Psychoneuroendocrinology (2015) 60, 39—45

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/psyneuen

SHORT COMMUNICATION

Thinking of attachments reduces noradrenergic stress response

Richard A. Bryant*, **Lilian Chan**

School of Psychology, University of New South Wales, Sydney, NSW 2052, Australia

Received 26 March 2015; received in revised form 6 June 2015; accepted 9 June 2015

KEYWORDS
Attachment;
Stress;
Noradrenergic;
Cortisol

Summary Although there is much evidence that activating mental representations of attachments figure is beneficial for psychological health and can reduce stress response, no research has directly investigated whether attachment activation can ameliorate hormonal stress response. This study investigated whether activating an attachment figure or a non-attachment figure following administration of a socially evaluated cold pressor test to elicit stress impacted on glucocorticoid and noradrenergic response. Participants ($N = 61$) provided baseline salivary samples, underwent a cold pressor test, then imagined an attachment or non-attachment figure, and finally provided subsequent saliva samples. Participants who imagined a non-attachment figure had greater noradrenergic response following the stressor than those who imagined an attachment figure. These findings highlight that activating attachment representations can ameliorate the immediate noradrenergic stress response.

Environmental stressors place enormous demands on our health and well-being (Schnurr and Jankowski, 1999), and can adversely affect key physiological responses such as immunological (Stam, 2007; Vidovic et al., 2011) and neural (Shin and Liberzon, 2010) functioning. Human stress response is underpinned by core stress hormones, which involve the fast-acting autonomic nervous system (which triggers noradrenergic response, leading to increased heart and respiration rate) and the slower-acting hypothalamic-pituitary-adrenal (HPA) axis (which elicits glucocorticoid response, which in turn down regulates the sympathetic arousal) (Tsigos and Chrousos, 2002). Given the importance of the stress response to clinical disorders, such as posttraumatic stress disorder (PTSD), it is important to understand factors that moderate these key stress hormones.

Seeking proximity to social attachments is one of the core strategies humans use to cope with stressful experiences. Attachment theory posits that humans, as well as many other species, programmed from an early age to seek refuge in trusted others in times of need; whereas this will initially be primary care-givers, others will assume this role as the organism develops (Mikulincer et al., 2005a). Consistent with this proposition, individuals seek attachments when they are presented with real or symbolic threats, and these supportive figures provide comfort during stress (Epstein and Meier, 1989; Mikulincer et al., 2002; Mikulincer and Shaver, 2007). For example, under conditions of threat

* Corresponding author. Tel.: +61 2 9385 3640; fax: +61 2 9385 3641.
E-mail address: r.bryant@unsw.edu.au (R.A. Bryant).

http://dx.doi.org/10.1016/j.psyneuen.2015.06.004
0306-4530/

individuals have faster reaction times in recognizing the names of their secure attachment figures (Mikulincer et al., 2002). Supporting this theory is convergent evidence that having close social relationships can reduce stress level, promote subjective wellbeing and decrease vulnerability to serious illnesses (Cohen, 2004; House et al., 1988; Kaplan and Kronick, 2006). Evidence from experimental studies demonstrates that social support also reduces physiological pain experience (Brown et al., 2003; Jackson et al., 2005), participants' pain ratings during painful thermal stimulation (Master et al., 2009), and pain-related neural activation (Eisenberger et al., 2011).

Inherent in attachment theory is that one develops mental representations of these attachment figures, which can then serve similar functions in providing comfort during stressful experiences (Mikulincer et al., 2005a). Attachment theory also posits that when attachment representations are activated, people experience a wide range of psychological benefits. People who have generally secure attachments tend to report greater ability to cope with stress (Berant et al., 2001), and are even less likely to develop posttraumatic stress disorder (PTSD) after trauma exposure (Dekel et al., 2004). At an experimental level, activating attachment figures leads to less attentional bias to threat (Mikulincer et al., 2002). Moreover, priming attachment representations by (e.g. mother holding a baby) leads to a range of psychological benefits, including attributing positive attributes to neutral events (Mikulincer et al., 2001a). There is also evidence that activating representations of attachment reduces pain and pain-related neural activation (Eisenberger et al., 2011). Taken together, this evidence supports the theory that internal representations of attachment can alleviate psychological and neural reactions to aversive stimuli and enhance positive affect.

