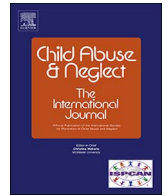




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Abnormal emotional processing in maltreated children diagnosed of Complex Posttraumatic Stress Disorder



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ABSTRACT

Maltreated children usually show a specific pattern of emotional and behavioral symptoms that exceed those relating to posttraumatic stress disorder (PTSD). These symptoms have been defined as Complex PTSD (CPTSD). The underlying attentional mechanisms of abnormal emotional processing and their relation to the clinical presentation of CPTSD are not well understood. A visual dot-probe paradigm involving pre-attentive (i.e., 500 ms) and attentive (i.e., 1500 ms) presentation rates of neutral versus emotional (i.e., angry, happy or sad) facial expressions was applied. Twenty-one maltreated CPTSD children were compared with twenty-six controls. The results are as follows: an attention bias away from threatening faces and an attentional bias towards sad faces were observed in maltreated CPTSD children during pre-attentive and attentive processing. Whereas the attentional bias away from angry faces was associated with social problems, the attentional bias towards sad faces was associated with depressive and withdrawn symptoms. Therefore, CPTSD children develop maladaptive negative cognitive styles, which may underlie not only social problems (by a cognitive avoidance of threatening stimuli) but also depressive symptoms (by a cognitive approach to sad stimuli). Attention processing abnormalities should be considered as therapeutic targets for new treatment approaches in this population.

1. Introduction

Children exposed to repeated, prolonged, or multiple ways of interpersonal trauma, often occurring under circumstances in which escape is not possible, commonly develop more complex and serious symptoms that exceed normal Posttraumatic Stress Disorder (PTSD) (Cloitre et al., 2012). Indeed, the eleventh version of the *International Classification of Diseases* (ICD-11) has proposed that Complex PTSD (CPTSD) captures the severe psychological damage that occurs in children who experience chronic interpersonal trauma. Thus, the ICD-11 has described PTSD and CPTSD as trauma-related disorders. Nevertheless, relevant differential features should be considered between both mental health diseases. First, whereas PTSD has been related to single-incident stressors, CPTSD has been associated with sustained exposure to repeat or multiple types of trauma. Second, while PTSD comprises re-experiencing the traumatic event, avoidance of traumatic reminders, and hypervigilance, CPTSD includes the PTSD symptoms in addition to the

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presence of symptoms on the three self-organization domains (i.e., emotional dysregulation, negative self-concept, and interpersonal disturbances) (Maercker et al., 2013). Recent research suggests that these self-organization disturbances can be explained by the differential impact of trauma on children and adults (Pynoos et al., 2009) rather than by trauma frequency (i.e., single or sustained). Noteworthy, childhood is a period in which individuals are still biologically, psychologically, and socially immature (Van der Kolk, 2003). Thus, this brain immaturity may explain why maltreated children are more sensitive to stressful and detrimental occurrences than adults. This in turn increases their vulnerability to an impaired identity configuration, negative cognitive styles (i.e., altered attributions about themselves and others), and emotional dysregulation (Cloitre et al., 2009). Unlike PTSD, CPTSD has been associated with long-term psychosocial and functional impairment, which might be partially explained by these self-organization disturbances (D'Andrea, Ford, Stolbach, Spinazzola, & Van der Kolk, 2012).

Among the self-organization disturbances of CPTSD, emotional dysregulation has been proposed as an underlying mechanism of negative self-concept and interpersonal disturbances (Gilbert et al., 2009; Scott, Smith, & Ellis, 2010; Widom, DuMont, & Czaja, 2007). At the theoretical level, information processing models (e.g., Beck, 1976) suggest that the manner in which information is attended to, interpreted, and remembered is congruent with mood (i.e., individuals with a low mood have a preference for negative information). Thus, emotional dysregulation conducts biases in emotional information processing (Dalglish, Moradi, Taghavi, Neshat-Doost, & Yule, 2001), leading to a negative self-concept (see Infurna et al., 2016, for a meta-analysis) and interpersonal disturbances (Pollak, Vardi, Ptzer Bechner, & Curtin, 2005; Pollak, 2008; Shackman, Shackman, & Pollak, 2007). Although these cognitive biases are a significant factor in emotional vulnerability and elicit abnormal behavioral responses, how emotional dysregulation occurs in CPTSD is still under discussion (Cloitre, Gavert, Brewin, Bryant, & Maercker, 2013; Elkliit, Hyland, & Shevlin, 2014; Knefel & Lueger-Schuster, 2013). As such, the assessment of how emotionally relevant stimuli from the social context are attended to and processed, and their association with a specific pattern of clinical symptoms, may be essential to understanding emotional dysregulation in maltreated CPTSD children.

