Moderators and mediators of emotion regulation and flexibility on post-trauma outcomes following the 2013 Boston Marathon

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Abstract

Strong evidence indicates a bi-directional relationship between trauma and emotion regulation. A traumatic event often leads to heightened emotional responses and dysregulation; these responses may in turn affect post-trauma outcomes, promoting or preventing both distress and growth (O’Bryan et al., 2015; Mennin et al., 2015). Individual differences in gender, gender role, proximity to the event and trauma history have shown significant, independent influences on both emotion regulation tendencies and post-trauma outcomes. This study examines the effects of gender, gender role, proximity to the event and trauma history on emotion regulation strategies, and their subsequent effects on post-trauma outcomes in individuals exposed to the events of the 2013 Boston Marathon. Self-report measures and an experimental manipulation of emotion flexibility were completed by a sample of college student EMTs, medical professionals, emergency responders and community members (N=257, 65.8% male and 34.2% female) through an online, Qualtrics-based survey. Results indicated that both adaptive and maladaptive regulatory strategies were positively associated with distress and growth; and distress and growth were strongly correlated. Exploratory models for both growth and distress demonstrate that the impact of adaptive and maladaptive regulation depend on moderating and mediating factors. Individuals high in adaptive regulation, low in maladaptive regulation, low in event proximity and high in trait femininity reported less distress following a trauma. They also reported experiencing less growth. Among the individuals who did experience high levels of distress (likely those high in maladaptive regulation, coping flexibility and event proximity), high adaptive regulation and high coping flexibility predicted higher growth, particularly for females. When all factors were considered, emotional flexibility was independently protective of distress. Implications and directions for future research are discussed.
Moderators and Mediators of Emotion Regulation and Flexibility on Post-trauma Outcomes Following the 2013 Boston Marathon Bombing

It is very likely that at some point, all individuals will experience highly stressful, negative life experiences. These experiences, often referred to as traumatic, have the potential to significantly disrupt and impair biological, psychological and social functioning. On the other hand, these experiences often give rise to incredible examples of resilience and growth. In fact, traumatic events are sometimes followed by simultaneous distress and growth.

Defining Trauma

For the following discussion, it is important to distinguish a traumatic event from a stressful event. The fifth version of the Diagnostic and Statistical Manual of Mental Disorders defines a trauma as “exposure to actual or threatened death, serious injury or sexual violence” (p. 271) through direct experience, witnessing of the event in person, learning that such an event has happened to a close friend or family member, or experiencing repeated/extreme exposure to adverse details of such events (American Psychological Association, 2013). The operational definition of experiencing excludes exposure through media unless such exposure is work-related (American Psychological Association, 2013). An epidemiological study of a representative sample of United States adults found that 89.7% of the population had been exposed to a traumatic event, as defined by the DSM-5 criteria, at some point in their lives (Kilpatrick et al., 2013). This criterion objectively determines exposure to a traumatic event. It is important to establish that events that meet this criterion are labeled ‘traumatic’, and that this determination is based solely on exposure and not distress symptoms.

The amount of stress an individual experiences describes the impact of the event; the same objective exposure could be associated with a wide variety of subjective distress (or
absence of distress) in different individuals. This is why additional criteria must be met for an individual to be diagnosed with PTSD, as these additional criteria assess the impact of the traumatic event (American Psychological Association, 2013). The idea that trauma is subjective is captured in a long-standing description by psychologist Judith Herman: “…traumatic events overwhelm the usual methods of coping that give people a sense of control, connection and meaning” (Herman, 1992, p. 32). As “usual methods of coping” will vary between individuals, the extent to which an event overwhelms coping abilities will also vary.

**Responses to Trauma: Growth, Resilience and Distress**

The field of trauma psychology has expanded rapidly in recent years, furthering understanding of normal and pathological responses to trauma. Four prototypical responses to trauma have been identified: chronic dysfunction, delayed reaction, recovery and resilience (Bonanno et al., 2010). These pathways characterize common reactions to trauma; however, they do not all constitute a “normal” response. Moderate to severe levels of dysfunction accompany chronic dysfunction, delayed reaction and even recovery responses at some point in their trajectory. Contrary to popular belief, resilience is still the most common response to a traumatic event (Bonanno et al., 2011). It is defined by Bonanno (2004) as “the ability of adults in otherwise normal circumstances who are exposed to an isolated and potentially highly disruptive event, such as the death of a close relative or life threatening situation, to maintain relatively stable, healthy levels of psychological and physical functioning” (p. 20). While resilience, characterized by the absence of significant post-traumatic symptoms of distress, is most common, it is also true that immediately after exposure to a potentially traumatic event, many individuals show symptoms consistent with PTSD, anxiety, depression and related functional impairment. Even resilience can include low levels of distress. In most cases, within the first
three to twelve months following the event, these symptoms decrease without formal psychological or psychiatric treatment (Zoellner & Feeney, 2014). It is important to note here that although common, post-traumatic symptoms are not normal responses to trauma, they are symptoms of distress. These post-traumatic symptoms (PTS) are components of the diagnostic criteria for post-traumatic stress disorder (PTSD). PTSD is a pathological response to a traumatic event; formerly considered an anxiety disorder, it is now classified as a “Trauma and Stressor Related Disorder”, caused by exposure to a traumatic event and characterized by PTS that interfere with the normal flow of life (American Psychological Association, 2013). Again, the presence of PTS may or may not meet the diagnostic criteria for PTSD but regardless, PTS are not normal responses to trauma; they are symptoms of distress (Bonanno et al., 2011).

In addition to resilience and PTS/PTSD, post-traumatic growth (PTG) is a potential response to trauma. PTG is described as the positive psychological change that occurs as a result of the psychological efforts to deal with challenging life circumstances (Calhoun & Tedeschi, 2001). Triplett et al. (2011) propose a model that explains the process of PTG in three steps: first, individuals must work cognitively to process the experience of a trauma. Next, this deliberate processing of the trauma leads to the incorporation of the trauma into core beliefs. Lastly, the incorporation of the trauma into core beliefs helps the individual discover a new sense of meaning in life. A study of this model on American undergraduate students who experienced a recent trauma provided support for this process model of PTG (Triplett et al., 2011). PTG differs from resilience in that PTG is not characterized by the absence of post-traumatic symptoms; in fact, some research has even found PTG to be positively correlated with psychological distress (Hobfoll et al., 2007). It is suggested that this is because individuals with higher levels of post-traumatic symptoms often report seeking out higher amounts of coping strategies (Pat-
Horenczyk & Brom, 2007). This reflects what has been referred to as the “Janus face model of PTG”, which suggests that there are multiple types of PTG including constructive and illusory growth. Constructive growth is characterized by coping improvements (high positive coping or decreases in negative coping) and increasing reports of growth at different time points, whereas illusory growth is characterized by no improvement in coping over time, yet increasing reports of growth (Pat-Horenczyk et al., 2015).

**Defining Emotion Regulation**

Our vastly expanding knowledge of psychological responses to trauma lead us to ask how individuals can best cope with exposure to and subsequent distress from a traumatic event. In other words, how can we guide people towards the resilience trajectory, post-traumatic growth and lower levels of PTS? The equally growing field of emotion regulation may provide some insight. As depicted by Gross’s modal model of emotion, emotion encompasses the attention paid to a situation, the appraisal of that situation and the response to the situation (Gross, 2014). This involves “person-situation transactions that compel attention, have meaning to an individual in light of currently active goals, and give rise to coordinated yet flexible multi-system responses that modify the on-going person-situation transaction in crucial ways” (Gross, 2014, p. 4).

Emotion regulation is commonly defined as “the process of shaping which emotions one has, when one has them, and how one experiences or expresses these emotions” (Gross, 2014, p. 6). Emotion regulation has three core features: activation of a regulatory goal, the engagement of regulatory processes, and the modulation of the emotion trajectory (Gross, 2014).

Emotion regulation and coping are terms that are widely used and that often overlap. However, emotion regulation and coping are not interchangeable and it is important to differentiate between the two. Coping is defined as conscious and volitional efforts to regulate
emotion, cognition, behavior, physiology and the environment in response to stressful events or circumstances (Compas et al., 2014). Thus, emotion regulation can be part of the coping process, but differs from coping as emotion regulation encompasses efforts to manage emotion under a wide range of stimuli, while coping occurs exclusively in response to stress. Emotion regulation includes both controlled and automatic processes, whereas coping includes only controlled, volitional processes (Compas et al., 2014).

**Emotion Regulation and Trauma: A Bi-Directional Relationship**

The relationship between emotion regulation and trauma is bi-directional: exposure to a traumatic event can affect our ability to regulate emotions; in turn, emotion regulation abilities can influence the impact and experience of a traumatic event. Upon exposure to a traumatic event, it is typical to experience heightened emotion responses even for individuals who follow a resilient outcome trajectory (O’Bryan et al., 2015). Naturally, exposure to such an event frequently leads to feelings of intense fear, helplessness and horror (Tull et al, 2007). Previous research suggests that post-traumatic symptoms (PTS), which are symptoms of distress and a component of the diagnostic criteria for PTSD, are associated with heightened emotional responses and therefore greater regulatory efforts are important for both reducing and preventing PTS (Mennin et al., 2005). Stress is often described as occurring when perceived resources are unable to meet an individual’s needs; as such, the inability to down-regulate the heightened emotional arousal that occurs after a traumatic event is associated with an increase in PTS and likely contributes to the perception of emotions as uncontrollable and unpredictable (Tull et al., 2007). Studies of individuals who have experienced a traumatic event have shown that severity of PTS is associated with emotion regulation difficulties including a lack of emotional acceptance, emotional clarity and difficulty accessing and engaging in regulatory strategies.
As much as trauma can affect emotion regulation, emotion regulation can also affect the experience of a trauma. The meaning that a person attributes to a traumatic event has a strong influence on both the experience of the traumatic event and coping abilities. Specifically, cognitive emotion regulation has a significant role in the attribution of meaning for various events, including those that are traumatic (Pat-Horenczyk et al., 2014). As described above, the perception that an event is overwhelming, and the intense feelings of fear and helplessness that often follow a traumatic event can lead to an individual’s belief that he/she lacks the resources to regulate heightened emotions following a traumatic event. A strategy like positive reappraisal can help an individual attribute new meaning to an event that is characterized by less distress; instead of perceiving the event as overwhelming, reappraisal gives the event a more positive meaning, potentially modifying the emotions or the interpretations of the emotions following the event. Further, positive reappraisal can even help an individual attribute new meaning to the emotions that arise after a traumatic event. For example, instead of feeling overwhelmed by feelings of grief after the death of a loved one, and individual may interpret (reappraise) these feelings to represent an indication of the special relationship between and individual and the deceased. Reappraisal specifically has been correlated with healthier affect, enhanced well-being, higher levels of social functioning and lower levels of PTS (Eftekhari et al., 2009; Singh & Mishra, 2011). Post-traumatic growth has also been associated with deliberate, event-specific processing of a traumatic event (Cann et al., 2011). Additionally, specific regulatory strategies, including rumination, suppression and overall difficulty accessing regulatory strategies have shown correlations with increased levels of PTS (O’Bryan et al., 2015; Singh & Mishra, 2011; Zhou et al., 2015). Regulatory strategies can be classified as maladaptive (self-blame,
rumination, catastrophizing, other-blame) or adaptive (acceptance, positive refocusing, refocus on planning, positive reappraisal, putting situation in perspective). Findings that maladaptive strategies measured by the Cognitive Emotion Regulation Questionnaire (CERQ) are correlated with PTS but positive strategies are not significantly (negatively) correlated with PTS highlight one discrepancy in the effect of groups of emotion regulation strategies on outcomes following trauma. This suggests that further research into the effect of specific strategies, rather than groups of strategies like “adaptive” and “maladaptive” may be useful (Pat-Horenczyk et al., 2014). Further, especially in cases of traumatic experiences, other factors may influence the effect of regulatory strategies on post-trauma outcomes.

A meta-analysis of predictors of PTSD and PTS shows that peri-traumatic emotional processes are significant predictors of PTSD; that is, emotion regulation at the time of exposure to traumatic event is most influential on post-trauma outcomes (Ozer et al., 2008). The type of regulatory strategies that an individual chooses to employ may be influenced by the intensity of the emotion and emotional stimulus, and the relevance of the stimulus to long-term goals (Sheppes et al., 2014). Thus, while peri-traumatic emotion regulation may have the most impact on responses to traumatic events, previous research about emotion regulation choice suggests that the ability to access and evaluate a number of different regulatory strategies at the time of a traumatic event is important; therefore, overall trait-based regulatory abilities influence state-based regulation abilities.

