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Fight, flight, and freeze: Threat sensitivity and emotion dysregulation in survivors of chronic childhood maltreatment



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ABSTRACT

Chronic childhood maltreatment (C-CM) is thought to result in permanent neurobiological alterations to the brain that manifest as a threat-sensitivity trait. However, extant research has yet to identify this trait in the context of existing personality theories. The current study utilized the fight–flight–freeze system (FFFS), a brain subsystem of the revised reinforcement sensitivity theory of personality, to identify the threat-sensitivity trait proposed to result from C-CM. Research suggests that C-CM is associated with both FFFS sensitivity and emotion dysregulation (ED), whereby increased threat-sensitivity is thought to contribute to greater ED. Accordingly, C-CM was expected to predict FFFS sensitivity, which was expected to mediate the relationship between C-CM and ED in an undergraduate sample ($N = 471$). Participants were separated into three maltreatment groups: C-CM, non-chronic CM (NC-CM), and no CM. Results indicated that individuals with a history of C-CM reported greater FFFS sensitivity and ED than those with a history of NC-CM or no CM. Analysis of the significance of the indirect effect of C-CM on ED via FFFS sensitivity indicated that FFFS sensitivity partially mediated this relationship. Specifically, individuals with C-CM, compared to no CM, reported greater FFFS sensitivity, which significantly accounted for a portion of their increased ED.

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1. Introduction

Childhood maltreatment¹ (CM) is variably defined in the literature, but typically includes: physical, emotional, and sexual abuse, neglect, and exposure to family violence. In 2010, there were an estimated 3.3 million reports of child abuse and neglect in the United States alone. When maltreatment is chronic (i.e., repeated and over time) it can have lifelong consequences, including increased risk for internalizing problems (e.g., anxiety and depression), externalizing problems (e.g., aggressive behavior), and emotion dysregulation² (ED; Kim & Cicchetti, 2010). Some researchers argue these longstanding difficulties are due to neurological changes that occur in response to chronic CM³ (C-CM; Lee & Hoaken, 2007; Perry, 1997, 2001; Perry, Pollard, Blakley, Baker, & Vigilante, 1995). These changes can cause hypersensitivity to threat cues and a tendency to respond to non-hostile situations as threatening, which according to Perry (1997, 2001), manifests as a threat-readiness trait. Such ingrained response patterns likely have enduring effects on chil-

dren's thoughts, feelings, behaviors, and ultimately, personality. In fact, personality factors resulting from or exacerbated by CM may contribute to the maintenance of adverse effects into adulthood. Interestingly, minimal research on personality as it relates to CM (not including research on personality disorders) has been conducted. Available studies show that a history of CM is associated with higher trait neuroticism and openness and lower trait agreeableness and conscientiousness (e.g., Nederlof, Van der Ham, Dingemans, & Oei, 2010; Rogosch & Cicchetti, 2004); however, these traits are not equivalent to the fear trait posited by Perry and colleagues (Perry, 1997, 2001; Perry et al., 1995), for which no correlates in an existing personality theory have been identified. The current study utilized the revised reinforcement sensitivity theory⁴ [r-RST] of personality to identify the threat-readiness trait believed to develop neurologically as a result of C-CM. Additionally, this study examined whether a specific subsystem of r-RST (the fight–flight–freeze system⁵ [FFFS]) had an indirect effect on the relationship between C-CM and one potential adverse consequence of C-CM, ED.

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¹ CM: child maltreatment.

² ED: emotion dysregulation.

³ C-CM: chronic child maltreatment.

⁴ r-RST: revised reinforcement sensitivity theory.

⁵ FFFS: fight–flight–freeze system.

1.1. Neurobiological impacts of CM

Children who experience C-CM often live in environments where violence is expected but unpredictable, resulting in perpetual fear states. Chronic victimization and early exposure to violence can permanently alter neurobiological development in children (Teicher et al., 2003) and are believed to cause persistent, maladaptive threat perceptions and responses (Lee & Hoaken, 2007; Perry, 1997, 2001; Perry et al., 1995). For example, Lee and Hoaken (2007) review neurobiological impacts of CM and posit that chronic exposure to violence is associated with fear conditioning in the prefrontal cortex and an overdevelopment of fear responses in the limbic system. Many other alterations to neurological structures have been identified in children who have experienced CM (see Teicher et al., 2003 for review), including alterations to the hippocampus and amygdala, which are of particular interest given the role of the hippocampus in dissociation and the amygdala in fear conditioning and the fight-or-flight response.

Thus, childhood experiences can have profound effects on brain organization and development. When experiences of maltreatment dominate, neural connections related to threat perception and response are strengthened relative to other connections, resulting in a brain that is “hardwired” to expect threat (Lee & Hoaken, 2007; Perry, 1997, 2001; Perry et al., 1995). Perry and colleagues (Perry, 1997, 2001; Perry et al., 1995) posit that the chronic fear state effected by C-CM can result in a hyperarousal-based pattern of responding to perceived threats, which is akin to a fight-or-flight response in which one physiologically, emotionally, and cognitively prepares to challenge or escape a situation. They also argue that children who have repeatedly failed to fight or flee learn to make themselves as inconspicuous as possible and dissociate (i.e., “freeze”) in order to avoid harm (Perry, 2001).

