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The prediction of intrusions following an analogue traumatic event: Peritraumatic cognitive processes and anxiety-focused rumination versus rumination in response to intrusions

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ABSTRACT

Intrusions are often considered the hallmark of posttraumatic stress disorder (PTSD). Despite this, relatively little is known about factors that give rise to intrusions. Cognitive models of PTSD highlight the importance of pre-existing cognitive vulnerabilities, cognitive processing and anxiety during a traumatic event, as well as negative responses to trauma sequelae. However, few studies have examined multiple forms of peritraumatic processes, and rumination in response to trauma intrusions using analogue trauma tasks, and none have examined whether broader anxious ruminative processes contribute to intrusion development. In addition, little work has investigated the role of post-state anxiety in intrusions, and anxiety may be related to both peritraumatic processing and rumination. The current study employed a distressing film paradigm to examine key tenets of cognitive models of PTSD. Ninety-one female university students completed measures of anxiety, rumination in response to anxious symptoms, peritraumatic dissociation, data driven processing, lack of self referent processing, intrusions, and rumination in response to intrusions of the distressing film. Results revealed that peritraumatic dissociation, data driven processing, and self referent processing were associated with intrusion development, with lack of self referent processing being a strong predictor of intrusion development. Post-state anxiety and rumination in response to intrusions also predicted intrusion development. Discussion focuses on implications of cognitive processes and anxiety in theories of intrusion development.

1. Introduction

Cognitive models of posttraumatic stress disorder (PTSD) highlight the importance of pre-existing cognitive vulnerabilities, cognitive processing and anxiety during a traumatic event, as well as negative responses to trauma sequelae (Ehlers & Clark, 2000). This study sought to examine key tenets of the Ehlers and Clark (2000) model that may be related to intrusions. Using a prospective induction design, we aimed to examine the effects of variables that occurred at different time points along the theorized development (e.g. pre-existing trait rumination, peritraumatic processing and anxiety) and maintenance (state rumination) of intrusions.

Increasingly, attention is focussing on the role of cognitive rumination in the onset and maintenance of trauma symptoms (e.g. Ehlers & Clark, 2000). Nolen-Hoeksema and Morrow (1991) prospectively found that pre-trauma depressive rumination was predictive of PTSD severity following an earthquake. Further, several clinical studies have demonstrated associations between rumination and PTSD symptoms following traumatic experiences (e.g. Ehlers, Mayou, & Bryant, 1998; Ehring, Frank, & Ehlers, 2008; Michael, Halligan, Clark, & Ehlers, 2007). Rumination also appears to be a particularly potent predictor when directly tested in relation to other cognitive predictors, for example pre-accident dissociative tendencies and initial memory fragmentation (e.g. Murray, Ehlers, & Mayou, 2002). However, these studies were correlational in nature, precluding conclusions regarding causality, and they examined rumination in the context of overall PTSD severity.

Many symptoms in PTSD may be secondary to intrusions. Intrusions are a hallmark feature of PTSD, and are often the most frequently endorsed of PTSD symptoms (e.g. Durham, McCammon, & Allison, 1985; Genest, Levine, Ramsden, & Swason, 1990). They have a central role in the development and maintenance of PTSD (e.g., Foa, Zinbarg, & Rothbaum, 1992) where additional PTSD

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symptom clusters are a consequence of the reexperiencing processes (e.g. Michael, Ehlers, Halligan, & Clark, 2005). McFarlane (1992) found that intrusion scores alone accounted for the etiological link between disaster and PTSD among firefighters. Despite this, relatively little is known about the factors that give rise to intrusions in the first place.

Most research on PTSD relies on retrospective reports, which are prone to error (e.g. Gorin & Stone, 2001). To decrease this error and investigate PTSD phenomena under tightly controlled circumstances, investigators use the distressing film paradigm, where a distressing film is used as an analogue trauma. This paradigm enables truly prospective investigations, provides a standardized stimulus which removes variance due to features of the distressing event, and allows for the determination of causality. Intrusive imagery exists on a continuum, and the induction of such imagery can be reliably studied with non-clinical samples (see Holmes & Bourne, 2008 for a review). This paradigm significantly increases anxiety, allows for the modelling of key processes related to PTSD, and numerous studies have shown it to be effective in examining key cognitive variables (e.g., Halligan, Clark, & Ehlers, 2002; Holmes, Brewin, & Hennessy, 2004; Laposa & Alden, 2006).

Rumination may be a key vulnerability factor to the initial development of intrusions. Ehring, Fuchs, and Klasener (2009) investigated the effects of rumination versus distraction in an analogue design. Participants instructed to ruminate about a negative life event displayed more intrusive memories compared to those encouraged to use distraction. However, this study did not use the distressing film paradigm, which prevents comparability to other research using this design. Zetsche, Ehring, and Ehlers (2009) used the distressing film paradigm and found no effect of rumination on intrusive memories. Thus, it remains unclear if rumination constitutes a pre-existing cognitive vulnerability for the onset of intrusions following an actual or simulated traumatic event.