Influencing the Emotion Regulation-Trauma Relationship: Moderators and Mediators

**Flexibility.** Emotional flexibility, the ability to flexibly express or suppress emotional expression as demanded by the situation context, or to flexibly alternate between regulatory strategies, has almost always been shown to be a significant protective factor against PTS
(Bonanno et al., 2004). While not necessarily a regulatory strategy in itself, flexibility encompasses the ability to alternate between different regulatory strategies; it also has consistently been found to predict resilience after a traumatic event (Galatzer-Levy et al., 2012). It is important to consider the difference between flexibility and inconsistency in responding. Flexibility has been measured in multiple ways: by both the ability to alternate between expressing and suppressing emotion, as well as by the ability to engage in both trauma-focused and forward-focused coping (Bonanno et al., 2004; Bonanno et al., 2011). As the theory of post-traumatic growth suggests, deliberate reflection and cognitive processing of the traumatic event is an important part of coping with a trauma; this is referred to as trauma-focused coping (Bonanno et al., 2011; Triplett et al., 2011). However, growing research also suggests that coping strategies that minimize trauma-focus, like distraction, emotional avoidance and/or optimism are associated with positive outcomes and lower levels of distress following a trauma, as they help individuals maintain focus on current goals, continuing with “normal” routines and moving beyond the traumatic distress. The idea of coping flexibility suggests that both trauma-focused and forward-focused strategies are important in the coping process and that the ability to alternate between the two, as a situation demands, predicts resilience (Bonanno et al., 2011).

Numerous studies have found that flexibility is indeed a protective factor against post-traumatic symptoms and a predictor of resilience (Bonanno et al., 2004; Galatzer-Levy et al., 2012; Pat-Horenczyk et al., 2014). While some previous research has shown that individuals experiencing higher levels of distress seek out higher amounts of coping strategies, it can be argued that flexibility differs from inconsistency in responding because flexibility is almost always associated with low levels of post-traumatic symptoms and high levels of resilience following a trauma (Pat-Horenczyk & Brom, 2007).
A number of additional factors influence the multifaceted relationship between trauma and emotion regulation. We focus specifically on gender and gender role identification, proximity to the event and trauma history.

**Gender.** Research findings support the idea that females are more internally focused and they tend to regulate emotion passively, while males tend to engage in suppression or emotional avoidance. Females report a greater likelihood of choosing to focus on and analyze emotions, and additionally report engaging in more types of emotion regulation than males do (Nolen-Hoeksema, 2012). Some theories suggest that this is because females appraise negative events as being more stressful relative to males, and report greater intensity of emotions; therefore, they are more likely to use more regulatory strategies because they have appraised a stimulus or stressor as being more severe/intense (Nolen-Hoeksema, 2012). Gender differences in rumination are especially common throughout research; females are more likely to ruminate, and rumination has been suggested to mediate higher rates of anxiety and depression, which are often co-morbid with PTSD, in women (Nolen-Hoeksema, 2012).

Studies have shown that when traumatic exposure is equivalent, females typically report more PTS compared to males, which is consistent with the idea that females have a greater tendency to engage in maladaptive emotion regulation strategies (Hetzel-Riggen & Roby, 2013; Pat-Horenczyk et al., 2009). Although degree of exposure tends not to explain gender differences in response to trauma, gender differences have been found regarding the type of traumatic events experienced. This suggests that gender differences in response to traumatic events may be explained by gender-specific event attributes (Freedman et al., 2002).

**Gender role.** Previous research suggests that gender role may explain some of the gender differences in various psychopathologies. Regardless of gender identification, individuals may
vary in levels of socially constructed gender role attributes including femininity, masculinity, or both (androgynous). Masculinity is associated with a sense of agency and instrumental nature, and femininity is associated with an expressive and a strong communal nature (Bem, 1974). Gender role has provided some explanations for gender differences in depression, as previous research has suggested that those embodying a highly female role are socially conditioned to ruminate and engage in maladaptive regulation more frequently, which is predictive of depression (Conway et al., 2008). Gender role likely explains similar findings that females are more likely to engage in cognitive reappraisal while males are more likely to engage in expression suppression strategies (Zhao et al., 2014). There is little research investigating the impact of gender role on reactions to trauma, but the understanding that gender role influences an individual’s regulatory tendencies may further account for gender differences in responses to trauma.

**Trauma History and Event Proximity.** In addition to gender role, trauma history and event proximity both show associations with PTS levels. History of multiple trauma exposure is associated with more PTS and is a significant predictor of PTSD (O’Bryan et al., 2015; Ozer et al., 2013). Previous studies have also found a significant interaction between trauma history and flexibility level that predicts PTS symptom severity, in which flexibility was protective of PTS severity regardless of level of repeated exposure, emphasizing the moderating effect that prior trauma history can have on effect of regulatory strategies on post-traumatic outcomes (Bonanno et al., 2011).

Additionally, proximity of exposure to a traumatic event has shown a positive correlation with levels of PTS, and individuals with high proximity to an event report using more adaptive and maladaptive coping compared to those with lower proximity (Pat-Horenczyk et al., 2009).
Therefore, proximity may moderate the degree to which adaptive coping is protective of distress and maladaptive coping is predictive of distress. Proximity to an event is defined not only by physical proximity of the individual to the traumatic event, but also by relative proximity (for example, knowing someone who was at the site of the traumatic event). Proximity encompasses multiple aspects of the connection between an individual and an event, including a “near miss,” when an individual planned to be at the site of a traumatic event but was not.

The Present Study

The aim of this study was to examine how individual differences moderate the effectiveness of emotion regulation strategies on post-trauma outcomes. In other words, under what conditions are different emotion regulation strategies most effective in dealing with trauma? Based on this review of previous literature around both trauma and emotion regulation, we proposed the following hypotheses:

Hypothesis one deals with expected first order correlations among the emotion regulation strategies and flexibility with post-traumatic distress and growth.

**Hypothesis 1a:** Maladaptive emotion regulation strategies would be positively associated with post-traumatic distress symptoms.

**Hypothesis 1b:** Adaptive emotion regulation strategies, including flexibility, would be negatively associated with post-traumatic distress symptoms.

**Hypothesis 1c:** High levels of adaptive emotion regulation and flexibility would be positively associated with post-traumatic growth.

Hypothesis two deals with the independent impact of adaptive and maladaptive regulation on post-traumatic distress and growth (further referred to as the base interactions).

**Hypothesis 2a:** High levels of adaptive emotion regulation would be associated with low
levels of distress. High levels of maladaptive emotion regulation would be associated with high levels of distress.

**Hypothesis 2b:** High levels of adaptive emotion regulation would be associated with high levels of post-traumatic growth. High levels of maladaptive emotion regulation would also be associated with high levels of post-traumatic growth.

Hypotheses three and four deal with moderators and mediators of the base interactions between emotion regulation and post-trauma outcomes. Hypothesis three addresses moderators of distress and hypothesis four addresses moderators of growth.

**Hypothesis 3a:** Gender would moderate the main effects of emotion regulation on distress. Adaptive regulation would be associated with lower levels of distress in females relative to males, whereas maladaptive regulation would be associated with lower levels of distress in males relative to females. Gender role would mediate the effect of gender on emotion regulation and distress.

**Hypothesis 3b:** Proximity to the event and/or prior trauma history would moderate the main effects of emotion regulation on distress. Maladaptive regulation would have more of an effect on distress when proximity and/or prior trauma history were high.

**Hypothesis 3c:** Emotional and coping flexibility would further influence the relationship between emotion regulation and distress. Maladaptive regulation would have more of an effect when emotional and coping flexibility were low.

**Hypothesis 4a:** Gender would moderate the main effects of emotion regulation on growth. Adaptive regulatory strategies would be associated with higher levels of growth in females relative to males, whereas maladaptive regulatory strategies would be associated with higher levels in growth in males relative to females. Gender role would mediate the effect of
gender on emotion regulation and growth.

**Hypothesis 4b:** Proximity to the event and/or prior trauma history would moderate the main effects of emotion regulation on growth. Maladaptive regulation would have more of an effect on growth when proximity and/or prior trauma history were high.

**Hypothesis 4c:** Emotional and coping flexibility would further influence the relationship between emotion regulation and growth. Maladaptive regulation would have more of an effect on growth when emotional and coping flexibility were low.

**Hypothesis 5:** Based on findings addressing predictors and moderators of emotion regulation strategies on both post-traumatic distress and growth, we derived two exploratory models, one for distress and one for growth. Input came from emotion regulation strategies (both general and individual strategies) and potential moderating and mediating factors.

**Methods**

**Participants**

The participants in this study included college student EMTs, medical professionals and community members who were over the age of 18 and resided in the greater Boston area at the time of the 2013 Boston Marathon. Participants were recruited through public email addresses and community list serves and websites. Data was collected from 284 participants and participants were not included in the analyses if more than 50% of data was missing. Of the data collected, 257 participants were included in the analyses. The sample was slightly overrepresented by males (65.8%, N=169) as opposed to females (34.2%, N=88), and participant ages ranged from 19 to 62 (M=33.28, SD=6.350). The study benefitted from a relatively diverse sample (74.3% Caucasian, 8.6% African American, 7.8% Hispanic, 3.9% Asian, and 4.7% Native American). Additionally, participants indicated if they were completing the study as a previous or current student EMT (33.2%), medical professional, (13.7%) college student (6.6%),
community member, (26.2%) emergency responder (19.9%) or other (0.4%).

**Measures**

**Gender Role.** The BEM Sex Role Inventory (BSRI) was administered to assess gender role (Appendix A). The BSRI was selected to assess gender role in the present study because it treats masculinity and femininity orthogonally. The BSRI provides ratings of masculinity and femininity and has shown Cronbach’s Alpha levels of .86 for masculinity and .82 for femininity in addition to high test-retest reliability (Masculinity $r = .90$; Femininity $r = .90$) (Holt & Ellis, 1998). The BSRI consists of a list of 60 traits that individuals rank on a scale of 1 (never or almost never true) to 7 (almost always true). Each item is classified as masculine, feminine or androgynous and scores for each of the three categories are calculated by totaling the questions category and dividing by 20. Higher scores indicate higher levels of each trait, respectively. Sample traits include self-reliant, helpful, cheerful, moody and independent. The BSRI demonstrated good internal consistency for both masculinity ($\alpha=0.896$) and femininity ($\alpha=0.904$) in the present study.

**Trauma Proximity and History.** Proximity to the Event and Trauma History were both measured with brief questionnaires developed by Professor Ruth Pat-Horenczyk (Appendix B and Appendix C, respectively). In the Trauma History measure, we substituted “Death of a parent of sibling” in place of “Moved out of home either by force or choice” for item 10. The measure was initially used in an Israeli population sample and we determined that the original question was specific to the Israeli sample and not applicable to the Boston area population. Additionally, we made three additions to the Proximity to Event measure to make it most applicable to our sample. Items 9, 10, and 11 are the additions and are listed below as sample items:
9. Someone close to me was present at the site of the attack.
10. Someone close to me was near the site of the attack.
11. I was present at a celebration after the capture of the suspected terrorist and the reversal of the citywide lockdown.

Trauma history was calculated by counting the number of items marked yes to obtain a total trauma history score, with a higher score indicating a greater trauma history. Proximity to event was scored similarly with the number of items between 1-10 marked true being totaled for an overall proximity measure; item eight, however, was reverse scored. Item 11 was viewed independently.

**Emotion Regulation Strategies.** Measures of emotion regulation include the Brief COPE, Emotion Regulation Questionnaire (ERQ) and Cognitive Emotion Regulation Questionnaire short (CERQ). The Brief COPE measured state-based strategies (strategies used during the time of the 2013 Boston Marathon) (Appendix D). We opted to use the Brief COPE, a shortened version of the COPE Inventory, as reports indicate the Brief COPE has a high internal consistency and validity without the length of the COPE Inventory (Carver, 1997). As we are administering the Brief COPE for an event that occurred almost three years ago, we changed the tense of each question to reflect an event that happened in the past, rather than an event currently happening. The Brief COPE consists of 28 items, ranked on a scale of 1 (I didn’t do this at all) to 4 (I did this a lot). With no reverse scoring, the value for each item codes for one of fourteen different coping strategies (see Appendix G for scoring and alpha levels) (Carver, 1997). *Sample item: I turned to work or other activities to take my mind off things.* Due to low scale reliability and to minimize reliance on memory recall in addition to self report, we opted to use the ERQ and CERQ as measurements of regulation in the present analyses.

