



Emotion dysregulation as a partial mediator between reinforcement sensitivity and posttraumatic stress symptoms

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ABSTRACT

The reinforcement sensitivity theory (RST) asserts that three brain subsystems (i.e., the Behavioral Approach System [BAS], the Behavioral Inhibition System [BIS], and the Fight–Flight–Freeze System [FFFS]) underlie individual variations seen in personality and psychopathology. Though revised by Gray and McNaughton (2000), many researchers continue to utilize the original, and now outdated, theory of reinforcement sensitivity. Additionally, while there is an abundance of research investigating the association between reinforcement sensitivity and psychopathology, the underlying mechanisms between these constructs remain largely unknown. Therefore, the aim of the current study was to test whether emotion dysregulation acted as a partial mediator between FFFS sensitivity and posttraumatic stress symptoms (PTSS) under the revised RST framework. Data was collected from 282 undergraduate students at a Midwestern university who experienced at least one potentially traumatic event. Bootstrapping was used to test the significance of the indirect effect (e.g., amount of mediation) of FFFS sensitivity on PTSS. The indirect effect was significant (2000 bootstrapped CI₉₅ = .11–.25), indicating that emotion dysregulation partially mediated the relationship between FFFS sensitivity and PTSS. More specifically, individuals with high FFFS sensitivity reported higher levels of emotion dysregulation, which in turn was associated with greater PTSS scores.

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1. Introduction

The reinforcement sensitivity theory (RST) of personality, as proposed by Gray (1982), draws from the notion that there are individual differences in reactions to punishing and rewarding stimuli. RST posits that three major brain subsystems (i.e., the Behavioral Approach System [BAS], Behavioral Inhibition System [BIS], and Fight–Flight–Freeze System [FFFS]) underlie individual variation in personality and psychopathology. Originally, the BAS was hypothesized to be activated in response to reward and negative reinforcement. Furthermore, the BIS was hypothesized to be sensitive to conditioned aversive stimuli. The BIS was not only related to anxiety, but also to extreme novelty, high intensity stimuli, and innate fear stimuli. Finally, the FFFS was originally known as the Fight–Flight System (FFS) and was hypothesized to be sensitive to unconditioned aversive stimuli. Gray and McNaughton made substantial revisions to RST in 2000, particularly to the BIS and the FFFS. The BIS is now conceptualized as a defensive approach system that is responsible for the emotion of anxiety, while the FFFS is a defensive avoidance system that is responsible for the

emotion of fear. However, researchers continue to combine the BIS and the FFFS to form BIS–FFFS sensitivity in current RST literature. Only recently have researchers begun to utilize the revised RST (e.g., Ivory & Kambouropoulos, 2012).

RST has been implicated in a number of psychological disorders, including anxiety disorders, depression, substance abuse disorders, and personality disorders (Bijttebier, Beck, Claes, & Vandereycken, 2009). Researchers are beginning to investigate relationships between reinforcement sensitivity and specific anxiety disorders; namely posttraumatic stress disorder (PTSD). The essential feature of PTSD is the development of characteristic symptoms following exposure to a traumatic stressor: persistent re-experiencing of the traumatic event, avoidance of stimuli associated with the trauma and numbing of general responsiveness, and increased arousal (American Psychiatric Association [DSM-IV-TR], 2000).

A major gap in the literature regarding RST and PTSD is that the mechanism through which reinforcement sensitivities lead to variations in PTSD symptomatology remains unclear (Bijttebier et al., 2009). One possible mechanism through which RST brain subsystems affect risk for PTSD expression is emotion dysregulation. Thus, the current study examined whether emotion dysregulation can help explain the relationship between reinforcement sensitivity and posttraumatic stress symptoms (PTSS). In addition, it is believed that these findings will add

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knowledge to the revised RST, as well as demonstrate the importance of RST to psychopathology.

1.1. The reinforcement sensitivity theory (RST)

As stated previously, RST was first postulated by Gray (1982) in order to explain variations in an individual's personality at the biological level. Currently, the BAS is conceptualized as the parallel system to the BIS, and associated personality characteristics include optimism, reward-orientation, and impulsiveness (Corr, 2008). The FFFS is responsible for mediating reactions to all aversive stimuli and mediates the “get me out of this place” emotion of fear, but not anxiety (Corr, 2008). Accordingly, the FFFS is associated with personality factors that are related to fear-proneness and avoidance. The BIS is now generally responsible for the resolution of goal-conflict (Gray & McNaughton, 2000). It mediates the “watch out for danger” emotion of anxiety, not fear. As such, the BIS maps on to disorders such as generalized anxiety disorder (GAD) and obsessive-compulsive disorder (OCD; Gray & McNaughton, 2000).

