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Difficulties with emotion regulation moderate the association between childhood history of maltreatment and cortisol reactivity to psychosocial challenge in postpartum women

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ABSTRACT

Exposure to child maltreatment can lead to long-term emotional difficulties and dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis. However, no prior work has examined emotion regulation as a moderator of the association between childhood history of maltreatment and cortisol response to psychosocial challenge. Amongst a sample of 140 postpartum women, associations between childhood maltreatment, emotion regulation, and cortisol response to a computerized Emotional Stroop paradigm were examined using structural equation modeling. Three saliva samples (baseline, 20- and 40-min post-challenge) were collected and later assayed for cortisol. Stepwise regression analyses revealed that difficulties with emotion regulation significantly moderated the association between maternal history of child maltreatment and cortisol reactivity ($\beta = -0.17$, $CI_{.95} = -0.31, -0.04$, $t = -2.51$, $p = 0.01$). Specifically, women with higher child maltreatment scores and greater difficulties with emotion regulation displayed reduced cortisol reactivity. This finding suggests that diminished emotion regulation capacity may uniquely contribute to blunted physiological reactivity in postpartum women exposed to higher levels of child maltreatment. As the postpartum period has significant implications for maternal well-being and infant development, these findings are discussed in terms of adaptive responsivity, maternal behaviour, and clinical practice.

1. Introduction

Although the experiences of trauma occur during childhood, the impact of child maltreatment can persist throughout the lifespan (Gilbert et al., 2009). Exposure to child maltreatment can have harmful effects on brain development leading to psychobiological changes (Bremner and Vermetten, 2001; Thompson et al., 2014). These changes include alterations to allostatic mechanisms in the neuroendocrine system that are responsible for responding to conditions of acute challenge (Ehring and Quack, 2010; McEwen, 2002), and neural regions underlying emotional processing and emotion regulation (Goldsmith et al., 2008; Teicher and Samson, 2016). Neuroendocrine systems, like the hypothalamic-pituitary-adrenal (HPA) axis, that are engaged in responding to challenging and emotional situations are particularly sensitive to early influences and undergo many changes throughout development (Juul et al., 2016; Perlman et al., 2008). The postpartum era poses a period of particular vulnerability for women in terms of mental health and emotional difficulties (Robertson et al., 2004). However, the long-term impact of child maltreatment on the regulation and physiological response to emotional information in women entering their childrearing years is relatively unexplored. Therefore, the purpose of the current study was to investigate cortisol reactivity and difficulties with emotion regulation in postpartum women with a history of childhood maltreatment. Investigating this relationship during the postpartum period is acutely important, as postpartum women with history of child maltreatment are at an increased risk of experiencing emotional difficulties (Collishaw et al., 2007; Sexton et al., 2015), which in turn impacts parenting and infant development (Stein et al., 2008).

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1.1. Emotion regulation and child maltreatment

Emotions interact with other goals and behaviours, and thus require dynamic and effortful regulation (Gross et al., 2011). Emotion regulation is defined as the essential processes for monitoring, evaluating, and modifying emotional reactions (Thompson, 2008a). One example of an emotion-regulatory act is an emotion regulation strategy, and emotion regulation strategies can be broadly differentiated based on whether they act adaptively on the antecedent of an emotion or maladaptively on the emotional response itself (Gross, 1998a). Trait reappraisal is an example of an antecedent-focused strategy, where cognitive effort is used to modify the interpretation of a situation before an emotional response is generated (i.e., attempting to think about a potentially emotional event in non-emotional terms) (Gross, 2002, 1998b). An example of a response-focused strategy is trait suppression, where a behavioural attempt is made to reduce an emotional response already underway (i.e., hiding an emotional outburst to a distressing event) (Gross, 2002; Gross and Levenson, 1993). Alternatively, effective emotion regulation can also be defined by global abilities that include understanding emotions, accepting negative emotions, behaving according to desired goals, controlling impulsivity, and using contextually-appropriate strategies (Cole et al., 2008; Gratz and Roemer, 2004; Thompson and Calkins, 1996). Previous research has demonstrated that both maladaptive emotion regulation strategies (Aldao et al., 2010; Gross, 1998b) and global dimensions of emotion dysregulation (Aldao et al., 2010; Dixon-Gordon et al., 2014) are linked to higher incidences of mood disorders and other socio-emotional difficulties.

