



A longitudinal examination of the role of attentional control in the relationship between posttraumatic stress and threat-related attentional bias: An eye-tracking study



Joseph R. Bardeen ^{a,*}, Thomas A. Daniel ^b

^a Auburn University, United States

^b Westfield State University, United States

ARTICLE INFO

Article history:

Received 12 June 2017

Received in revised form

4 August 2017

Accepted 13 September 2017

Available online 18 September 2017

Keywords:

Eye tracking

Attentional bias

Attentional control

Inhibition

Longitudinal

Arousal

ABSTRACT

The purpose of the present study was to use eye-tracking technology to (a) show that attentional control can be used to reduce attentional bias to threat (ABT) among those with higher levels of posttraumatic stress (PTS) symptoms, (b) identify the specific attentional control (AC) processes (i.e., inhibition, shifting, working memory updating) that account for this effect, and (c) determine the short- (sympathetic nervous system reactivity) and long-term effects (PTS symptoms) of using attentional control in this manner. At Time 1 (T1), participants ($N = 116$ trauma exposed) completed self-report measures, an eye-tracking task assessing ABT, and behavioral measures assessing cognitive processes. A subsample ($n = 49$) completed an online follow-up assessment (T2). AC at T1 moderated the PTS-ABT relationship. Inhibitory ability appears to be driving this effect. Those with higher PTS symptoms and higher AC at T1, who spent less time attending to threat stimuli and had the lowest sympathetic response, had the highest levels of PTS symptoms at T2. Findings suggest that the habitual use of AC (especially inhibition) to shift attention from threat to neutral stimuli may alleviate distress in the short-term for those with higher PTS symptoms, but maintain, and perhaps exacerbate, PTS symptoms over longer periods.

© 2017 Elsevier Ltd. All rights reserved.

1. Introduction

Approximately 6.8% of the American population (Kessler, Chiu, Demler, & Walters, 2005), and 5–20% of returning military personnel (Ramchand et al., 2010) will develop posttraumatic stress (PTS) disorder (PTSD). PTSD is associated with severe dysfunction, high rates of co-occurring psychiatric disorders, and substantial societal, economic, and personal costs (Amaya-Jackson et al., 1999; Brady, Killeen, Brewerton, & Lucerini, 2000). Because of the severe human suffering and substantial economic burden associated with PTSD, researchers have expended considerable effort toward identifying risk and resilience factors for the development and maintenance of PTSD in hopes of ameliorating these negative outcomes.

A bias for attending to threat information (i.e., attentional bias to threat [ABT]) is one factor that has been implicated in the

maintenance and exacerbation of PTSD. An extensive body of research has examined ABT in PTSD from a bottom-up (i.e., more automatic, sensory-driven) perspective, while paying relatively little attention to the role of top-down (i.e., more controlled, effortful, and goal-directed) attentional processes in understanding the relation between PTS symptoms and ABT. Findings regarding the degree to which individuals with PTSD exhibit ABT have been mixed, with some suggesting that PTSD-related ABT is a robust phenomenon (e.g., Buckley, Galovski, Blanchard, & Hickling, 2003; Constans, 2005), and other work suggesting that effects used to support PTSD-related ABT are weak at best (e.g., Kimble, Frueh, & Marks, 2009). Mixed findings may be the result of failing to consider that differences in top-down attention may influence the nature and magnitude of the relation between ABT and PTS symptoms.

More specifically, both theory (e.g., goal driven/stimulus driven theory: Corbetta & Shulman, 2002; attentional control theory: Eysenck, Derakshan, Santos, & Calvo, 2007) and preliminary evidence suggest that attentional control (i.e., the effortful allocation of attention toward goal relevant behavior [top-down] in the face of conflicting prepotent attentional demands that draw on more

* Corresponding author. Department of Psychology, Auburn University, 226 Thach Hall, Auburn, AL 36849-5214, United States.

E-mail address: jbardeen@auburn.edu (J.R. Bardeen).

automatic [bottom-up], habitual, responses tendencies; Sarapas, Weinberg, Langenecker, & Shankman, 2017) may be used to modulate ABT (Bardeen & Orcutt, 2011; Bardeen, Tull, Daniel, Evenden, & Stevens, 2016). Bardeen and Read (2010) found that participants with higher (versus lower) attentional control exhibited quicker affective recovery after providing a first person account of their most traumatic event. Longitudinal findings have similarly suggested the distress-buffering effects of attentional control. In a longitudinal study by Bardeen, Fergus, and Orcutt (2015), attentional control assessed at baseline was inversely associated with PTS symptoms assessed 4–12 weeks later, but only among participants who experienced a potentially traumatic event between the time points. Together, these findings suggest attentional control as trauma-related self-regulatory mechanism.

In considering the distress-buffering effects of attentional control at a more proximal level (i.e., information processing), Bardeen and Orcutt (2011) had participants complete a modified dot-probe task to assess ABT and a battery of self-report measures. Among participants with relatively higher PTS symptoms, those with higher attentional control disengaged and shifted attention from threat to neutral stimuli, whereas those with lower attentional control maintained attention on threat stimuli. This moderation effect remained significant even after accounting for state levels of anxious arousal. Bardeen and Orcutt (2011) hypothesized that the use of attentional control to disengage and shift attention from threat stimuli among those with higher PTS symptoms may help to down-regulate sympathetic nervous system arousal and emotional distress in the short-term. They also suggested the possibility that this form of regulation would allow one to avoid the use of less adaptive strategies that are known to maintain and exacerbate PTS symptoms (e.g., physical escape) and increase treatment compliance and the likelihood of fear extinction.