The impact of attachment availability appears to be moderated, however by individual differences in how people seek attachments in response to stress. Attachment theories posit that prior experiences of unreliable relationships lead to differences in how are able to benefit from attachments. Specifically, it is proposed that early experiences of unavailable attachment figures result in people either excessively seeking attachments because they fear this support will not be provided or they may avoid attachments because they have learnt that they do not provide support during times of stress (Mikulincer et al., 2005b). Accordingly, attachment theories posit that during stress people with avoidant attachment tendencies distance themselves from attachments as a means of coping (i.e. *hypoactivate* the attachment system), whilst those with anxiety attachments tend to *hyperactivate* their attachment needs and seek out attachments (Mikulincer and Shaver, 2007). Supporting this proposal is evidence that during threat avoidantly attached individuals inhibit proximity-seeking behaviour and are less likely to activate attachment representations (Mikulincer et al., 2005a). Relatedly, there is evidence that individuals with severe anxiety, such as chronic posttraumatic stress disorder following prisoner of war experiences, do not experience the benefits of attachment priming, which suggests that these individuals may also lack the appropriate secure attachment systems that can benefit from attachment activation (Mikulincer et al., 2014).

To date there is no evidence regarding the impact of activating attachment representations on core psychophysiological stress responses. If attachment representations do in fact ameliorate stress reactions, one would expect them to reduce fundamental biological reactions to threats. To study the impact of attachment representations on human stress response, we studied the effects of either an attachment or non-attachment prime following a stressor on both noradrenergic and glucocorticoid response. We administered the attachment/non-attachment prime following a cold pressor test, which was employed because it induces marked stress reactions that include increased glucocorticoid and noradrenergic response (Bryant et al., 2013; Cahill et al., 2003). Accordingly, this paradigm allowed us to test the extent to which activating attachments can alleviate core stress responses. We hypothesized that the attachment prime would result in reduced noradrenergic and glucocorticoid response to the stressor relative to the non-attachment prime, however that this effect would be less evident in participants with an avoidant attachment style because of their tendency to not hyperactivate attachment systems in response to threat.

1. Methods

1.1. Participants

Participants were 61 healthy undergraduate students (mean age, 20.18 y; SD, 1.23 y) who participated in return for course credit. Participants scored below 'severe' levels on scales of the Depression, Anxiety and Stress Scale (DASS) (Lovibond and Lovibond, 1995). The study was approved by the University of New South Wales School of Psychology Ethics Review Committee, and all participants gave written informed consent. Participants were randomized to either the attachment ($n = 32$; 15 males, 17 females or non-attachment prime conditions ($n = 29$; 11 males, 18 females).

1.2. Procedure

Participants were instructed not to exercise for 24 h nor consume caffeine or alcohol 3 h prior to the study. To control for diurnal changes in cortisol levels, all testing occurred between 13.00 and 18.00 h, and each experimental session was conducted by a female experimenter. Participants initially completed the DASS to measure anxiety and depression. Participants were then asked to nominate either attachment or non-attachment figures. Participants in the Attachment Condition were asked to describe a relationship with a person who was very supportive and those in the non-attachment condition were asked to describe someone they knew who but were not personally close to; participants overwhelmingly nominated a direct family member as the attachment figure. To minimize the possibility that nominating the attachment figure may preemptively activate attachments prior to the administration of the stressor, 20 min were then devoted to administration of further questionnaires and collection of saliva. Specifically, the Experiences in Close Relationships scale (ECR) (Brennan et al., 1998) was administered to assess anxious attachment and avoidant attachment styles. The ECR is a