



# Activating attachment representations during memory retrieval modulates intrusive traumatic memories



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## ABSTRACT

Although priming mental representations of attachment security reduces arousal, research has not examined the effect of attachment on the retrieval of emotionally arousing memories. This study investigated the effect of priming attachment security on the retrieval of emotional memories. Seventy-five participants viewed negative and neutral images, and two days later received either an attachment prime or a control prime immediately prior to free recall of the images. Two days later, participants reported how frequently they experienced intrusions of the negative images. The attachment group had less distress, and reported fewer subsequent intrusions than the control group. Attachment style moderated these effects such that individuals with an avoidant attachment style were not impacted by the attachment prime. These findings suggest that priming attachment security decreases distress during memory reactivation, and this may reduce subsequent intrusive memories.

## 1. Introduction

Emotional memories, and particularly intrusive memories, are a common feature of many psychological disorders (Bryant, O'Donnell, Creamer, McFarlane, & Silove, 2011). Models of emotional memories converge on the critical role of arousal at the time of memory consolidation that contributes to subsequent distressing memories (Ehlers & Clark, 2000). Biological models propose that memory traces are strengthened by activation of glucocorticoid receptors in the basolateral nucleus of the amygdala facilitating noradrenergic signals (Roозendaal, Quirarte, & McGaugh, 2002). Supporting this proposition is much evidence that strength of emotional memories is moderated by glucocorticoid and noradrenergic activation at the time of consolidation (Roозendaal, Hahn, Nathan, de Quervain, & McGaugh, 2004). It is proposed that intrusive emotional memories are particularly strongly consolidated, and characterised by closely interconnected memory traces that result in involuntary recurrences of memories (Foa, Steketee, & Rothbaum, 1989). This is consistent with evidence that intrusive memories are predicted by glucocorticoid and noradrenergic response during the consolidation phase (Bryant, McGrath, & Felmingham, 2013; Chou, La Marca, Steptoe, & Brewin, 2014; Nicholson, Bryant, & Felmingham, 2014).

There is distinct research suggesting that proximity to attachment figures alleviates stress responses (Eisenberger et al., 2011; Mikulincer, Shaver, Gillath, & Nitzberg, 2005). This evidence reflects a fundamental tenet of attachment theory that during stress we seek social support (Bowlby, 1969). This theory posits that one internalizes mental representations of attachment figures, and these representations similarly can provide a sense of security during stress. Experimentally activating attachment figures results in a range of psychological benefits, including reductions in bias to threat (Mikulincer, Shaver, & Horesh, 2006), pain-related neural activation (Eisenberger et al., 2011), noradrenergic response to threat (Bryant & Chan, 2015), and also enhancement of heart rate variability

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(Bryant & Hutanamon, in press).

The extent to which attachments can benefit people depends, however, on individual differences in attachment security. Attachment theories posit that prior experiences of unreliable relationships can lead to deficiencies in the capacity to benefit from attachment figures because they do not activate representations of security (Mikulincer & Shaver, 2007a, 2007b). It is proposed that prior experiences of insecure attachments lead people to evolve insecure attachment systems, which may be manifest in anxious or avoidant attachment tendencies. People with anxious attachments worry about abandonment and seek support from others, yet nonetheless perceive they are not receiving sufficient support (Campbell, Simpson, Boldry, & Kashy, 2005). Hence, they monitor attachment proximity closely, reflected in faster naming of attachment figures lexical decision tasks (Mikulincer, Gillath, & Shaver, 2002), and greater recognition of proximity-related words (Mikulincer, Birnbaum, Woddis, & Nachmias, 2000). In contrast, those with avoidant attachment tendencies distance themselves during threat processing as a means of coping; supporting this proposal is evidence that during threat avoidantly attached individuals inhibit proximity-seeking behaviour and are less likely to activate attachment representations, except when functioning under additional cognitive load (Mikulincer et al., 2000).

Despite the evidence that attachments can ameliorate stress responses, no research has directly addressed the extent to which attachments may impact retrieval of emotional memories. There is indirect evidence of a link between attachment and emotional memories from literature on posttraumatic stress disorder (PTSD), which is characterised by intrusive memories of a traumatic event. Secure attachments have been shown to mitigate PTSD symptoms after trauma (Dekel, Solomon, Ginzburg, & Neria, 2004). Further, providing attachment primes to participants with PTSD results in reductions in attentional bias to threats, suggesting that attachment representations can ameliorate one of the core dysfunctions in PTSD (Mikulincer et al., 2006). To test the potential impact of attachments on emotional memories directly, the current study presented participants with traumatic and neutral images, and two days later were directed to imagine an attachment or positive non-attachment experience immediately prior to recall and recognition tasks of the images that were previously presented. A positive non-attachment prime was employed as a comparator because of strong evidence that attachment priming impacts mood (Mikulincer & Shaver, 2007a, 2007b) and that current mood impacts retrieval of memory (Bower, 1981); accordingly, the effects of an attachment prime were compared to those of a positive non-attachment prime to isolate the specific effects of activating attachment representations rather than mood. Participants were then assessed two days later to index occurrence of intrusive memories of the presented stimuli. On the basis that attachment priming can enhance mood and positive appraisals and reduce stress responses, we hypothesized that participants receiving the attachment prime would have less recall of negative material, and also fewer subsequent intrusions than those in the control condition. Moreover, we predicted these effects would be stronger for participants with low avoidant attachment tendencies relative to those who are avoidantly attached. The ambivalent nature of anxious attachment, which motivates monitoring of attachment cues and simultaneously triggers anxiety about the availability of attachments, makes specific hypotheses more difficult; however, it would be expected that anxiously attached participants would have stronger recall and intrusions of the negative material than those non-anxiously attached participants.

## 2. Methods and methods

### 2.1. Participants

Seventy-five first year psychology students (56 females, 19 males) of mean age 19.25 years ( $SD = 3.067$ ) were recruited from the University of New South Wales and received course credit for their participation. Following previous study demonstrating moderate effect of attachment activation studies (Mikulincer et al., 2002), we estimated a required sample size of at least 30 per cell to achieve an effect size of 0.7 between the two conditions, providing power of 80% to detect a difference between conditions at the 5% significance level. Participants were randomly assigned to the attachment or control conditions. Sixty-nine participants completed the follow-up measure of intrusions, 35 in attachment condition and 34 in the control condition.

### 2.2. Materials

#### 2.2.1. Stimuli

Forty images were selected from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 2005). Twenty were negatively-valenced and high in arousal (mean valence = 2.34, mean arousal = 6.15) and depicted images of mutilated bodies, blood, and death. Twenty were neutrally-valenced and low in arousal (Mean valence = 6.31, mean arousal = 3.99) and depicted images of landscapes, plants, and household items.

#### 2.2.2. Experiences in Close Relationships (ECR)

The ECR (Brennan, Clark, & Shaver, 1998) is a 36-item self-report questionnaire that measures adult attachment along the two dimensions of attachment anxiety and avoidance. The anxious and avoidant subscales of this measure have a high level of internal consistency, with coefficient alphas of 0.91 and 0.94, respectively (Wei, Russell, Mallinckrodt, & Vogel, 2007). The ECR asks participants to rate on a 7-point Likert-scale the extent to which they agree with the statements pertaining to how they feel in emotionally intimate relationships. The statements in this version of the ECR anchored responses to “the person who I consider close to me” (Bryant & Chan, 2015).

#### 2.2.3. Depression Anxiety Stress Scale 21 (DASS21)

The DASS21 (Lovibond & Lovibond, 1995) is a 21-item self-report questionnaire that indexes levels of depression, anxiety and

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