The ERQ and CERQ are used to measure trait-based emotion regulation strategies (strategies an individual uses to cope and regulate emotions in general). As mentioned, trait-
based strategies often predict the type of strategies and individual will employ in response to a traumatic event (state-based strategies) (Sheppes et al., 2014). We chose to measure trait-based strategies to address our first hypothesis, as we predicted that emotion regulation strategies would be associated with post-trauma outcomes. It is necessary to explore both the effects of state and trait-based strategies to see if individuals who have a tendency to use maladaptive/adaptive strategies generally across multiple situations differ in post-traumatic outcomes. Additionally, ability to access and evaluate a number of different regulatory strategies at the time of a traumatic event may dependent on trait-based strategies. We opted to use both the ERQ and the CERQ because the ERQ is only ten items and measures suppression, which is not included in the CERQ.

The ERQ consists of 10 items ranked on a scale of 1 (strongly disagree) to 7 (strongly agree) (Appendix E). With no reverse scoring, scores on items 1, 3, 5, 7, 8, and 10 are totaled to calculate a reappraisal score and items 2, 4, 6, and 9 are totaled to calculate a suppression score; the higher each score, the higher an individual’s tendency to engage in either suppression or reappraisal. Both the suppression and reappraisal factors show high internal consistency, with alpha levels of .76 and .82, respectively (Gross & John, 2003). The ERQ demonstrated good internal consistency in the present study for both suppression (α=.76) and reappraisal (α=.804).

Sample item: 1) When I want to feel more positive emotion (such as joy or amusement), I change what I am thinking about.

The CERQ consists of 18 thoughts rated on a scale of 1 (almost never) to 5 (almost always) to indicate how often an individual generally has these thoughts after an unpleasant event (Appendix F). Each item codes for one of nine conceptual scales (self-blame, other-blame, rumination, catastrophizing, positive refocusing, planning, positive reappraisal, putting into
perspective and acceptance) (see Appendix D for scoring and alpha levels). The higher the subscale score, the more a specific cognitive strategy is used (Garnefski & Kraaij, 2006). The CERQ subscales can be used to calculate overall scores for maladaptive and adaptive. Maladaptive coping consists of four subscales (self-blame, rumination, catastrophizing and other-blame) and adaptive coping consists of the remaining five subscales (acceptance, positive refocusing, refocus on planning, positive reappraisal and putting into perspective) (Pat-Horenczyk et al., 2014). Both maladaptive and adaptive coping factors demonstrated good internal consistency in the present study with alpha levels of .917 and .895, respectively. *Sample item:* *I often think about how I feel about what I have experienced.*

**Flexibility.** Replicating earlier studies, emotional flexibility was measured experimentally with the International Affective Picture System. This aspect of the study is important, as studies of emotion regulation are frequently limited to self-reports. Participants viewed a different series of images in three separate conditions and rated the amount of negative and positive emotion they felt upon viewing each image. The first condition was a control condition; after this, and in random order, the participants were prompted to express their emotions upon viewing image, or to suppress their emotions as if an outside observer was guessing what they felt with each image. Each condition included two images of positive valence, two images of negative valence, and one neutral image based on prior ratings of image valence on a scale of 1-9 (Lang et al., 2008). The selected images were matched for positive and negative valence, as well as arousal level (see 5 (Appendix G). Each image was presented to participants for five seconds. Before the presentation of each image in the expressive and suppressive condition, participants received instruction regarding the status of the hypothetical observer (express emotion or suppression emotion). After each picture, participants rated the
degree to which they felt negative emotion and the degree to which they felt positive emotion on a scale of 1 (no emotion) to 7 (extreme emotion).

The IAPS images selected demonstrated strong internal consistency with alpha levels of .89 for positive emotion and .87 for negative emotion.

Coping flexibility, the ability to engage in both trauma-focused and forward-focused coping behaviors, was measured with the Perceived Ability to Cope with Trauma (PACT) scale (Appendix H). We opted to measure both coping flexibility and emotional flexibility because coping flexibility, in contrast, measures responses to stress as an exclusively, state-based construct, while emotional flexibility is a more stable, trait-based construct. PACT has shown high levels of internal consistency with alpha levels of .79 for trauma-focusing coping and .91 for forward-focused coping. Each item in PACT codes for either forward-focused coping (factor A) or for trauma-focused coping (factor B). Total coping can be calculating through totaling the averaging scores for factor A and factor B. Coping flexibility is calculated as follows: total coping – |average of factor A – average of factor B| (Bonanno et al., 2011). PACT demonstrated good internal consistency in the current study with alpha levels of .885 for forward-focused coping and .828 for trauma-focused coping. Sample item: Keep my schedule and activities as constant as possible.

**Post-trauma outcomes.** Post-trauma outcomes were assessed with the Post Traumatic Growth Inventory (PTGI) and the PCL-5. The PCL-5 is the DSM-5 measure of post-traumatic symptoms (Appendix I). This measure is typically not used for the diagnosis of PTSD, which requires a structured clinical interview, but is used to monitor post-traumatic symptoms. It has a high internal consistency with an alpha level of .94 (Blevins et al., 2015). It can also measure resilience, as defined by low levels of post-traumatic symptoms. The PCL contains 20 items
rated on a scale of 0 (not at all) to 4 (extremely) to indicate how much an individual was bothered by the problem listed. The scores for each item are totaled; the higher the score, the higher the amount of PTS an individual is experiencing. The PCL demonstrated good internal consistency in the current study ($\alpha=.963$). *Sample item: Repeated, disturbing and unwanted memories of the stressful experience* (Weathers et al., 2013).

The PTGI measures post-traumatic growth and consists of 21 items (Appendix J). Each item is rated on a scale of 0 (I did not experience this change) to 5 (I experienced this change to a very great degree). Total growth is calculated by summing all responses; the higher the score, the greater the amount of post-traumatic growth. Additionally, the PTGI items can be divided into five factor subscales: relating to others, new possibilities, personal strength, spiritual change and appreciation of life. The PTGI has a high internal consistency with alpha levels from .9-.94 and demonstrated good internal consistency in the current study ($\alpha=.946$) (Cann et al., 2011). *Sample item: I changed my priorities about what is important in life.*

**Procedure**

The study was administered through a Qualtrics survey and participants were recruited through public email addresses and community listservs. The survey began with informed consent (Appendix K) and brief demographic questions, followed by questionnaires that measured gender/gender role identification, proximity to the event, prior trauma history, emotion regulation strategies (e.g., rumination, reflection, suppression, reappraisal), emotional flexibility, coping flexibility, post-traumatic symptoms, post-traumatic growth and resilience. Questionnaires were administered in the following order (see appendix A-J for questionnaire instructions): 1. Bem Sex Role Inventory (BSRI), 2. Trauma History Questionnaire, 3. Emotion Regulation Questionnaire (ERQ), 4. Cognitive Emotion Regulation Questionnaire (CERQ), 5.
After completing these questionnaires, participants completed the IAPS task. During this task, they were asked to view a series of pictures and rate the amount of negative and positive emotion they felt upon viewing each picture. The task consisted of three conditions of five pictures each (two negative valence images, two positive valence images, and one neutral image). The first condition was a control condition and in the two proceeding conditions, participants received instructions express their emotions as if an outside observer wants to know what they are feeling, and then to suppress their emotions as if trying to hide how they were feeling from an outside observer. The order in which participants were presented with the expressive and suppressive conditions was randomized. Each picture was presented for five seconds and before the presentation of each picture, participants received the following instructions for each condition:

*Control Condition*: In the last portion of this study, we ask you to complete a brief task. You will be presented with a series of images. Each image will remain on the screen for five seconds. After viewing each image, you will be asked to rate the amount of negative and positive emotion you felt while viewing the image. Please view each image carefully.

*Expressive Condition*: When you view this round of images, imagine that an observer is watching you. While viewing the images, please do your best to express as fully as possible any emotions you feel while viewing the image. It is important for the sake of this study that you do your best to communicate what you are feeling to the observer, so please do the best you can to behave in such a way that an observer would be able to guess what you are feeling when you view each image.

*Suppressive Condition*: When you view this round of images, imagine that an observer is watching you. While viewing the images, please do your best to suppress as fully as possible any emotions you feel while viewing the image. It is important for the sake of this study that you do your best to conceal what you are feeling from the observer, so please do the best you can to behave in such a way that an observer would NOT be able to guess what you are feeling when viewing
The IAPS task completed the study. After the task, participants were presented with a debriefing form (Appendix L) and a resource page (Appendix M) providing information about resources for individuals who have experienced a traumatic event. Participants had the option to receive compensation for completing the study in the form of a $5 Amazon gift card and indicate a desire to be informed of future research opportunities by sharing their email address. At both times, email addresses were collected through a separate survey and stored in a completely separate response sheet from the primary survey response sheet (which contained responses to the study questionnaires), ensuring that participant email addresses could not be linked to survey responses.

**Data Reduction and Analytic Plan**

The present study looked at gender, styles of coping, and emotional regulation as main predictors of post-trauma outcomes. Emotional flexibility was calculated by summing the difference between total levels of valence-matched emotion (positive emotion with a positive image, negative emotion with a negative image) in each condition with the control condition using the following formula: 

$$\left( \Sigma_{\text{expressive positive image positive emotion}} + \Sigma_{\text{expressive negative image negative emotion}} \right) - \left( \Sigma_{\text{control positive image positive emotion}} + \Sigma_{\text{control negative image negative emotion}} \right) + \left( \Sigma_{\text{control positive image positive emotion}} + \Sigma_{\text{control negative image negative emotion}} \right) - \left( \Sigma_{\text{suppressive positive image positive emotion}} + \Sigma_{\text{suppressive negative image negative emotion}} \right) = \text{overall flexibility score.}$$

A higher score equals a greater ability to both enhance and suppress. This task design and formula were adapted from an earlier study of emotional flexibility by Bonanno et al (Bonanno et al., 2004).

Further, this study investigated moderators and mediators of the relationship between
gender, emotion regulation and post-trauma outcomes. To test for moderation and mediation, we created median split variables for adaptive coping, maladaptive coping, distress, post-traumatic growth, coping flexibility, emotional flexibility, masculinity, femininity, proximity and prior trauma history. We opted to use a categorical approach to moderation and mediation due to the equivalence between categorical and dimensional methods, and because ANOVA provided results that could easily be visualized.

Additionally, we created z-scores for each variable or scale to build two exploratory models incorporating significant moderates and mediators of all factors on distress and growth. These models used a dimensional approach and replicated findings from our previous ANOVAs.

Results

The purpose of this study was to test the effects of gender, gender role, proximity to event, and prior trauma history on styles of coping and emotion regulation, and the influence of combinations of these factors on post-trauma outcomes. We ran descriptive statistics for all scales (see Table 1). Participants used the scales widely across scale ranges. Our sample endorsed high levels of masculinity \( (M = 5.17, SD = 0.79) \), fairly high levels of growth \( (M = 4.15, SD = 0.96) \) and reasonably low distress \( (M = 3.16, SD = 0.98) \). Post-traumatic growth and distress were significantly correlated \( (.78) \). Trauma history in our sample \( (M = 2.60, SD = 2.36) \) was reasonably representative of the average trauma history (according to DSM-5) criteria of general population samples in previous studies (Kilpatrick et al., 2013). Our sample may have slightly higher trauma histories due to the population of first responders and emergency professionals.

The low distress group showed significantly less posttraumatic growth \( (M = 3.55, SD = 0.84) \) than the high distress group \( (M = 4.78, SD = 0.59) \), \( t(231.85) = -13.62, p < .001 \), and the
effect size was large ($r = 0.66$). In parallel, the high growth group showed significantly more distress ($M = 3.96$, $SD = 0.62$) than the low growth group ($M = 2.49$, $SD = 0.68$), $t(250.99) = -18.09, p < .001$, and the effect size was large ($r = 0.75$).

**Hypothesis 1a**

To test the hypothesis that maladaptive emotion regulation strategies would be positively associated with post-traumatic distress symptoms, Pearson correlations were run on the respective variables. As hypothesized, CERQ maladaptive regulation was significantly correlated with PCL distress (.80, $p < .001$), as was ERQ suppression (.67, $p < .001$) and CERQ rumination (.63, $p < .001$) (see Table 2).

**Hypothesis 1b**

To test the hypothesis that adaptive emotion regulation strategies, including emotional and coping flexibility, would be negatively correlated with post-traumatic distress symptoms, correlations were run on the respective variables. Emotional flexibility (as measured by the IAPS task) was significantly negatively correlated and distress (-0.32) and the correlation remained when controlling for randomization of the order of the suppressive and expressive IAPS task (-.033). However, adaptive regulation was significantly, positively correlated with distress (.66) as was ERQ reappraisal (.47). Coping flexibility (as measured by the PACT) was also significantly positively correlated with distress (0.63). All correlations were significant at $p < .001$ (see Table 2).

