



SHORT COMMUNICATION

Engagement with Cognitively-Based Compassion Training is associated with reduced salivary C-reactive protein from before to after training in foster care program adolescents

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Summary

Background: Children exposed to early life adversity (ELA) have been shown to have elevated circulating concentrations of inflammatory markers that persist into adulthood. Increased inflammation in individuals with ELA is believed to drive the elevated risk for medical and psychiatric illness in the same individuals. This study sought to determine whether Cognitively Based Compassion Training (CBCT) reduced C-reactive protein (CRP) in adolescents in foster care with high rates of ELA, and to evaluate the relationship between CBCT engagement and changes in CRP given prior evidence from our group for an effect of practice on inflammatory markers. It was hypothesized that increasing engagement would be associated with reduced CRP from baseline to the 6-week assessment.

Methods: Seventy-one adolescents in the Georgia foster care system (31 females), aged 13–17, were randomized to either 6 weeks of CBCT or a wait-list condition. State records were used to

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obtain information about each participant's history of trauma and neglect, as well as reason for placement in foster care. Saliva was collected before and again after 6 weeks of CBCT or the wait-list condition. Participants in the CBCT group completed practice diaries as a means of assessing engagement with the CBCT.

Results: No difference between groups was observed in salivary CRP concentrations. Within the CBCT group, practice sessions during the study correlated with reduced CRP from baseline to the 6-week assessment.

Conclusions: Engagement with CBCT may positively impact inflammatory measures relevant to health in adolescents at high risk for poor adult functioning as a result of significant ELA, including individuals placed in foster care. Longer term follow-up will be required to evaluate if these changes are maintained and translate into improved health outcomes.

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1. Introduction

Children exposed to various types of early life adversity (ELA) (e.g. parental loss, physical or sexual abuse, physical and emotional neglect) suffer significantly increased mortality as adults. Although some of this increased mortality comes from suicide, ELA also increases the risk of developing many adult-onset medical and psychiatric conditions associated with increased mortality, including cardiovascular disease and major depression (Felitti et al., 1998; Nanni et al., 2011). Consistent with the contribution of inflammation to the pathophysiology of these conditions (Black, 2003; Haroon et al., 2011), inflammatory activity has been found to be higher in adults with a history of ELA (Danese et al., 2007). Furthermore, maltreatment-related elevation in inflammation levels may already be detected in some children (Danese et al., 2011) and early pharmacological interventions targeting inflammation may be effective in preventing the long-term consequences of ELA (Brenhouse and Andersen, 2011). Taken together, these findings raise the possibility that behavioral interventions known to reduce inflammatory tone, if administered early in life, might protect against – or at least mitigate – the adverse health consequences of ELA.

Previous research by our group has shown that practice of Cognitively-Based Compassion Training (CBCT), a secular, analytical meditation-based program derived from Tibetan Buddhist mind-training (Tibetan *lojong*), is associated with innate immune inflammatory responses to a standardized laboratory psychosocial stressor in medically healthy young adults (Pace et al., 2009, 2010). The goal of CBCT is to challenge unexamined assumptions regarding feelings and actions toward others, with a focus on generating spontaneous empathy and compassion for the self as well as others. Because increased empathy for oneself and others would be expected to enhance prosocial behavior in ways likely to reduce psychosocial stress, our group initially developed CBCT as a behavioral intervention to reduce deleterious behavioral and physiological stress responses (Pace et al., 2009, 2010). In the current study we sought to extend the clinical relevance of these findings by examining whether CBCT would demonstrate anti-inflammatory properties in younger individuals with a history of significant ELA, who are at high risk for developing an inflammatory condition later in life. To accomplish this, we conducted a randomized study to evaluate whether CBCT would reduce salivary concentrations of C-reactive protein (CRP) in a group of highly traumatized adolescents in the Georgia state foster care

system. Based on prior findings of an association between level of engagement with CBCT and reductions in inflammatory biomarkers, in the current study we also examined whether changes in salivary CRP would be associated with amount of practice time in the group randomized to CBCT. Anxiety and depressive symptoms were also assessed to conduct an exploratory analysis of whether changes in CRP were associated with changes in these behavioral constructs. Of note, additional behavioral as well as psychosocial outcomes have been recently published elsewhere (Reddy et al., 2012), and only marginal effects of CBCT were observed for these variables.

2. Methods

2.1. Participants

Seventy-one adolescents (mean age = 14.7 [SD = 1.14]; 56% female) in the Georgia foster care system were evenly randomized (by a list of random numbers, generated by computer) to either 6 weeks of CBCT or a 6 weeks wait-list control condition during late August 2010. All participants were free of medical illness including cancer, cardiovascular disease, diabetes, and autoimmune disorders. Participants were also free of schizophrenia, bipolar I disorder, eating disorders, and major depression severe enough to require hospitalization, as determined by psychiatric examination. Participants taking medications known to influence immune and endocrine functioning including corticosteroids and non-steroidal anti-inflammatory compounds were excluded. Case managers for each participant provided informed written consent and participants provided informed written assent. The study was approved by the Institutional Review Board at the Georgia Department of Public Health.

2.2. Overview of study procedures

The 6-week CBCT program employed in this study generally followed procedures outlined previously (Pace et al., 2009). Children randomized to the CBCT group attended 1-h long classes twice a week for 6 weeks, for a total of 12 classes. As in our previous studies (Pace et al., 2009, 2010), CBCT class sessions combined teaching, discussion, and CBCT meditation practice. Our previous experience with teaching CBCT in children suggested that foster care adolescents would likely benefit from several targeted changes in the way CBCT is typically delivered to adults. Specifically, we adapted our

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