Children who experience negative parenting environments characterized by maltreatment are at risk of developing socio-emotional development issues (Luke and Banerjee, 2013). Specifically, children exposed to chronic stress, abuse, and/or neglect can exhibit difficulties regulating their emotional and behavioural responses to emotional information (Lupien et al., 2009; Pollak, 2008). Children who experience trauma are more frequently aroused, and as a consequence, are often unable to monitor their reactions and regulate their emotions (Dodge et al., 1995; Ford et al., 2009). They have a lower tolerance for negative emotions and may employ more avoidant and response-focused emotion regulation strategies, which can hinder their emotional processing (Luke and Banerjee, 2013; Pollak and Tolley-Schell, 2003). During the period of maltreatment, these emotional responses may represent an adaptation to a stressful environment, but these response patterns can persist and manifest as emotional dysregulation in adulthood (Pollak, 2008; Thompson et al., 2014). Adults with a history of childhood maltreatment have been shown to experience difficulties empathizing and regulating their emotional responses (Cloitre et al., 2008; Paivio and Laurent, 2001). Examining the persistent influence of child maltreatment on these abilities across the lifespan will help identify if emotion regulation serves as a potentially modifiable risk factor and target for preventative intervention. This relationship is critical to examine in new mothers as women are particularly vulnerable to emotional dysfunction during the postpartum period (Robertson et al., 2004), and maternal emotion regulation capacity greatly influences parenting behaviour and infant development (Haga et al., 2012; Neumann et al., 2005).

1.2. Cortisol response to challenge and childhood maltreatment

Sustained exposure to stress and negative environments also has implications for the hypothalamic-pituitary-adrenal (HPA) axis, with evidence showing long-term associations between child maltreatment and dysregulation of both cortisol levels and cortisol reactivity (Tarullo and Gunnar, 2006). Exposure to child maltreatment has been linked to an altered, and often maladaptive, cortisol response in both children and adults (Charmandari et al., 2003; Ehlert, 2013). However, across studies there is debate on the magnitude and direction of this relationship. Some studies have reported that child maltreatment is associated with increased cortisol reactivity (Cicchetti and Rogosch, 2001a; Harkness et al., 2011; Linares et al., 2013), whereas others have shown that maltreated adolescents and adults exhibit decreased, or blunted cortisol response (Carpenter et al., 2007; MacMillan et al., 2009; Ouellet-Morin et al., 2011).

The direction of cortisol reactivity reported in maltreatment research can vary based on the age of the sample, concurrent psychiatric diagnosis, and whether the methodological design utilizes a psychosocial challenging task or exogenous administration of hormones to stimulate the HPA axis (Abravanel and Sinha, 2015). One method that helps disentangle the complex relationships between variables is through the identification and testing of potential moderating variables. For example, some studies have shown that chronicity, maltreatment type, and presence of internalizing or externalizing problems influence the direction of cortisol reactivity (Cicchetti et al., 2010; Cicchetti and Rogosch, 2001a, 2001b; Heim et al., 2000b; McCrory et al., 2011). In addition, there is research to suggest that emotion regulation is a mechanism through which exposure to child maltreatment is related to maladaptive psychological and emotional outcomes (Langevin et al., 2015; Maughan and Cicchetti, 2002). However, emotion regulation has not yet been explored as a potential moderator in the association between child maltreatment and adult physiological responsivity to challenge. As a recent study reported that postpartum women exposed to adversity during childhood are at increased risk for disrupted affect and cortisol dysregulation (Juul et al., 2016), examination of this relationship in new mothers is a crucial extension.

1.3. Emotion regulation and physiological reactivity to challenge

Regulating emotions requires general attentional and cognitive resources that activate physiological systems in challenging situations (Aldao, 2013; Butler et al., 2006). Difficulties with emotion regulation place an individual at risk for maladaptations to other systems responsible for responding to acute challenge (Campos et al., 1989). Although emotion regulation is noted to encompass a broad range of processes, empirical investigation focuses on connecting specific emotion regulation strategies, like trait suppression and reappraisal, to patterns of physiological reactivity (Gross, 2002; Gross and Levenson, 1993). Studies show that employing maladaptive emotion regulation strategies, such as trait suppression, increase cardiovascular and electrodermal activation (Egloff et al., 2006; Gross, 1998b). Additional research has shown that use of adaptive emotion regulation strategies, like trait reappraisal, is associated with a reduction in cardiovascular and autonomic reactivity (Butler et al., 2006; Gross and John, 2003; John and Gross, 2004).

Research linking emotion regulation to cortisol reactivity has reported somewhat conflicting results, with some studies indicating that higher levels of both adaptive (de Veld et al., 2012; Denson et al., 2014; Gaab et al., 2003; Lam et al., 2009) and maladaptive emotion regulation strategies (de Veld et al., 2012; Lam et al., 2009; Zoccola et al., 2008) are associated with increased cortisol reactivity in response to stress, psychosocial challenge, pain, and social-evaluation. Conversely, greater use of trait reappraisal has been associated with decreased cortisol reactivity to psychosocial challenge (Carlson et al., 2012). Finally, emotional non-acceptance (i.e., a tendency to have secondary emotional responses like shame or guilt to negative emotions) was negatively associated with cortisol reactivity to social threat in adults exposed to early life stress (Cărnuţă et al., 2015). Using more integrative models of emotion regulation in scientific research is an important step to better understanding its relation to health and physiological vulnerability (Dixon-Gordon et al., 2014). Prior work has advised that the strategy-focused model of emotion regulation is too simplistic, as specific emotion regulation strategies are often context-dependent and adaptive emotion regulation requires flexibility and more global skills (Aldao and Dixon-Gordon, 2014; Cole et al., 2004).