**Hypothesis 1c**

To test the hypothesis that high levels of adaptive emotion regulation would be positively associated with post-traumatic growth (as measured by the PTGI), correlations were run on the respective variables. Significant results for maladaptive regulation on growth were also explored.
Coping flexibility was significantly correlated with growth (.66, \(p<.001\)) as was suppression (0.66, \(p<.001\)), maladaptive regulation (0.58, \(p<.001\)), rumination (0.43, \(p<.001\)), adaptive coping (0.47, \(p<.001\)) and reappraisal (0.55, \(p<.001\)). Unexpectedly, emotional flexibility (as measured by the IAPS) was significantly negatively correlated with post-traumatic growth (-.20, \(p=.002\)) and the correlation remained when controlling for randomization of the order of the suppressive and expressive IAPS task (-.21, \(p=.002\)) (see Table 2).

**Hypothesis 2a**

To test the hypothesis that high levels of adaptive emotion regulation would be associated with low levels of distress while high levels of maladaptive emotion regulation would be associated with high levels of distress, a 2 (high and low adaptive regulation) x 2 (high and low maladaptive regulation) ANOVA was run on distress.

**Base Interaction for Distress:** There were significant main effects for both adaptive regulation, \(F(1, 241) = 9.08, p=.003\), small effect size (partial eta squared = 0.036), and maladaptive regulation, \(F(1, 241) = 104.69, p<.001\), large effect size (partial eta squared = 0.303). Types of regulation significantly interacted to predict distress, \(F(1, 241) = 25.11, p<.001\), medium effect size (partial eta squared = 0.094). This interaction indicates that the main effect for maladaptive regulation is moderated by the impact of adaptive regulation. When participants reported lower levels of maladaptive regulation, levels of low (\(M = 2.53, SE = 0.06\)) or high adaptive regulation (\(M = 2.30, SE = 0.14\)) did not significantly affect levels of distress. However, when participants reported high maladaptive regulation, reports of high adaptive regulation (\(M = 4.04, SE = 0.07\)) were associated with significantly more distress than reports or low adaptive regulation (\(M = 3.12, SE = 0.16\)). (see Figure 1)

**Hypothesis 2b**
To test the hypothesis that high levels of both adaptive and maladaptive emotion regulation would be associated with high levels of growth, a 2 (high and low adaptive regulation) x 2 (high and low maladaptive regulation) ANOVA was run on growth.

**Base Interaction for Growth:** There were significant main effects for maladaptive regulation, $F(1, 240) = 89.24, p<.001$, large effect size ($partial \eta^2 = 0.271$). Types of regulation significantly interacted to predict growth, $F(1, 240) = 29.48, p<.001$, medium effect size ($partial \eta^2 = 0.109$). This interaction indicates that the main effect for maladaptive regulation is moderated by the impact of adaptive regulation. When participants reported lower levels of maladaptive regulation, levels of low adaptive regulation ($M = 3.60, SE = 0.07$) or high adaptive regulation ($M = 3.14, SE = 0.15$) did not significantly affect levels of growth. But, when participants reported high maladaptive regulation, reports of high adaptive regulation ($M = 4.94, SE = 0.07$) were associated with significantly more growth than reports or low adaptive regulation ($M = 4.09, SE = 0.17$). (see Figure 2)

**Hypothesis 3a**

To test the hypothesis that differences in gender would moderate the main effects of emotion regulation on distress, a 2 (gender) x 2 (high and low maladaptive regulation) x 2 (high and low adaptive regulation) ANOVA was conducted to explore the impact of gender and regulation on levels of distress, as measured by the PCL.

**Gender Moderating Distress:** Results indicated a significant main effect for gender, $F(1, 237) = 10.68, p = .001$, and the effect size was small ($partial \eta^2 = 0.043$). Results also indicated a significant main effect for maladaptive regulation, $F(1, 237) = 108.46, p<.001$, and the effect size was large ($partial \eta^2 = 0.314$). Types of regulation significantly

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1 An independent samples t-test indicated significant gender differences in distress, maladaptive
interacted to predict levels of distress, $F(1, 237) = 56.07, p<.001$, and the effect size was large (partial eta squared = 0.191). Additionally, results showed a significant interaction between gender and adaptive regulation, $F(1, 237) = 6.80, p = .01$, and the effect size was large (partial eta squared = 0.28).

These two interactions must be interpreted by examining the significant three-way interaction between gender, adaptive regulation and maladaptive regulation on distress, $F(1, 237) = 44.79, p<.001$. The effect size of the interaction was large (partial eta squared = 0.159). Thus, the three-way interaction indicates that for males, higher levels of maladaptive regulation were associated with increased distress under either low ($M = 2.85, SE = 0.15$) or high ($M = 3.92, SE = 0.08$), levels of adaptive regulation. Females reported the lowest amount of distress (relative to any other condition) when they reported high levels of adaptive regulation but low levels of maladaptive regulation ($M = 1.21, SE = 0.22$), but did not differ in distress under low levels of adaptive regulation with either high ($M = 2.64, SE = 0.29$) or low maladaptive regulation ($M = 2.86, SE = 0.10$). The three-way interaction between gender * adaptive regulation * maladaptive regulation remained significant when duration of distress was taken into consideration: $F(1, 221) = 35.49, p<.001$. The effect size remained large (partial eta squared = .138) (see Figure 3)

**Mediation by Femininity:**

Since gender is significantly associated with both distress and emotion regulation strategies and a moderator of the effects of emotion regulation strategies on distress, we also regulation and adaptive regulation. No significant gender differences were found in reappraisal, suppression, rumination, growth, coping flexibility, emotional flexibility, trauma history or proximity to the event. Females reported significantly more distress ($M = 3.36, SD = 1.03$) than males ($M = 3.06, SD = 0.94$), $t(254) = -2.324, p < .05$. Females also reported significantly more maladaptive regulation ($M = 3.53, SD = 0.88$) than males ($M = 3.17, SD = 1.08$), $t(204.8) = -2.859, p < .05$. Additionally, females reported significantly more adaptive regulation ($M = 3.75, SD = 0.66$) than males ($M = 3.30, SD = 0.90$), $t(223.245) = -4.472, p < .001$. 


examined gender role as a mediator of the gender impact on distress. To do so, we first investigated first-order correlations between gender role and emotion regulation. Masculinity and femininity were both significantly correlated with reappraisal, suppression, maladaptive regulation, adaptive regulation, rumination, coping flexibility, distress, and growth. Femininity was also significantly negatively correlated with emotional flexibility (see Table 2).

An independent samples t-test indicated that there were no gender differences in masculinity, \( t(141.04) = -0.794, p = .428 \). There was a significant gender difference in femininity, \( t(253) = -3.048, p = .003 \). Females reported higher levels of femininity (\( M = 5.19, SD = .90 \)) than males (\( M = 4.85, SD = .82 \)). Therefore, femininity was the only gender role trait investigated as a potential mediator.

To test the hypothesis that femininity would mediate the effect of gender on distress, a hierarchical linear model was conducted, with gender entered at the first step. As before, gender (\( \beta = .144, p = .021 \)) was significant. In the second step, femininity was introduced into the model. At step two, gender was no longer significant (\( \beta = .003, p = .950 \)), but femininity predicted distress (\( \beta = .726, p < .001 \)), indicating that femininity was mediating the effects of gender on distress.

**Hypothesis 3b**

To examine the moderating effects of prior trauma history and event proximity on distress, we conducted a series of 2 (moderator) x 2 (maladaptive regulation) x 2 (adaptive regulation) ANOVA on each of the moderating factors on distress.

**Moderation of distress by proximity:** There was a significant main effect for maladaptive regulation on distress, \( F(1, 236) = 111.5, p < .001 \), and the effect size was large (partial eta squared = 0.321). There was also a significant main effect for proximity, \( F(1, 236) = \)
41.13, and the effect size was moderate \((\text{partial eta squared} = 0.148)\). As with examination of other moderators, there was a significant interaction between maladaptive and adaptive regulation, \(F(1, 236) = 44.01, p<.001\), and the effect size was large \((\text{partial eta squared} = 0.157)\).

There was also a significant interaction between maladaptive regulation and proximity, \(F(1, 236) = 15.33, p<.001\), and the effect size was small \((\text{partial eta squared} = 0.061)\).

The moderation of proximity on regulation is demonstrated by a significant three way interaction between maladaptive regulation, adaptive regulation and proximity, \(F(1, 236) = 16.87, p<.001\), small effect size \((\text{partial eta squared} = 0.067)\). Reports of high levels of maladaptive regulation were always associated with high distress regardless of level of adaptive regulation or proximity. When adaptive regulation was low, being high in maladaptive regulation increased distress \((M = 2.74, SE = 0.20)\), but being high in proximity increased distress more than being high in maladaptive regulation did \((M = 3.46, SE = 0.19)\). However, when participants reported high levels of adaptive regulation, reports of low proximity and low maladaptive regulation were associated with significantly reduced distress, \((M = 1.55, SE = 0.18)\), relative to the same condition with high proximity, \((M = 3.00, SE = 0.18)\). (see Figure 4)

**Moderation of distress by trauma history:** No significant effect for trauma history on distress was obtained, \(F(1, 237) = 0.68, p=0.409\), nor did trauma history moderate the effect of adaptive and maladaptive regulation on distress, all \(ps >0.1\).

**Hypothesis 3c**

To test the hypothesis that emotional and coping flexibility would further influence the relationship between maladaptive and adaptive regulation and distress, we conducted a series of 2 (flexibility) x 2 (maladaptive regulation) x 2 (adaptive regulation) ANOVA on each of the flexibility types on distress.
Coping Flexibility on Distress: Results indicated a significant main effect for maladaptive regulation, \( F(1, 236) = 43.17, p<.001 \), and the effect size was large (partial eta squared = .155). Maladaptive regulation and coping flexibility interacted significantly, \( F(1, 236) = 6.26, p=.013 \), and the effect size was small (partial eta squared = .026). The interaction indicated that for those low in maladaptive regulation, coping flexibility did not impact distress (\( M_{\text{low flexibility}} = 2.78, SE = 0.11 \) and \( M_{\text{high flexibility}} = 2.77, SE = 0.1 \)). However, for individuals high in maladaptive regulation, being high in coping flexibility predicted higher distress (\( M = 3.22, SE = 0.11 \)) compared to being low in coping flexibility (\( M = 2.62, SE = 0.18 \)). (see Figure 5)

Emotional Flexibility on Distress: No significant main effects were found for emotional flexibility, \( F(1, 212) = 1.01, p=.108 \) (partial eta squared = 0.012). Additionally, there were no significant interactions incorporating emotional flexibility, all \( ps >0.1 \).

Hypothesis 4a

To test the hypothesis that differences in gender would moderate the main effects of emotion regulation on growth, a 2 (gender) x 2 (high and low maladaptive regulation) x (high and low adaptive regulation) ANOVA was run on growth (as measured by the PTGI).

Gender Moderating Growth: Results indicated a significant main effect for gender, \( F(1, 236) = 12.04, p =.001 \), and the effect size was small (partial eta squared = 0.049). Results also indicated a significant main effect for maladaptive coping, with participants reporting higher levels of maladaptive regulation, \( F(1, 236) = 107.40, p<.001 \), and the effect size was large (partial eta squared = 0.313). Types of regulation significantly interacted to predict levels of growth, \( F(1, 236) = 36.67, p<.001 \), and the effect size was moderate (partial eta squared = 0.134) Results also indicated a significant interaction between gender and maladaptive regulation, \( F(1, 236) = 16.79, p<.001 \), and the effect size was medium (partial eta squared =
Finally, results indicated a significant three-way interaction between gender, adaptive coping and maladaptive regulation, $F(1, 236) = 7.93, p = .005$, and the effect size was small ($\text{partial eta squared} = 0.033$). The three-way interaction indicates that being high in both types of regulation is associated with the most growth for both females ($M = 5.07, SE = 0.10$) and males ($M = 4.84, SE = 0.08$). Being low in maladaptive regulation but high in adaptive regulation is associated with the least growth in both females ($M = 2.13, SE = 0.24$) and males ($M = 3.65, SE = 0.17$). Males reporting low adaptive and low maladaptive regulation reported slightly more growth ($M = 3.72, SE = 0.07$) than females ($M = 3.32, SE = 0.11$). Males showed higher growth no matter what levels of regulation they reported (except when high in both types of regulation), and for females, being higher in maladaptive regulation was associated with more growth (see Figure 6). Essentially, the distinction between being low or high on maladaptive regulation when also high in adaptive has more of an effect on growth for females relative to males.