Recently, researchers have begun to recognize the need for new measurement tools that accurately reflect the revised RST (Corr, 2008). For example, Jackson (2009) attempted to operationalize the theoretical developments of RST into a set of personality scales that would effectively measure the revised RST (e.g., Jackson-5 scales of revised RST). He stated that the revised BIS must be reconceptualized in terms of anxiety (e.g., sensitivity to uncertainty and social-evaluative stimuli), instead of a mixture of anxiety and fear. The Jackson-5 scales are an important contribution to the RST literature because they (a) are the first scales that adequately reflect the changes in the revised RST and (b) de-emphasize the importance of the BIS by placing more emphasis on the FFFS with regard to specific behaviors (i.e., avoidance and delinquency) and psychopathologies.

1.2. Associations between RST and PTSS

Few research studies have examined the relationship between reinforcement sensitivity and PTSS. For example, Pickett, Bardeen, and Orcutt (2011) found a positive association between BIS sensitivity and PTSS while investigating whether experiential avoidance (e.g., attempting to suppress unwanted emotions, thoughts, and bodily sensations; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996) acted as a moderator between these two constructs. Overall, research has demonstrated strong empirical support for the relationship between BIS sensitivity and anxiety symptoms. In general, higher BIS sensitivity has been shown to be related to higher general anxiety symptoms (Campbell-Sills, Liverant, & Brown, 2004; Johnson, Turner, & Iwata, 2003).

1.3. Associations between RST and emotion dysregulation

Theory suggests that individual differences in reinforcement sensitivity may have implications for the development of emotion regulation (Depue & Iacono, 1989). In other words, whether an individual has high or low BIS, BAS, or FFFS sensitivity may affect the way that individual reacts to or regulates his/her emotions. For example, the emotional states of fear and anxiety may give rise to avoidance. This avoidance, in turn, underlies maladaptive responses to emotions (Tull, Gratz, Litzman, Kimbrel, & Lejuez, 2010). Tull and colleagues (2010) examined the associations between RST and emotion regulation difficulties as measured by the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). They found that BIS-FFFS sensitivity was positively associated with overall self-reported emotion regulation difficulties, along with BAS-Fun-Seeking. Although the study conducted

by Tull and colleagues (2010) played a crucial role in extending the literature on reinforcement sensitivity and emotion dysregulation, some limitations must be addressed. For example, the authors continued to use a well-established, but not consistent with revised RST, measurement scale (BIS/BAS Scales; Carver & White, 1994) to assess reinforcement sensitivity levels.

1.4. Associations between emotion dysregulation and PTSS

Emotion regulation is a central concept in one of the major conceptual theories of PTSD: Emotional Processing Theory (EPT; Foa & Kozak, 1986). EPT states that in PTSD, the fear (emotional) structure associated with the traumatic memory promotes avoidance of trauma-related thoughts, images, and situations. This avoidance of emotional stimuli related to the event prevents emotional processing, which is needed in order for recovery to take place. Therefore, the maladaptive use of emotional avoidance can lead to the development and maintenance of PTSD. Extant literature has also demonstrated that persons with PTSD show deficits in emotion regulation. For example, Tull, Barrett, McMillan, and Roemer (2007) investigated whether emotion dysregulation was associated with severity of PTSS in a group of trauma-exposed individuals. As they predicted, PTSS severity was positively associated with reports of multiple emotion regulation difficulties. Tull et al. (2007) also found that individuals exhibiting PTSS at a severity level consistent with a diagnosis of PTSD reported significantly higher levels of emotion dysregulation. In addition, Ehring and Quack (2010) investigated the role of trauma type and PTSD symptom severity on emotion regulation difficulties in a large sample of trauma survivors. These authors found significant correlations between all emotion regulation variables and PTSD symptom severity.

2. Overview and hypotheses

The current study investigated the relationships between reinforcement sensitivity (as it was revised by Gray and McNaughton (2000)), emotion dysregulation, and PTSS. It was hypothesized that there would be a positive association between FFFS sensitivity and PTSS, given that (a) new research has shown that the BIS has a reduced role in mediating responses to punishment compared to the FFFS (Jackson, 2009) and (b) Gray and McNaughton (2000) now conceptualize the BIS as a defensive approach system, while the FFFS is now a separate defensive avoidance system. It was also hypothesized that emotion dysregulation would be positively associated with PTSS. Although no research to date has investigated the relationship between the newly revised FFFS and emotion dysregulation, due to the nature of the FFFS (that it is a defensive avoidance system) and that avoidance of thoughts and feelings is consistent with emotion regulation difficulties, it was hypothesized that FFFS sensitivity would be positively associated with emotion dysregulation. Finally, we expected that emotion dysregulation would act as a partial mediator between the relationship of FFFS sensitivity and PTSS.

3. Methods

3.1. Participants and procedure

A total of 471 undergraduate psychology students from a mid-sized Midwestern university participated in this study. Of this sample, 358 participants reported experiencing at least one traumatic event. Participants needed only to endorse that they were exposed to a traumatic event (*DSM-IV-TR* criterion A1); it was not required that they endorse feelings of fear, helplessness, or horror (criterion A2). The *DSM-5* Task Force has decided to

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