and to develop inappropriate attentional and interpretative behaviors (Bardel & Colombel, 2009). The feeling of threat is non-specific and non-oriented, which induces apprehension, indecision, and arousal related to the potential occurrence of future threat (Sylvers, Lilienfeld, & LaPrairie, 2011). Anxious individuals have a hyperactive scheme of danger, which is characterized by a tendency to retrieve mainly negative or unpleasant rather than positive or neutral information during memory tasks involving conscious recollection (Mogg & Bradley, 1998). They perceive and process negative information more rapidly and tend to interpret ambiguous stimuli and situations in a threatening fashion (White, Suway, Pine, Bar-Haim, & Fox, 2011). In addition to these explicit memory and interpretive biases, studies have also revealed attentional bias (Watts & Weems, 2006).

Generally, attentional difficulties in sub-clinical individuals were associated to threat-related information (Egloff & Hock, 2001; Eldar, Yankelevitch, Lamy, & Bar-Haim, 2010; Mogg, Bradley, de Bono, & Painter, 1997). On the other hand, the nature of the attentional bias is not clear. Some studies found a vigilance bias, with an enhancement of response times for threat-related stimuli for sub-clinical anxiety (Bardel & Colombel, 2009; Keogh & French, 1999; MacLeod, Mathews, & Tata, 1986; Mogg & Bradley, 1998; White et al., 2011). Conversely, others authors postulated that anxious individuals were characterized by disengagement difficulties for this kind of information (Bar-Haim, Lamy, & Glickman, 2005; Fox, Russo, & Dutton, 2002; Koster et al., 2004; Puliafico & Kendall, 2006; Saleminck, Van den Hout, & Kindt, 2007).

Based on these different studies, it appears that attentional bias has been explored with different paradigms in sub-clinical PTSS or anxious individuals. Results on attentional impairments are heterogeneous and the specificity of these two types of symptoms is debated. The present study sought to determine specific attentional bias for PTSS and anxious students. Alterations during information processing in participants with and without sub-clinical symptoms were explored. Hypothesis for this study were declined according to three groups, who should show specific attentional bias. No symptom group should obtain a better performance for negative stimuli as compared to neutral information in the two attentional conditions (vigilance and disengagement; Carretié, Mercado, Tapia, & Hinojosa, 2001; Mogg & Bradley, 1998). The PTSS group should be characterized by a disengagement bias to trauma-related stimuli as compared to neutral information (Pineles et al., 2007, 2009; Vrana et al., 1995). The anxious group should exhibit a vigilance bias to negative

information relative to neutral stimuli (Bardel & Colombel, 2009; Keogh & French, 1999; White et al., 2011).

2. Method

2.1. Participants

One hundred and thirty-one students of University Côte d'Azur from Nice (UCA, France) participate in psychological study, without references about PTSD or PTSS. They were recruited by volunteering with tracts distribution, notice board or presentation during classes (according to university regulations). They were screened for PTSS and anxious symptoms based on the scores they obtained to the French PTSD scale (Post-Traumatic Stress Disorder Diagnosis Scale – PDS; Foa, Cashman, Jaycox, & Perry, 1997; French version: Silva, Marchand, & Desjardins, 2008) and the French State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983; French version: Schweitzer & Paulhan, 1990). Inclusion criteria are to have more than 18 years old and to be French-speakers.

2.2. Material

Four types of stimuli were used in a French version of the Visual Search Task (VST) with a lexical decision component. Four types of words were used: neutral words, general threat-related words, trauma-related words (road accident, physical assault, or hostage taking), and non-words (e.g. frash). Words were chosen in the French traumatic database (unpublished results). Non-words were given by the Lexique Database (New, Ferrand, Pallier, & Brysbaert, 2006), according to French linguistic rules, after entering selective words and different criteria as the number of letters or the level of frequency. Non-words and words were matched in length (number of letters) and frequency, allowing us to create pairs of word/word, non-word/word, or non-word/non-word.

The PDS is a widely used measure of PTSD symptoms with 19 items. The PDS consists of the collection of traumatic event information and a 19-item self-report scale with items for each PTSD symptom, according to the DSM-IV-TR (APA, 2000). Participants indicated whether they had experienced traumatic events, and those with exposure to such events were asked to complete the entire questionnaire. Participants rated the degree to which they were bothered by each symptom over the past month on a four-point scale ranging from 0 ("Not at all") to 3 ("Extremely"). Possible scores range from 0 to 51, critical threshold is 10 (Shepherd & Wild, 2014).

The State Trait Anxiety Inventory (STAI) consists of 40 short sentences: 20 assessing the participant's current state (STAI-A; e.g., "I feel afraid") and 20 assessing the participant's usual state (STAI-B; e.g., "I am happy"). These questions are rated on a four-point scale ranging from 1 ("seldom/never") to 4 ("very often/always"). Possible scores, for this clinical scale range from 20 to 80, critical threshold is 36 (Koster et al., 2004).

2.3. Apparatus

Stimuli for the VST were presented on a 19" monitor (800 × 600, 60 Hz) using Superlab software (Version 2; Cedrus Research, 1999) with a Dell XPS T500 computer. Response latencies (ms) and accuracy were automatically recorded by the Superlab Software.

2.4. Procedure

In the first time, when participants came, the study was presented and explained, with standard procedure for inclusions. In the second time, participants were individually tested in a

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