**Mediation by Femininity:**

Since gender is significantly associated with both growth and emotion regulation strategies and a moderator of the effects of emotion regulation strategies on growth, we also examined gender role as a mediator of the gender impact on distress and growth.

To test the hypothesis that femininity would mediate the effect of gender on growth, a hierarchical linear model was conducted, with gender entered at the first step. Gender was not significant ($\beta = -.033, p = .599$). In the second step, femininity was introduced into the model. At step two, gender was no longer significant ($\beta = .003, p = .950$), so mediation by femininity was not present.

**Hypothesis 4b**
To examine the moderating effects of prior trauma history and event proximity on growth, we first conducted a series of 2 (moderator) x 2 (maladaptive regulation) x 2 (adaptive regulation) ANOVA on each of the moderating factors on growth.

**Moderation of growth by proximity:** Maladaptive regulation displayed a significant effect on growth, $F(1, 236) = 102.9, p < .001$, and the effect size was large ($\text{partial eta squared} = 0.304$). Proximity also displayed a main effect on growth, $F(1, 236) = 14.10, p < .001$, and the effect size was small ($\text{partial eta squared} = 0.057$). As with previous analyses of moderation, there was a significant interaction between maladaptive and adaptive regulation, $F(1, 236) = 35.31, p < .001$, and the effect size was large ($\text{partial eta squared} = 0.131$). There were also significant interactions between maladaptive regulation and proximity, $F(1, 236) = 13.18$, $p < .001$, small effect size ($\text{partial eta squared} = 0.053$), and between adaptive regulation and proximity, $F(1, 236) = 9.01, p = .003$, small effect size ($\text{partial eta squared} = 0.037$).

The moderation of proximity on regulation is demonstrated by a significant interaction between maladaptive regulation, adaptive regulation and proximity, $F(1, 236) = 20.50, p < .001$, and the effect size was small ($\text{partial eta squared} = 0.080$). When reports of adaptive regulation were low, the impact of proximity and maladaptive regulation were not significantly different. However, when participants reported high levels of adaptive regulation, reports of high maladaptive regulation predicted more growth and this difference was bigger for those who reported lower levels of proximity, ($M_{\text{high maladaptive}} = 5.03, SE = 0.10$ and $M_{\text{low maladaptive}} = 2.24, SE = 0.20$) than high levels of proximity ($M_{\text{high maladaptive}} = 4.86, SE = 0.86$ and $M_{\text{low maladaptive}} = 3.95, SE = 0.20$). (see Figure 7)

**Moderation of growth by trauma history:** No significant effect for trauma history on growth was obtained, $F(1, 236) = 3.06, p = 0.08$, nor were any of the interactions between trauma
history moderate the effect of adaptive and maladaptive regulation on distress, all $ps > 0.1$

**Hypothesis 4c**

To test the hypothesis that emotional and coping flexibility would further influence the relationship between maladaptive and adaptive regulation and growth, we conducted a series of 2 (flexibility) x 2 (maladaptive regulation) x 2 (adaptive regulation) ANOVA on each of the flexibility types on growth.

**Coping Flexibility on Growth:** Results indicated a significant main effect for maladaptive regulation, $F(1, 235) = 62.48, p < .001$, and the effect size was large ($partial eta squared = .210$). There was a significant two-way interaction between adaptive regulation * coping flexibility, $F(1, 235) = 13.82, p < .001$, and the effect size was small ($partial eta squared = .056$).

A significant three-way interaction was obtained between maladaptive regulation * adaptive regulation * coping flexibility, $F(1, 235) = 9.06, p = .003$, and the effect size was small ($partial eta squared = .037$). The adaptive regulation * coping flexibility interaction indicates that individuals low in adaptive regulation do not show distinct differences in growth when coping flexibility is low ($M = 3.76, SE = 0.11$) or high ($M = 3.48, SE = 0.17$). However, individuals who are high in adaptive regulation show more growth when also high in coping flexibility ($M = 4.33, SE = 0.11$), compared to those high in adaptive regulation but low in coping flexibility ($M = 3.49, SE = 0.19$).

The adaptive regulation * maladaptive regulation * coping flexibility introduces maladaptive coping into the equation and suggests that when participants reported low adaptive regulation, there is no significant difference in growth regardless of levels of maladaptive regulation or coping flexibility. When participants reported high adaptive regulation, those that
reported high maladaptive regulation reported more growth, but that difference was only
significant when coping flexibility was high ($M_{\text{high maladaptive}} = 4.97, SE = 0.07$ and $M_{\text{low maladaptive}} = 3.69, SE = 0.21$) compared to when coping flexibility was low ($M_{\text{high maladaptive}} = 4.25, SE = 0.32$ and $M_{\text{low maladaptive}} = 2.73, SE = 0.19$). The lowest growth was associated with either individuals low in coping flexibility and maladaptive regulation (while high in adaptive regulation) ($M = 2.73, SE = 0.19$) or individuals high in coping flexibility and low in both types of regulation ($M = 2.61, SE = 0.26$). (see Figure 8)

**Emotional Flexibility on Growth:** No significant main effects were found for emotional flexibility, $F(1, 211) = 0.36, p=0.549$ (partial eta squared = 0.002). Additionally, there were no significant interactions incorporating emotional flexibility, all $ps >0.1$.

**Hypothesis 5**

Our final hypothesis was the development of an exploratory model examining the roles of emotion regulation, and previously identified moderating and mediating factors on post-trauma outcomes. We expect this modeling will provide us with guidance about who will cope well after a traumatic event.

To create the final model of distress, a model using general linear modeling was created considering the significant main effects and interactions of the previous hypotheses using z-scores for each variable. After removing effects that were not significant, the model accounted for a significant portion of the variance, adjusted $R^2 = 0.778$ (see Table 3). Consistent with previous literature and hypotheses, the model demonstrates that higher levels of femininity ($\beta=0.26, p<.001$), greater proximity to the Boston Marathon bombing ($\beta=0.26, p<.001$), higher levels of maladaptive regulation ($\beta=0.39, p<.001$) and suppression ($\beta=0.23, p<.001$) predicted higher levels of distress. Trauma history ($\beta=-0.24, p<.001$) and emotional flexibility ($\beta=-0.73,$
were both protective of distress (i.e., higher levels of both were associated with lower levels of distress). The significant interaction between gender and adaptive regulation ($\beta=-0.11$, $p=0.019$) indicated that the levels of adaptive regulation mattered for females more than for males – those females reporting higher levels of adaptive regulation but lower levels of maladaptive regulation reported low distress, but not when they reported lower adaptive regulation. For males, reporting lower maladaptive regulation was always associated with lower distress. The interaction between maladaptive and adaptive regulation ($\beta=0.27$, $p<.001$) indicates that when participants reported higher levels of maladaptive regulation, reports of higher adaptive regulation were associated with significantly higher distress than when participants reported lower adaptive regulation. Finally, the 3-way interaction between adaptive regulation, maladaptive regulation and gender ($\beta=0.17$, $p<.001$) indicates that for males higher levels of maladaptive regulation were associated with increased distress under either low or high levels of adaptive regulation. In contrast, females reported the lowest amount of distress (relative to any other condition) when they reported high levels of adaptive regulation but low levels of maladaptive regulation, but their levels of distress did not differ under low levels of adaptive regulation.

To create the final model of growth, general linear modeling was used, and the significant main effects and interactions of the previous hypotheses were input using z-scores for each variable. Terms that were not significant were eliminated from the model. The model for growth that had the best fit accounted for a significant portion of the variance, adjusted $R^2 = 0.737$ (see Table 4). The model demonstrates that distress ($\beta=0.74$, $p<.001$) was a strong predictor of growth. The gender by distress interaction ($\beta=0.20$, $p<.001$) suggests that distress was even more predictive of growth for females, and that males that reported lower rates of distress also reported
more growth than females that were lower in distress. The interaction between gender and suppression ($\beta=0.12, p=.011$) indicated that males and females reporting higher levels of trait suppression did not differ in growth, but low trait suppression males reported more growth than low trait suppression females. The three-way interaction seen in previous analyses, gender by adaptive regulation by maladaptive regulation ($\beta=-0.32, p<.001$), indicates that regardless of gender, the highest levels of growth were reported when participants reported high levels of both adaptive and maladaptive regulation. However, females reported the lowest levels of growth when they reported high levels of adaptive regulation but low levels of maladaptive.

**Discussion**

The main purpose of this study was to investigate the effects of gender, gender role, proximity to event, and prior trauma history on styles of coping and emotion regulation, and the influence of combinations of these factors on post-trauma distress and growth. We hoped that through examining these effects and interactions in a diverse sample, we could derive a potential comprehensive model to provide guidance about who will cope well after a traumatic event. Our results highlight a number of interesting points for discussion.

**Main Findings**

Distress and growth were closely related; individuals that reported high levels of distress reported higher levels of growth than those that displayed low levels of distress. Consistent with previous research, maladaptive coping, suppression and rumination were predictive of distress. Our results further emphasized the aforementioned discrepancies in emotion research concerning trauma as most adaptive strategies (adaptive coping, coping flexibility and reappraisal) were positively correlated with distress. Emotional flexibility was negatively correlated with distress. The different effects of emotional flexibility and coping flexibility on distress may be understood.
by the theoretical difference between emotion regulation and coping. As coping occurs in response to stressful events, and emotion regulation occurs in a wider variety of situations, coping flexibility may be utilized more frequently in stressful situations compared to emotional flexibility.

The relationship between adaptive and maladaptive regulatory strategies and distress helps to explain the observed relationship between such strategies on growth, in addition to the strong positive correlation between distress and growth. Emotional flexibility was negatively correlated with distress, and the strong relationship between distress and growth may be one explanation for the observed negative correlation between emotional flexibility and growth. Strategies that were positively correlated with distress, including coping flexibility, suppression, maladaptive coping, rumination, reappraisal and adaptive coping all additionally showed positive correlations with growth, suggesting that the coping processes that accompany distress are integral in the process of growth.

This study suggests that central to the relationship between regulatory strategies and responses to trauma is the understanding that the impact of maladaptive and adaptive strategies on post-trauma outcomes depend on a variety and combination of other moderating and mediating factors. As mentioned, this can be understood by comparing base interactions between regulation and post-trauma outcomes with interactions accounting for additional moderating and mediating factors.

The base interaction for distress alone implies that high levels of maladaptive regulation in combination with high levels of adaptive regulation are associated with significantly more distress than with low levels of adaptive regulation, and low levels of maladaptive regulation are associated with low distress regardless of adaptive regulation. The base interaction for growth
was remarkably similar to that of distress; and it implies that high levels of maladaptive regulation in combination with high levels of adaptive regulation are associated with significantly more growth than with low levels of adaptive regulation, and low levels of maladaptive regulation are associated with low growth regardless of adaptive regulation. In essence, more attempts at coping and more struggling lead to more growth.

When gender is considered, this base interaction for distress remains true for males. For females, however, high maladaptive regulation did not increase distress when adaptive regulation was low. As femininity mediated the effect of gender on distress, levels of femininity may explain why adaptive coping was more protective of distress for females. Adaptive coping strategies (e.g., positive reappraisal, putting the situation into perspective) may be more adaptive for individuals more inclined towards cognitive processing and with more of an expressive nature. The base interaction for growth remains across genders but has a greater impact on females; that is, for females, the difference between low and high maladaptive regulation in predicting growth was significantly larger, and high maladaptive regulation made more of an impact on post-traumatic growth for females relative to males.

These comparisons suggest that strategies research deems adaptive are more adaptive for females. It also suggests that females may be displaying more constructive growth post-trauma. Although our data is not longitudinal, the fact that maladaptive regulation was more influential for females suggests that the process of growth is influenced by gender. Further, the report that females low in maladaptive regulation while high in adaptive regulation reported significantly lower growth than males that were low in maladaptive but high in adaptive regulations hints that the type of growth being reported might vary between males and females.

Gender plays an important role in the effect of regulation on both distress and growth.
Males overall showed more distress than females and generally reported higher growth regardless of coping levels. It is important to consider here that our sample was overrepresented by males and males may have been more likely to hold professional roles associated with event proximity (EMT or medical professional). Additionally, burgeoning research has suggested that it is becoming more socially acceptable, and common, for females to be high in both femininity and masculinity. The same research suggests that the trend is not true for males; high levels of communality are not socially acceptable or common for males (Diekman & Eagly, 2000). This may help explain both why our study only found gender differences in trait femininity, and why females overall showed more adaptive outcomes. We did observe high correlations between masculinity and femininity, which may be due to common-method variance.