Rumination has been conceptualized in different ways. The distinction between trait rumination as a general affect regulation strategy in PTSD versus state rumination in response to intrusions is a potentially important one. While trait rumination may be a vulnerability factor in the development of intrusions, state rumination after a trauma may maintain symptoms of PTSD. Anxious rumination, where individuals focus on ruminative content themes pertaining to gaining control and coping with future uncertainty, has been found to be elevated in individuals with several anxiety disorders in comparison to non-anxious controls (Rector, Antony, Laposa, Kocovski, & Swinson, 2008). However, this study did not include participants diagnosed with PTSD, so the relationship between anxious rumination and PTSD remains unknown. As anxious rumination has already been associated with an intrusion-related anxiety disorder (i.e., obsessive compulsive disorder, Rector et al., 2008) it is possible that ruminative responses to anxious mood contribute to intrusion development. Nolen-Hoeksema and Morrow (1993)'s finding that depressotypic rumination predicted PTSD development and severity provides further support for the likely association between mood-state rumination and intrusions.

State rumination may also be of prime importance in intrusion maintenance. Rumination in response to experiencing intrusions has been linked to PTSD in clinical studies (e.g. Clohessy & Ehlers, 1999; Laposa & Alden, 2003; Steil & Ehlers, 2000). One analogue study found that rumination in response to intrusions was specifically related to intrusion frequency (i.e. not just to overall PTSD) (Regambal & Alden, 2009). This sole finding warrants replication, particularly in a prospective study that can control for findings that current PTSD symptoms can inflate reports of emotional responses to, and severity of, the event (e.g., Harvey & Bryant, 2000; Roemer, Litz, Orsillo, Ehlich, & Friedman, 1998).

A second key tenet of cognitive models of intrusions is that maladaptive peritraumatic processing during the trauma gives rise to intrusions (e.g. Ehlers & Clark, 2000; Brewin, Dalgleish, & Joseph, 1996). Three main variables have been investigated; peritraumatic dissociation, data driven processing, and self referent processing. Ehlers and Clark (2000) conceptualize peritraumatic dissociation as a phenomenon that may interfere with adequate processing. Research on clinical samples showed positive relationships between peritraumatic dissociation and reexperiencing symptoms (e.g. Harvey & Bryant, 1999; Laposa & Alden, 2003; Weiss, Marmar, Metzler, & Ronfeldt, 1995), flashbacks (Bremner & Brett, 1997), and intrusive memory qualities (Halligan, Michael, Clark, & Ehlers, 2003). In addition, while Ozer, Best, Lipsey, and Weiss's (2008) meta analysis indicated that peritraumatic dissociation had the largest effect size of seven predictors, a review of prospective studies questioned whether peritraumatic dissociation is an important independent predictor of PTSD (van der Velden & Wittmann, 2008) and therefore the findings in this area remains mixed. As a whole, three analogue studies indicate that laboratory methods to induce dissociation were largely unsuccessful in affecting intrusions in the expected direction (Brewin & Saunders, 2001; Holmes et al., 2004; Murray, 1997; Study 1; see Hagenaars, van Minnen, Holmes, Brewin, & Hoogduin, 2008 for an exception). In contrast, the amount of *spontaneous* peritraumatic dissociation that occurred while watching a film was linked to intrusion frequency in five analogue studies (Holmes et al., 2004 Study 1; Study 2; Kindt, van den Hout, & Buck, 2005 Study 1; Study 2; Regambal & Alden, 2009), although not in four others (Holmes et al., 2004; Study 3; Hagenaars et al., 2008; Holmes & Steel, 2004; Kindt & van den Hout, 2003). All in all, the research literature does suggest that peritraumatic dissociation may play a role in intrusion development, although the results to date have been equivocal.

Data driven processing refers to surface level perceptual processing, such that the individual processes perceptual and sensory features as opposed to the broader meaning of the situation. In clinical studies, data driven processing during the trauma was associated with intrusive memory qualities (e.g. strong perceptual elements, accompanied by sense of reliving the event) (Halligan et al., 2003; McKinnon, Nixon, & Brewer, 2008), intrusions (Evans, Ehlers, Mezey, & Clark, 2007), and PTSD severity (Ehlers, Mayou, & Bryant, 2003; Murray et al., 2002) and diagnosis (Ehlers et al., 2010). Analogue studies have largely supported the hypothesis that data driven processing plays a role in intrusion development (Halligan et al., 2002; Regambal & Alden, 2009).

Self referent processing refers to the individual's ability to process information in a self referent manner. This variable was proposed as potentially relevant following research indicating that autobiographical memory is arranged around one's sense of self (Howe & Courage, 1993; Wheeler, Stuss, & Tulving, 1997). In clinical studies, lack of self referent processing was associated with intrusive memory qualities (Halligan et al., 2003) and intrusions (Evans et al., 2007). To our knowledge, self referent processing has not been investigated using an analogue trauma paradigm. In sum, further work is needed to prospectively examine maladaptive peritraumatic cognitive processing in intrusion development. In addition, no analogue studies have examined all three peritraumatic processes simultaneously.

Lastly, many theories of PTSD assert that anxiety during the trauma has a role in the subsequent development of PTSD (e.g. Ehlers & Clark, 2000). However, what is related to overall PTSD is not always then individually related to specific PTSD symptoms. For example, in a sample of emergency room professionals, Laposa and Alden (2003) found that peritraumatic dissociation related to reexperiencing symptoms, but did not relate to overall PTSD symptom severity. Some studies suggest that peritraumatic anxiety may specifically influence the development of intrusions. In analogue studies, Davies and Clark