Shields and Cicchetti (1998) describe a similar process of threat-sensitivity development. They argue that maltreated children are forced to endure an interminable possibility that violence might occur at any time, which leads to the development of heightened arousal and hypervigilance for threat cues. These factors cause maltreated children to become easily triggered and either emotionally and physically prepare for a fight or mentally remove themselves from threat. Consistent with these arguments, Shields and Cicchetti (1998) report increased aggression, dissociation, and ED among children with a history of CM.

1.2. The reinforcement sensitivity theory of personality

The revised RST (r-RST; Gray, 1970, 1982; Gray & McNaughton, 2000) may be well suited to capture this hypothesized threat-sensitivity trait. The RST is a biological theory of personality in which individual differences in brain activation and corresponding behavior were used to identify brain subsystems that make-up personality. The r-RST includes three major brain subsystems: the behavioral activation system (BAS), the fight–flight–freeze system (FFFS), and the behavioral inhibition system (BIS). The BAS is related to anticipatory pleasure, and is associated with personality characteristics of optimism, reward-orientation, and impulsiveness. The FFFS is responsible for behavioral reactions to fear and is associated with personality factors related to avoidance and fear-proneness. Finally, the BIS is associated with anxious personality traits and is thought to mediate FFFS-avoidance and BAS-approach motivations (Corr, 2008; Hannan & Orcutt, 2013). The r-RST makes a clear distinction between fear (FFFS) and anxiety (BIS); fear directs one away from threat whereas anxiety induces caution when one must move toward threat (Corr, 2008). Essentially, anxiety is associated with *future danger* and fear is associated with *imminent danger* (Barlow, 1988).

No known research has employed r-RST to evaluate personality in the context of CM; however, the FFFS resembles the threat-readiness trait Perry and colleagues describe (Perry, 1997, 2001; Perry et al., 1995). A sensitive FFFS system is associated with heightened fearfulness and threat-readiness (Gray & McNaughton, 2000), which is consistent with the response styles of hypervigilance and expectation for *imminent danger* associated with C-CM.

1.3. Child maltreatment and emotion dysregulation

Developmental research has demonstrated that emotion regulation is not simply present at birth; it develops across the lifespan (Dodge & Garber, 1991). Accordingly, early interactions with primary caregivers shape the development of emotion regulation (Calkins & Hill, 2007). When violence and chaos are present in the home, the development of adaptive emotion regulation is disrupted (Morris, Silk, Steinberg, Myers, & Robinson, 2007). A history of C-CM is an identified factor in the development of ED (Ehring & Quack, 2010), and ED has been found to mediate the relationship between CM and associated negative outcomes (Shields & Cicchetti, 1998). Shields and Cicchetti (1998) argue that exposure to C-CM increases threat-sensitivity and emotional arousal in response to threat, which draws attention away from attempts to regulate emotions when threatened. Further, prior research has documented associations between FFFS sensitivity and ED (Hannan & Orcutt, 2013; Tull, Gratz, Litzman, Kimbrel, & Lejuez, 2010), supporting the argument that FFFS sensitivity contributes causally to the relationship between CM and ED.

2. Overview and hypotheses

The current study proposed that FFFS sensitivity would capture the trait-like response style believed to develop in response to C-CM. While the distinction between C-CM and non-chronic CM⁶ (NC-CM) is less clear than the distinction between the presence and absence of CM, it is an important one to make given Perry and colleagues (Perry, 1997, 2001) argument that neurological alterations primarily occur in response to C-CM. It was hypothesized that FFFS sensitivity would be higher among adults who experienced C-CM compared to those reporting a history of NC-CM or no CM. Consistent with prior research (e.g., Ehring & Quack, 2010), adult survivors of C-CM were also expected to exhibit more ED than those who experienced NC-CM and no CM. Finally, given arguments that response styles developed as a result of C-CM are responsible for negative outcomes such as ED, an indirect effect of FFFS sensitivity on the relationship between CM type and ED was hypothesized. Specifically, those reporting a history of C-CM, relative to no CM, were expected to have heightened FFFS sensitivity, which was expected to predict increased ED. However, given the emphasis on the chronic nature of maltreatment in research on neural adaptations to maltreatment, it was predicted that individuals reporting a history of NC-CM would not have heightened FFFS sensitivity or ED relative to those reporting no CM.

3. Method

3.1. Participants

Participants were 471 undergraduate students from a mid-sized Midwestern university. Fifteen cases were removed because participants elected not to provide information regarding CM frequency and could not be classified as having experienced C-CM or NC-CM. Three cases were removed due to substantial missing

⁶ NC-CM: non-chronic child maltreatment.

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