Flexibility further contributes to our understanding of the relationship between regulation and outcomes following trauma. When coping flexibility was examined, the base interaction for distress (high maladaptive regulation predicting significantly more distress when adaptive regulation was also high, while no significant variation by adaptive regulation when maladaptive regulation was low) remained only when coping flexibility was high. The effect of maladaptive regulation when adaptive regulation was high was strongest when individuals were high in coping flexibility. Individuals who were high in maladaptive regulation, high in adaptive regulation and had high levels of coping flexibility reported higher levels of distress (compared to low levels of coping flexibility). This suggests that these individuals are struggling and likely alternating between various regulatory strategies. Contrary to our initial hypothesis, coping flexibility is not protective of distress. While emotional flexibility was negatively correlated with distress, it did not influence the effect of regulation on distress. Emotional flexibility was negatively correlated with almost all other variables, suggesting that emotional flexibility is
associated with a resilient trajectory characterized by low regulatory efforts, low distress and therefore low growth following a trauma. Coping flexibility, on the other hand, occurs exclusively in response to stressful situation and was therefore associated with more distress. It was also associated with more growth when adaptive and maladaptive regulatory strategies were high.

Flexibility also contributes to our understanding of the relationship between regulation and growth. The base interaction for growth did not remain when coping flexibility was considered; which suggests that regardless of coping flexibility, low adaptive regulation is associated with the least growth. Coping flexibility was a significant predictor of growth and had more of an effect on levels of growth for individuals who are high in adaptive regulation, however when maladaptive regulation was considered, being high in maladaptive regulation was generally predictive of growth regardless of levels of growth or adaptive regulation. This supports a long-standing theory that “bad is stronger than good,” by demonstrating that regardless of levels of adaptive strategies, high maladaptive strategies have the strongest impact (Baumeister et al., 2001).

Proximity and trauma history were also considered and it is notable that they were significantly correlated. The population of first responders in our sample may help to explain the positive associations between proximity and trauma history, as the nature of their work makes them more likely to have prior exposure to trauma and to have been in close proximity to the events of the Marathon. When proximity and trauma history were considered, the base interactions for both growth and distress remained. However, proximity influenced the effect; individuals low in proximity and maladaptive regulation, while high in adaptive regulation, reported significantly less distress than those in the same condition reporting higher proximity to
the event. Additionally, individuals high in adaptive regulation and high in maladaptive regulation reported more growth (as indicated by the base interaction) than those low in maladaptive regulation, and the difference in growth was larger for individuals reporting low proximity. Thus, when an individual is high in adaptive regulation, maladaptive regulation will have more of an influence on levels of growth when event proximity is low; when event proximity is high, it potentially mitigates the effect of maladaptive regulation on growth.

Overall, our model emphasizes the importance of the occurrence of distress in the process of growth. It suggests that adaptive regulatory strategies were overall protective against distress, while maladaptive and coping-based strategies were promotive of distress. In light of the necessity of distress for growth to occur, the same maladaptive strategies (specifically suppression and coping flexibility) were significant in promoting growth. Adaptive strategies protective against distress and indicative of resilience were protective against growth as resilience is characterized by a lack of distress symptoms; and, as mentioned, these symptoms are important catalysts in the process of growth.

The overarching idea suggested by this study and the derived models is that situational variables, like proximity and trauma history, do not have such strong effects on distress or growth when all factors (situational and regulatory) are considered together. Rather, regardless of situation variables, the process through which an individual copes, regulates emotion and responds to trauma has the most influence on the amount of distress felt and growth achieved. Maladaptive regulation showed a particularly strong effect on distress, as the interaction between gender and adaptive regulation was protective of distress before maladaptive regulation was introduced. Again, this is suggestive of the idea that bad is stronger than good and that the use of maladaptive regulatory strategies in the process of coping with trauma is more predictive of
distress than the use of adaptive strategies is protective, regardless of gender. Our results do show that trauma history is protective of distress, and that this may be attributed to the population of emergency responders in the study. Recent findings suggest that in first responders, the effect of high levels of repeated trauma exposure on distress can be mitigated by regulatory choice flexibility (a concept similar to coping and emotional flexibility) (Levy-Gigi et al., 2015).

Limitations

The primarily limitation of this study was timing; the study investigated responses to a traumatic event three years after the event occurred. Therefore, the self-report data in the study specifically related to the events of the 2013 Boston Marathon required participants to recall feelings and responses from a few years prior. For the analyses in this paper, we opted to use the CERQ and ERQ for measurements of emotion regulation, rather than the Brief Cope. Although the Brief Cope was also administered, it specifically asked about regulation at the time of the 2013 Boston Marathon. As the CERQ and ERQ assessed overall trait based styles and strategies, they minimized the amount of data that was dependent on memory recall. However, the retrospective nature of the study limited the investigation.

Post-traumatic growth can be further classified as either illusory or constructive growth, but data collected at multiple time points is needed for such differentiation. Constructive growth is defined as an increase in levels of PTG with an improvement in coping strategies (decrease in maladaptive strategies and increase in adaptive strategies) whereas illusory growth is defined by reports of increased growth without changes in coping (Pat-Horenczyk et al., 2015). As we were unable to distinguish between multiple types of post-traumatic growth, findings about growth must be interpreted with the understanding that this growth may be constructive or illusory.
As mentioned, a further limitation of this study was its reliance on primarily self-report data. The IAPS task introduced an experimental component to the study design, but measured emotional flexibility, which is a separate construct from coping flexibility (therefore, it introduced experimental data but was used in conjunction with self report data). Primarily due to the nature of the study’s timing, no physiological data was collected to assess either distress or regulation.

A final limitation was that the proximity measure did not assess whether proximity to the event was work-related, so while participants indicated the role in which were completing the study, and then completed a proximity questionnaire, we did not specifically assess proximity in relation to professional role. Additionally, the terms used in the proximity questionnaire (including ‘near’ and ‘present’) were not operationally defined and were open to participant interpretation. Thus, our findings regarding event proximity may have benefitted from further specifications within the proximity questionnaire to define distal terms including ‘near’ and ‘present’. It is also important to note that these this study investigated a community-wide trauma and the effects of mass-trauma are likely different from the effects of individual trauma.

Implications

This study contributes to previous research about trauma and emotion regulation by examining the potential effects that gender, gender role trauma history and event proximity have on the effectiveness of regulatory strategies following a trauma. We hoped that through examining these interactions we could provide a potential model of who does well and who does not following exposure to a traumatic event.

Adaptive regulation is likely more protective of distress for females and specifically for individuals high in trait femininity. Emotional flexibility is independently protective of distress.
When proximity is high and an individual is not utilizing adaptive regulation, the high proximity will likely increase distress more than maladaptive regulation would. Distress is highly predictive of growth and specifically; females experiencing distress are more likely to experience growth.

As distress is important in the process of growth, predicting who will do “well” is somewhat complex. In terms of distress, individuals high in adaptive regulation, low in maladaptive regulation, low in event proximity and high in trait femininity will likely report less distress following a trauma. They will likely experience less growth as well. Among the individuals who do experience high levels of distress (likely those high in maladaptive regulation, coping flexibility and event proximity), high adaptive regulation and high coping flexibility will likely predict higher growth, particularly for females.

**Future Research**

The analyses conducted in this study give rise to a few promising avenues for future research. New research in the field of trauma psychology suggests that profiles of adaptation incorporating both growth and distress can be identified in trauma-exposed populations. The types of profiles that do exist, and can be identified, are still being explored. They typically include a purely distressed group, a group experiencing distress and growth (struggling to grow), a resilient/resistant group (experiencing and reporting little initial distress and little coping efforts), and a constructive growth group (reporting low distress and coping efforts, and post-traumatic growth) (Pat-Horenczyk et al., 2016). Profiles, varying in operational definition, have been tested in a variety of populations and one direction for future research would be explore the presence of profiles in this data set by testing a small variety of profiles varying in operational definition to see which profiles differentiate between groups most clearly. After identifying
profiles within the data set, the moderation and mediation analyses conducted on the overall data could be conducted by profile to explore the moderating role of gender and the mediating role of gender role, proximity, and trauma history on regulation and outcomes within different profiles. We examined masculinity and femininity to explore gender role and future research may consider the effect of androgyny (high levels of both masculinity and femininity) on regulation and post-trauma outcomes as well.

**Conclusion**

The purpose of this study was to investigate the effects of individual differences on post-trauma outcomes, specifically in terms of the moderation and mediation of the relationship between emotion regulation and post-trauma outcomes. While gender plays a significant role in the effectiveness of regulatory strategies following a traumatic event and proximity and trauma history explain some variance in strategy effectiveness, the most accurate understanding of pathways to distress and growth come from an examination considering all potential moderating and mediating factors. Our model suggests that when all factors are considered, distress is a main component of the growth process and while situational variables will have some effect on outcomes, individual coping and regulatory strategies provide strong guidance as to the trajectory an individual will follow after a trauma.
References


Appendix A
Bem Sex Role Inventory (BSRI)

Please rate the extent to which the following items describe you, in your own opinion, on a scale from 1 (never or almost never true) to 7 (almost always true).

1. ________ self-reliant
2. ________ yielding
3. ________ helpful
4. ________ defends own beliefs
5. ________ cheerful
6. ________ moody
7. ________ independent
8. ________ shy
9. ________ conscientious
10. ________ athletic
11. ________ affectionate
12. ________ theatrical
13. ________ assertive
14. ________ flatterable
15. ________ happy
16. ________ strong personality
17. ________ loyal
18. ________ unpredictable
19. ________ forceful
20. ________ feminine
21. ________ reliable
22. ________ analytical
23. ________ sympathetic
24. ________ jealous
25. ________ has leadership abilities
26. ________ sensitive to the needs of others
27. ________ truthful
28. ________ willing to take risks
29. ________ understanding
30. ________ secretive
31. ________ makes decisions easily
32. ________ compassionate
33. ________ sincere
34. ________ self-sufficient
35. ________ eager to soothe hurt feelings
36. ________ conceited
37. ________ dominant
38. ________ soft-spoken
39. ________ likable
40. ________ masculine
41. _______ warm
42. _______ solemn
43. _______ willing to take a stand
44. _______ tender
45. _______ friendly
46. _______ aggressive
47. _______ gullible
48. _______ inefficient
49. _______ acts as a leader
50. _______ childlike
51. _______ adaptable
52. _______ individualistic
53. _______ does not use harsh language
54. _______ unsystematic
55. _______ competitive
56. _______ loves children
57. _______ tactful
58. _______ ambitious
59. _______ gentle
60. _______ conventional
Appendix B

The following questions deal specifically with the events of the 2013 Boston Marathon.

Proximity to Event Questionnaire

During the events of the 2013 Boston Marathon including the marathon bombings, MIT shooting, Watertown shootings and citywide manhunt, please indicate if any of the following statements were true:

1. I was present during the events of the terrorist attack and hurt. True False
2. I was present during the events of the terrorist attack but not hurt. True False
3. Someone close to me was killed in the terrorist attack. True False
4. Someone close to me was wounded in the terrorist attack. True False
5. I was near the terrorist attack. True False
6. I was at the location of the terrorist attack immediately before or after the attack. True False
7. I was supposed to be in the area in which the terrorist attack happened. True False
8. I was not near the terrorist attack. True False
9. Someone close to me was present at the site of the attack True False
10. Someone close to me was near the site of the attack True False
11. I was present at a celebration after the capture of the suspected terrorist and the reversal of the city-wide lockdown. True False
## Appendix C
### Trauma History Questionnaire

Please indicate if you have ever experienced any of the following:

1. A severe disease of a relative  
   - No  
   - Yes
2. A sudden or unexpected death of a relative  
   - No  
   - Yes
3. Your parents divorced or separated  
   - No  
   - Yes
4. You were a victim of physical abuse/assault (non-sexual)  
   - No  
   - Yes
5. You were a victim of sexual harassment/assault/violence  
   - No  
   - Yes
6. Were you ever in a serious or life-threatening situation (accident, natural disaster, fire, etc.)  
   - No  
   - Yes
7. Did you ever witness a serious or life threatening accident?  
   - No  
   - Yes
8. Did you ever witness a serious injury or death of another person in an accident, natural disaster or other situation that was not a terrorist attack?  
   - No  
   - Yes
9. Suffered from a severe disease that threatened your life  
   - No  
   - Yes
10. Death of a parent or sibling  
    - No  
    - Yes
Think back to the time surrounding the events of the 2013 Boston Marathon. These items ask what you were doing to cope with the potential stress of the 2013 Boston Marathon events at the time surrounding the events. Thinking back to the spring of 2013, please indicate how frequently you engaged in the following coping behaviors.