Of note, some evidence suggests that the moderating effect of attentional control may apply broadly to the relations between threat related attentional bias and anxiety-related distress. Using a spatial cuing task, Derryberry and Reed (2002) found that individuals high in trait anxiety and high in AC showed significantly faster disengagement from threat cues in comparison to participants high in trait anxiety and low in AC. Studies in which modified dot-probe tasks were used have shown similar effects in relation to dispositional trait anxiety (Ho, Yueng, & Mak, 2017) and social anxiety (Taylor, Cross, & Amir, 2016).

However, one of the significant limitations in this line of research has been an overreliance on self-report to assess attentional control. Evidence suggests that attentional control processes can influence bottom-up reactivity as early as 100–150 ms (Bardeen & Orcutt, 2011; Peers & Lawrence, 2009). Thus, it may be particularly difficult to provide an accurate self-report on processes that occur so quickly. This hypothesis has been supported by recent preliminary research in which self-reported attentional control failed to correlate with behavioral measures of working memory and inhibitory ability (Quigley, Wright, Dobson, & Sears, *in press*). To address this limitation, as well as others (i.e., lack of a clinical sample, use of attentional bias scores that typically have poor reliability), Bardeen et al. (2016) used a behavioral measure of attentional control that assesses the use of the three top-down cognitive processes that are thought to make up the primary components of the construct (i.e., inhibitory ability, set shifting, and working memory updating; Eysenck et al., 2007; Miyake, Friedman, Emerson, Witzki, & Howerter, 2000). Bardeen et al. (2016) found that attentional control (measured via a behavioral task) moderated the association between PTSD status and ABT, such that among those with PTSD, those with relatively worse attentional control exhibited significantly greater ABT (assessed via trial-level bias scores; Naim et al., 2015; Zvielli, Bernstein, & Koster, 2015). This

effect remained significant even after accounting for variability on trials with only neutral content, thus ensuring that the observed effect was specific to the presence of threat stimuli and not merely a function of general variability in response times.

As described by Bardeen et al. (2016), individuals with PTSD and relatively worse attentional control appear to exhibit a pattern of monitoring that may allow for the constant updating of threat potential, thus resulting in greater attentional engagement with the threat stimulus over time. In contrast, those with PTSD and relatively better attentional control appear to exhibit a more consistent attentional pattern in the presence of threat stimuli. Although it is important to monitor the environment to accurately identify threat, difficulty disengaging from objectively safe stimuli (e.g., images on a computer monitor) may increase the likelihood of functional impairment and serve to maintain emotional distress. On the other hand, using attentional control to habitually disengage and shift attention from threat may also be seen as a maladaptive avoidance strategy that may maintain PTS symptoms over time. Longitudinal research, including the assessment of top-down attentional processes, will be important for understanding the complex nature of the PTS-ABT relationship.

In the few studies that have examined temporal relations between PTSD and ABT, findings have been mixed, with evidence in favor of both avoidance of threat (Beevers, Lee, Wells, Ellis, & Telch, 2011; Wald et al., 2013) and dysregulation both toward and away from threat (Schäfer et al., 2016) prospectively predicting higher PTS symptoms, as well as evidence that ABT may develop in response to a traumatic event, but pre-trauma ABT does not necessarily confer risk for post-trauma distress (Iacoviello et al., 2014). Equivocal findings may be the result of a number of methodological limitations, including the use of methods of assessing ABT that have poor reliability (Schmukle, 2005), the use of word stimuli which require greater semantic processing (Iacoviello et al., 2014; Wald et al., 2013), or the use of aggregate scores with stimulus presentations as long as 30,000 ms (Beevers et al., 2011). However, as has been described, discrepancies in the extant literature may be the result of failing to account for the impact of top-down attentional processes on the PTS-ABT relationship. As described by some (Cisler & Koster, 2010; Mogg & Bradley, 2016), failure to move beyond basic bottom-up examinations of ABT may lead to spurious conclusions regarding the nature of threat-related information processing and related maladaptive outcomes. Empirical research has failed to keep pace with recent dual-process models of ABT that assert that two systems (bottom-up and top-down) interact to differentially impact the expression of threat biases (Corbetta & Shulman, 2002; Eysenck et al., 2007). Thus, accounting for the interactive effect of bottom-up and top-down processes may greatly advance our understanding of the complex nature of attentional biases as they relate to PTSD, provide more accurate predictions of vulnerability for experiencing prolonged PTSD symptoms, and have important treatment implications.

1.1. Present study

As recommended (Bardeen, Daniel, Hinnant, & Orcutt, 2017; Wald et al., 2013), eye-tracking technology was used in the present study to provide a more precise, overt measure of attention allocation. This method is less vulnerable to alternate explanations than measures of covert attention that are susceptible to poor reliability (Schmukle, 2005). We first sought to replicate previous research by examining self-reported attentional control as a moderator of the relationship between PTS symptoms and ABT. We hypothesized that, among participants with higher PTS symptoms, those with higher (versus lower) attentional control would spend significantly more time attending to neutral stimuli than threat

Download English Version:

<https://daneshyari.com/en/article/5038112>

Download Persian Version:

<https://daneshyari.com/article/5038112>

[Daneshyari.com](https://daneshyari.com)