Over last decade, emotional information processing has been exhaustively investigated in relation to acute trauma and PTSD, which has been characterized by a bias toward threat-related stimuli (Dalglish et al., 2001; Elsesser, Sartory, & Tackenberg, 2005). Emotional processing in PTSD has been studied mainly through behavioral experimental paradigms. The dot-probe task has been considered an excellent behavioral technique for examining how emotional stimuli capture attention (García-Blanco, García-Blanco, Fernando, & Perea, 2016). During the dot-probe task, two cues of different valence (i.e., neutral versus emotional) are presented simultaneously. The presentation rate of cues determines whether the attentional processing is automatic or controlled (i.e., under or over 1 s, respectively) (Yiend, 2010). Thus, emotional cues can either be displayed by using a pre-attentive presentation rate, in which stimuli presented for shorter durations (i.e., 500 ms) are used to evaluate automatic and earlier stages of processing, or by using an attentive presentation rate, in which stimuli presented for extended durations (i.e., up to 1000 ms) are used to assess controlled and higher-order regulatory influences (Mc Crory et al., 2013). As soon as the stimuli disappear, a dot-probe (target) replaces one of the stimuli. This trial can be either an emotional trial (e.g., when the target replaces the emotional stimulus) or a neutral trial (e.g., when the target replaces the neutral stimulus). Participants are instructed to indicate the location at which the target has appeared. Faster responses in emotional trials indicate an attentional bias *toward* emotional stimuli, whereas faster responses in neutral trials indicate an attentional bias *away* from emotional stimuli.

Similar to PTSD, recent data suggests that early exposure to maltreatment is related to a bias to threat-related stimuli (Gibb, Schofield, & Coles, 2009; Pine et al., 2005). Nevertheless, the direction of this abnormal threat-related processing (i.e., avoidance versus approach) is not entirely consistent since it has provided contradictory evidence of the association between complex trauma exposure and threatening attention bias (Gibb et al., 2009; Pine et al., 2005). Two plausible hypotheses have been proposed for these discordant findings: i) the stage of the assessed attentional processing, which is determined by the presentation rate of the emotional cues (Yiend, 2010); ii) recent or distal trauma exposure, which is determined by whether the assessed individuals are children or adults with a history of complex trauma (Elsesser et al., 2005).

The first hypothesis proposes that the direction of this abnormal threat-related processing depends on the stimulus presentation rate (Yiend, 2010). For instance, whereas Gibb et al. (2009) found an attentional approach *toward* threatening faces at an attentive presentation rate, Pine et al. (2005) documented attention avoidance *away* from threatening faces at a pre-attentive presentation rate. Gibb et al. (2009) applied a dot-probe task to adults with a history of childhood abuse. Attentional biases to threatening, happy, and sad faces were assessed during an attentive (i.e., 1000 ms) presentation rate. The results showed attention bias *toward* threatening cues in adults who had suffered maltreatment relative to the control group. However, no significant group differences relative to sad or happy faces were obtained. In contrast, Pine et al. (2005) administered a dot-probe task to maltreated children, most of whom presented concomitant PTSD. Attentional biases to threatening and happy faces were assessed during a pre-attentive (i.e., 500 ms) presentation rate. Unlike the control group, maltreated children performed attention bias *away* from threatening faces. Moreover, those children who had been more intensely maltreated and met the PTSD criteria demonstrated a greater avoidance of threatening faces. No differences emerged in their attention responses to happy faces.

A second hypothesis suggests that the period of time since the traumatic event occurred could determine the direction of attentional bias. In other words, recent versus distal trauma might explain if threatening stimuli are avoided or attended to (Fani, Bradley-Davino, Ressler, & McClure-Tone, 2011). Gibb et al. (2009) assessed adults with a history of trauma, whereas Pine et al. (2005) assessed maltreated children at the moment of testing. To check this hypothesis, Elsesser et al. (2005) administered a dot-probe task to recent acute and single trauma survivors at short lapses since the trauma and at three months later. Attentional biases to trauma-related pictures were assessed during a pre-attentive (i.e., 500 ms) presentation rate. Trauma victims attended *away* from threat-related pictures shortly after the traumatic experience but *toward* threatening pictures three months after the trauma occurred.

Another important gap in studies concerning children exposed to complex trauma is that the attentional processes have been

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