1 = I did not do this at all  
2 = I did this a little bit  
3 = I did this a medium amount  
4 = I did this a lot

1. I turned to work or other activities to take my mind off things.
2. I concentrated my efforts on doing something about the situation I'm in.
3. I said to myself "this isn't real."
4. I used alcohol or other drugs to make myself feel better.
5. I got emotional support from others.
6. I gave up trying to deal with it.
7. I took action to try to make the situation better.
8. I refused to believe that it has happened.
9. I said things to let my unpleasant feelings escape.
10. I got help and advice from other people.
11. I used alcohol or other drugs to help me get through it.
12. I tried to see the situation in a different light, to make it seem more positive.
13. I criticized myself.
14. I tried to come up with a strategy about what to do.
15. I got comfort and understanding from someone.
16. I gave up attempting to cope.
17. I looked for something good in what was happening.
18. I made jokes about the situation.
19. I did things to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.
20. I accepted the reality of the fact that it has happened.
21. I expressed my negative feelings.
22. I tried to find comfort in my religion or spiritual beliefs.
23. I tried to get advice or help from other people about what to do.
24. I learned to live with the situation/stress.
25. I thought hard about what steps to take.
26. I blamed myself for things that happened.
27. I prayed or meditated.
28. I made fun of the situation.
### Brief Cope Alphas and Subscales:

<table>
<thead>
<tr>
<th>Scale</th>
<th>Cronbach’s Alpha</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Coping</td>
<td>.68</td>
<td>2, 7</td>
</tr>
<tr>
<td>Planning</td>
<td>.73</td>
<td>14, 25</td>
</tr>
<tr>
<td>Positive Reframing</td>
<td>.64</td>
<td>12, 17</td>
</tr>
<tr>
<td>Acceptance</td>
<td>.57</td>
<td>20, 24</td>
</tr>
<tr>
<td>Humor</td>
<td>.73</td>
<td>18, 28</td>
</tr>
<tr>
<td>Religion</td>
<td>.82</td>
<td>22, 27</td>
</tr>
<tr>
<td>Use of emotional support</td>
<td>.71</td>
<td>5, 15</td>
</tr>
<tr>
<td>Use of instrumental support</td>
<td>.64</td>
<td>10, 23</td>
</tr>
<tr>
<td>Self-distraction</td>
<td>.71</td>
<td>1, 19</td>
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<tr>
<td>Denial</td>
<td>.54</td>
<td>3, 8</td>
</tr>
<tr>
<td>Venting</td>
<td>.50</td>
<td>9, 21</td>
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<tr>
<td>Substance Use</td>
<td>.90</td>
<td>4, 11</td>
</tr>
<tr>
<td>Behavioral Disengagement</td>
<td>.65</td>
<td>6, 16</td>
</tr>
<tr>
<td>Self-Blame</td>
<td>.69</td>
<td>13, 26</td>
</tr>
</tbody>
</table>
Appendix E
Emotion Regulation Questionnaire

Next, we would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

1-----------------2------------------3------------------4------------------5------------------6------------------7
strongly disagree neutral strongly agree

1. When I want to feel more positive emotion (such as joy or amusement), I change what I’m thinking about.
2. I keep my emotions to myself.
3. When I want to feel less negative emotion (such as sadness or anger), I change what I’m thinking about.
4. When I am feeling positive emotions, I am careful not to express them.
5. When I’m faced with a stressful situation, I make myself think about it in a way that helps me stay calm.
6. I control my emotions by not expressing them.
7. When I want to feel more positive emotion, I change the way I’m thinking about the situation.
8. I control my emotions by changing the way I think about the situation I’m in.
9. When I am feeling negative emotions, I make sure not to express them.
10. When I want to feel less negative emotion, I change the way I’m thinking about the situation.
Appendix F
Cognitive Emotion Regulation Questionnaire (CERQ)

Everyone is confronted with negative or unpleasant events at some time. These events might be disruptive to the course of our lives. Everyone responds to these events in his or her own way. The following questions ask you to indicate what you generally think when you experience negative or unpleasant events.

1 = almost never
2 = sometimes
3 = regularly
4 = often
5 = almost always

1. I think that I have to accept that this has happened.
2. I often think about how I feel about what I have experienced.
3. I think I can learn something from the situation.
4. I feel that I am the one who is responsible for what has happened.
5. I think that I have to accept the situation.
6. I am preoccupied with what I think and feel about what I have experienced.
7. I think of pleasant things that have nothing to do with the experience.
8. I think that I can become a stronger person as a result of what has happened.
9. I keep thinking about how terrible what I have experienced is.
10. I feel that others are responsible for what has happened.
11. I think of something nice instead of what has happened.
12. I think about how to change the situation.
13. I think that what happened hasn’t been too bad compared to other things.
14. I think that basically the cause of what happened must lie within myself.
15. I think about a plan of what I can do best.
16. I tell myself that there are worse things in life.
17. I continually think how horrible the situation has been.
18. I feel that basically the cause lies with others.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Cronbach’s Alpha</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Blame</td>
<td>.68</td>
<td>4, 14</td>
</tr>
<tr>
<td>Acceptance</td>
<td>.73</td>
<td>1, 5</td>
</tr>
<tr>
<td>Rumination</td>
<td>.79</td>
<td>2, 6</td>
</tr>
<tr>
<td>Positive Refocusing</td>
<td>.80</td>
<td>7, 11</td>
</tr>
<tr>
<td>Refocus on Planning</td>
<td>.79</td>
<td>12, 15</td>
</tr>
<tr>
<td>Positive Reappraisal</td>
<td>.81</td>
<td>3, 8</td>
</tr>
<tr>
<td>Putting into Perspective</td>
<td>.79</td>
<td>13, 16</td>
</tr>
<tr>
<td>Catastrophizing</td>
<td>.81</td>
<td>9, 17</td>
</tr>
<tr>
<td>Other-blame</td>
<td>.77</td>
<td>10, 18</td>
</tr>
</tbody>
</table>
Appendix G
International Affective Picture System

IAPS Used:

<table>
<thead>
<tr>
<th>Description</th>
<th>Slide No</th>
<th>Valence</th>
<th>Arousal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beach</td>
<td>5201</td>
<td>8.03 (positive)</td>
<td>5.4</td>
</tr>
<tr>
<td>Accident</td>
<td>3015</td>
<td>1.52 (negative)</td>
<td>5.9</td>
</tr>
<tr>
<td>Baby</td>
<td>2070</td>
<td>8.17 (positive)</td>
<td>4.51</td>
</tr>
<tr>
<td>Car Accident</td>
<td>9920</td>
<td>2.50 (negative)</td>
<td>5.76</td>
</tr>
<tr>
<td>Farmer</td>
<td>2191</td>
<td>5.30 (neutral)</td>
<td>3.61 (low)</td>
</tr>
<tr>
<td>Dead Body</td>
<td>9491</td>
<td>2.78 (negative)</td>
<td>5.69</td>
</tr>
<tr>
<td>Headless body</td>
<td>3001</td>
<td>1.62 (negative)</td>
<td>6.64</td>
</tr>
<tr>
<td>Seal</td>
<td>1440</td>
<td>8.19 (positive)</td>
<td>4.61</td>
</tr>
<tr>
<td>Baby</td>
<td>2071</td>
<td>7.32 (Positive)</td>
<td>5.00</td>
</tr>
<tr>
<td>Man</td>
<td>2357</td>
<td>5.41 (neutral)</td>
<td>3.33 (low)</td>
</tr>
<tr>
<td>Kids</td>
<td>2345</td>
<td>7.41 (positive)</td>
<td>5.42</td>
</tr>
<tr>
<td>Spider</td>
<td>1205</td>
<td>3.65 (negative)</td>
<td>5.79</td>
</tr>
<tr>
<td>Fire</td>
<td>9921</td>
<td>2.04 (negative)</td>
<td>6.52</td>
</tr>
<tr>
<td>Ferris Wheel</td>
<td>7508</td>
<td>7.02 (positive)</td>
<td>5.09</td>
</tr>
<tr>
<td>Woman</td>
<td>2026</td>
<td>4.82 (neutral)</td>
<td>3.4 (low)</td>
</tr>
</tbody>
</table>

9 point rating scale
Valence: negative < 4.5 > positive
Arousal: approx. 5.5-6.5 (a bit higher than normal arousal); positive pictures have lower arousal

Matching:
\[
\frac{10 - \text{Neg}V^+ + 10 - \text{Neg}V}{2} \quad v \quad \frac{\text{Pos}V + \text{Pos}V}{2}
\]

Block 1 Matching
P = 8.1
N = 7.99

Block 2 Matching
P = 7.75
N = 7.8

Block 3 Matching
P = 7.215
N = 7.155
Appendix H
Perceived Ability to Cope with Trauma Scale (PACT)

Below you will find a list of different kinds of behaviors and strategies that people sometimes use in the weeks following potentially traumatic events. Please think of a relatively recent stressful or traumatic event you experienced. Try to recall how able you would have been to do each of the following behaviors if you needed to.

1. Keep my schedule and activities as constant as possible.
2. Comfort other people.
3. Look for a silver lining.
4. Stay focused on my current goals and plans.
5. Find activities to help me keep the event off my mind.
6. Let myself fully experience some of the painful emotions linked with the event.
7. Spend time alone.
8. I would be able to laugh.
9. Try to lessen the experience of painful emotions.
10. Reduce my normal social obligations.
11. Alter my daily routine.
12. Reflect upon the meaning of the event.
13. Distract myself to keep from thinking about the event.
14. Face the grim reality head on.
15. Enjoy something that I would normally find funny or amusing.
16. Focus my attention on or care for the needs of other people.
17. Remind myself that things will get better.
18. Keep myself serious and calm.
19. Remember the details of the event.
20. Pay attention to the distressing feelings that result from the event.

PACT Scoring:

Factor A: 1 + 2 + 3 + 4 + 5 + 8 + 9 + 13 + 15 + 16 + 17 + 18

Factor B: 6 + 7 + 10 + 11 + 12 + 14 + 19 + 20

Total coping: (Average of Factor A + average of Factor B)
Polarity: (abs|Average of Factor A - average of Factor B|)
Discrepancy: (Average of Factor A - average of Factor B)
Flexibility: total coping – polarity
Appendix I
PCL – 5

Below is a list of problems and complaints that people sometimes have in response to stressful
life experiences. Please read each one carefully, then indicate how much you were bothered by
that problem relating to the events of the 2013 Boston Marathon.

0 = Not at all
1 = A little bit
2 = Moderately
3 = Quite a bit
4 = Extreme

In the time following the 2013 Boston Marathon, how much were you bothered by:

___1. Repeated, disturbing, and unwanted memories of the stressful experience?
___2. Repeated, disturbing dreams of the stressful experience?
___3. Suddenly feeling or acting as if the stressful experience was actually happening again (as
   if you were actually back there reliving it?)
___4. Feeling very upset when something reminded you of the stressful experience?
___5. Having strong physical reactions when something reminded you of the stressful
   experience (for example, heart pounding, trouble breathing, sweating)?
___6. Avoiding internal reminders of the stressful experience (for example, thoughts, feelings,
   or physical sensations)?
___7. Avoiding external reminders of the stressful experience (for example, people, places,
   conversations, objects, activities or situations)?
___8. Trouble remembering important parts of the stressful experience?
___9. Having strong negative beliefs about yourself, other people, or the world (for example,
   having thoughts such as: I am bad, there is something seriously wrong with me, no one can be
   trusted, the world is completely dangerous)?
___10. Blaming yourself or someone else strongly for the stressful experience or what
    happened after it?
___11. Having strong negative feelings such as fear, horror, anger, guilt or shame?
___12. Loss of interest in activities that you used to enjoy?
___13. Feeling distant or cut off from other people?
___14. Having trouble experiencing positive feelings (for example, being unable to have
    loving feelings for those close to you, or feeling emotionally numb)?
___15. Feeling irritable or angry or acting aggressively?
___16. Taking too many risks or doing things that cause you harm?
___17. Being “super-alert” or watchful or on guard?
___18. Feeling jumpy or easily startled?
___19. Having difficult concentrating?
___20. Trouble falling or staying asleep?

Overall, how long were you bothered by any of these problems (if not applicable, type 0)

______ weeks
Appendix J
Post-Traumatic Growth Inventory (PTGI)

Indicate for each of the statements below the degree to which this change occurred in your life as a result of the 2013 Boston Bombing Events, using the following scale.

\[ 0 = \text{I did not experience this change as a result of the events} \]
\[ 1 = \text{I experienced this change to a very small degree as a result of the events} \]
\[ 2 = \text{I experienced this change to a small degree as a result of the events} \]
\[ 3 = \text{I experienced this change to a moderate degree as a result of the events} \]
\[ 4 = \text{I experienced this change to a great degree as a result of the events} \]
\[ 5 = \text{I experienced this change to a very great degree as a result of the events} \]

____1. I changed my priorities about what is important in life.
____2. I have a greater appreciation for the value of my own life.
____3. I developed new interests.
____4. I have a greater feeling of self-reliance.
____5. I have a better understanding of spiritual matters.
____6. I more clearly see that I can count on people in times of need.
____7. I established a new path for my life.
____8. I have a greater sense of closeness with others.
____9. I am more willing to express my emotions.
____10. I know better that I can handle difficulties.
____11. I am able to do better things with my life.
____12. I am better able to accept the way things work out.
____13. I can better appreciate each day.
____14. New opportunities are available which wouldn’t have been otherwise.
____15. I have more compassion for others.
____16. I put more effort into my relationships.
____17. I am more likely to try to change things which need changing.
____18. I have a stronger religious faith.
____19. I have discovered that I’m stronger than I thought I was.
____20. I learned a great deal about how wonderful people are.
____21. I better accept needing others.

PTGI Factor Scoring:

Factor I: Relating to Others \((6 + 8 + 9 + 15 + 16 + 20 + 21)\)
Factor II: New Possibilities \((3 + 7 + 11 + 14 + 17)\)
Factor III: Personal Strength \((4 + 10 + 12 + 19)\)
Factor IV: Spiritual Change \((5 + 18)\)
Factor V: Appreciation of Life \((1 + 2 + 13)\)
Appendix K
Information Sheet

Purpose and Procedures of the Research: Thank you for your willingness to participate in our research study! This study was designed to examine the relationship between personal characteristics, coping, and stress following traumatic events. Given the importance of understanding how people cope with stress, we believe you can help us understand how to help individuals who have been exposed to potentially traumatic events. The study consists of nine brief questionnaires and one interactive task. It will take approximately 20-30 minutes to complete. Specifically, you will be asked to answer questions about your personal characteristics, past experiences you might have had, and some of your experiences and feelings during and after the events of the 2013 Boston Marathon. Additionally, you will be asked to complete a brief task to help us understand emotions in response to different emotion-eliciting scenes. This will involve viewing a series of photos and sharing how you feel when viewing each photo. These photos are not related at all to the 2013 Boston Marathon, but are a standard set of photos used in emotion research.

Benefits to the Participant: You may be participating in this study to learn more about psychology research, or out of curiosity or interest. You may gain new insights into your own style of coping with stressful events through your participation in the study. In addition, we hope the results of this study will provide us with information that will allow us to create new ways to help people exposed to different traumatic events.

Potential Risks to Participants: To get some understanding of the impact of emotions and coping, during the study you will be asked to share some of your thoughts, feelings, and activities. Certain questions in this study may make you uncomfortable. You may experience some negative emotions when completing questionnaires about coping with stressful events or when viewing potentially emotionally stimulating photographs. You may skip any questions that make you feel uncomfortable or upset without penalty and you may discontinue your participation in this study at any time. All of the information you give will be completely confidential. The data collected in this study will be stored in the HIPPA-compliant, Qualtrics-secure database until it has been deleted by the primary investigator. At the end of the survey, you will have the two options to provide your email address. The first will be for compensation for your participation in the study. The second will be for follow-up about future research. Sharing your email address for both fields is completely optional. If you choose to share your email address with us, for either option, your email will be kept strictly confidential. No one will have access to your email address other than the members of this research lab. Additionally, your email address will be collected in a separate response database to ensure that it cannot be linked to your responses to the questionnaires in this survey.

Confidentiality: As you complete the questionnaires, it is important to remember that all the answers that you give us will be confidential. It is impossible for anyone to trace your name back to the answers you provide. Additionally, no one will ever see your answers, except for the research team. This information will only be used for the purpose of this research. Once the research is completed, all records from the study will be destroyed. When the report is written, all information and analysis will be about groups. No mention of the subjects who participated and no data that enables participant identification will be
possible. This research will be conducted in compliance with all applicable state and federal laws governing the treatment of research participants, including full confidentiality. As indicated above, sharing your email address is optional, and used only to provide you with compensation if you wish, or to indicate interest in participating in further research opportunities. Your email will be collected in a separate survey so no one will ever be able to link your email to your survey responses.

Voluntary Nature of Participation: Your participation in this study is entirely voluntary. If you feel uncomfortable, you may discontinue this study at any point without any penalty to your grade in any course.

Compensation: You may choose to be compensated with a $5 Amazon Gift Card, delivered electronically via email. This email will be collected in a separate survey and will not be linked in any way to the data you provided in this survey.

Human Subject Statement: If you have any questions about this research, please contact Sophie Brickman at srbrick@brandeis.edu or her supervisor, Professor Ellen Wright at ejwright@brandeis.edu. You may obtain further information about your rights as a participant by contacting the Institutional Review Board at Brandeis University by email (irb@brandeis.edu) or phone (781-736-8133).

( ) I have read the above information sheet and understand my rights as a research participant. I am 18 years of age or older and am voluntarily participating in this study.
Appendix L
Debriefing Statement

Thank you for participating in our research study. Different individuals respond differently when exposed to a potentially traumatic event. While we know that managing emotions is an important way to cope, the effectiveness of different strategies is still unclear. Thus, we were interested in different strategies you might have used to cope. Additionally, research suggests that other aspects of personal characteristics or previous experiences may influence the ways in which individuals cope with trauma. This study was designed to explore the relationship between various coping strategies following exposure to a potentially traumatic event on post-trauma outcomes and how one feels in addition to examining other personal factors, and to examine different potential moderators of this relationship. The picture task was designed to be useful in examining how flexibly individuals can manage emotional responses.

Please remember that all of the answers you gave are confidential. Your name will never be linked to your answers or your subject number. Don’t forget, the data collected in this study are stored in the HIPPA-compliant, Qualtrics-secure database until it has been deleted by the primary investigator. If you decide to provide your email address for compensation or follow-up, please know that your email address will be kept strictly confidential. No one will have access to your email address other than the members of this research lab. All data from this survey is entirely anonymous.

We acknowledge that this survey asked questions about your thoughts, feelings and experiences that might have made you uncomfortable or brought up negatives emotions. On the following page, you will see a list of resources available to those who have experienced a traumatic event and would like professional help. We encourage you to take full advantage of these resources if you are in need of assistance or help processing these feelings and experiences.

If you have any questions or concerns about the study, please feel free to contact me at srbrick@brandeis.edu. You may also contact my supervisor, Professor Ellen Wright, by sending her an email at ejwright@brandeis.edu.

Thank you very much for participating in this study. Our hope is that this study will contribute to our understanding of how to best help individuals cope after exposure to traumatic events.

Following the resources page, you will be taken to an additional page to enter your email address to receive compensation for your participation in the study, should you choose to provide your email address. Providing your email address is entirely optional. Please note that your email addresses are collected through a separate survey and will not be linked to any responses you provided to the questionnaires.
Appendix M  
Resource List

For a complete list of Boston-area resources and hotlines, please follow this link: http://www.bphc.org/whatwedo/mental-emotional-health/trauma-response-and-recovery/Documents/Trauma_Resource_Directory.pdf

Center for Violence Prevention & Recovery
Beth Israel Deaconess Medical Center; 617-667-8141; http://www.bidmc.org/violenceprevention
Services: free individual counseling; crisis counseling and trauma focused therapy, community education

The Trauma Center at JRI
1269 Beacon Street, Brookline MA; 617-232-1303; http://www.traumacenter.org/
Services: outpatient mental health services for physical abuse, sexual abuse, psychological trauma, chronic and complex trauma, intimate partner violence, child trauma, emotion abuse and neglect, victims of crime and more

Disaster Distress Helpline
The Disaster Distress Helpline is a national hotline dedicated to providing year-round immediate crisis counseling for people who are experiencing emotional distress related to any natural or human-caused disaster. This toll-free, multilingual, and confidential crisis support service is available to all residents in the United States and its territories. Stress, anxiety, and other depression-like symptoms are common reactions after a disaster. Call 1-800-985-5990 or text TalkWithUs to 66746 to connect with a trained crisis counselor.
Table 1
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**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Note: Correlations between all of the study’s predictor and outcome variables
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Distress Model Regression Table

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Note: This model explained a significant portion of the variance, Adjusted $R^2 = 0.778$. 
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Growth Model Regression Table

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Note: This model explained a significant portion of the variance, Adjusted $R^2 = 0.737$. 
Figure 1

Base Interaction: Effect of Adaptive and Maladaptive Regulation on Distress

![Graph showing the interaction effect of adaptive and maladaptive regulation on distress.](image)

**Figure 1.** Reports of high maladaptive regulation are associated with higher levels of distress, and the main effect for maladaptive regulation is moderated by the impact of adaptive regulation. When maladaptive regulation was low, distress was not significantly different regardless of adaptive regulation; however, when maladaptive regulation was high, high adaptive regulation was associated with significantly more distress than low adaptive regulation.
**Figure 2**

**Base Interaction: Effect of Adaptive and Maladaptive Regulation on Growth**

![Bar chart showing the interaction between adaptive and maladaptive regulation and growth.]

Reports of high maladaptive regulation are associated with higher levels of growth, and the main effect for maladaptive regulation is moderated by the impact of adaptive regulation. When maladaptive regulation was low, growth was not significantly different regardless of adaptive regulation; however, when maladaptive regulation was high, high adaptive regulation was associated with significantly more growth than low adaptive regulation.

**Figure 2.** Reports of high maladaptive regulation are associated with higher levels of growth, and the main effect for maladaptive regulation is moderated by the impact of adaptive regulation. When maladaptive regulation was low, growth was not significantly different regardless of adaptive regulation; however, when maladaptive regulation was high, high adaptive regulation was associated with significantly more growth than low adaptive regulation.
Figure 3. Being high in both types of coping was associated with the most distress in both females and males, but the effect of being high in adaptive (but low in maladaptive) is associated with the lowest distress for females. In contrast, males show higher distress when reporting high adaptive coping with low maladaptive. For males, lowest distress is associated with being low in both types of coping.
Figure 4. Reports of higher levels of maladaptive regulation were always associated with higher distress regardless of adaptive regulation of proximity. However, proximity had an affect when adaptive regulation was high. When adaptive regulation was high, participant reports of low proximity and low maladaptive regulation were associated with significantly less distress relative to the same condition with high proximity.
Figure 5

Coping Flexibility Moderates the Effect of Maladaptive Regulation on Distress

Figure 5. There were significant differences in the impact of maladaptive regulation on distress when participants reported high coping flexibility. When maladaptive regulation was low, reports of coping flexibility did not significantly influence distress. However, when maladaptive regulation was high, participants reporting high coping flexibility reported significantly more distress than those reporting low coping flexibility.
Figure 6

Gender Moderates the Effect of Adaptive and Maladaptive Coping on Growth

Figure 6. Being high in both types of coping is associated with the most growth for both females and males. Being low in maladaptive coping but high in adaptive coping is associated with the least growth in both females and males. Males reporting low adaptive and low maladaptive coping reported slightly more growth than females. Males showed higher growth no matter what levels of coping they reported (except when high in both types of coping), and for females, being higher in maladaptive coping was associated with more growth.
Figure 7. When reports of adaptive strategies were low, the impact of proximity and maladaptive regulation were not significantly different. However, when participants reported high levels of adaptive strategies, reports of high maladaptive strategies predicted more growth and this difference was bigger for those who reported lower levels of proximity than high levels of proximity.
Figure 8

Coping Flexibility Influences the Effect of Adaptive and Maladaptive Coping on Growth

Figure 8. When participants reported low adaptive regulation, there is no significant difference in growth regardless of maladaptive regulation or coping flexibility. When participants reported high adaptive regulation, those that reported high maladaptive strategies reported more growth, but that difference was only significant when coping flexibility was high compared to when coping flexibility was low. The lowest growth was associated with either individuals low in coping flexibility and maladaptive regulation (while high in adaptive regulation) or individuals high in coping flexibility and low in both types of regulation.