REAPPRAISAL AND HEALTH: AN INVESTIGATION INTO REAPPRAISAL ABILITY AND STRESSFUL LIFE EVENTS AS THE MISSING LINKS

by

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A dissertation submitted to the faculty of
The University of North Carolina at Charlotte
in partial fulfillment of the requirements
for the degree of Doctor of Philosophy in
Health Psychology

Charlotte

2021

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ABSTRACT

LYDIA GENEVIEVE ROOS. Reappraisal and health: An investigation into reappraisal ability and stressful life events as the missing links.
(Under the direction of DR. JEANETTE M. BENNETT)

Inadequate emotion regulation may underlie the development of psychopathology as well as worsened physical health, particularly in the context of stress. Cognitive reappraisal is typically considered an adaptive strategy to manage negative emotions. However, the extent to which reappraisal is beneficial may hinge upon contextual and individual differences. Specifically, it is unclear whether and how the ability to reappraise effectively (i.e., reappraisal ability) and exposure to stressful life events moderate the association between habitual reappraisal and health. Using a series of questionnaires and an experimental task designed to measure the ability to effectively down-regulate sad emotions using reappraisal, this dissertation examines the interactive effects of habitual reappraisal, reappraisal ability, and exposure to stressful life events on depressive and anxiety symptoms as well as self-reported physical health. Results indicate that habitual reappraisal may protect against elevated depressive symptoms and worsened self-reported physical health for people exposed to stressful life events, and that reappraising often appears to be particularly important when people are less effective in their attempts. These findings provide novel contributions to the field of emotion regulation and health by clarifying that exposure to stressful life events is an important moderator in the association between reappraisal and health and by elucidating the important roles of both habitual reappraisal and reappraisal ability.

DEDICATION

This dissertation is dedicated to my daughter, Eleonora. I have been enthralled by this work ever since I discovered it, but now I have a new reason for doing it: you. Your presence in my life has allowed me to truly understand the importance of effectively and adaptively regulating emotions. Things were not easy in the beginning, and I quickly learned the power of reappraisal in allowing me to be a kinder, more patient, and more empathetic mother to you. After getting to know your vibrant, passionate personality, I also became dedicated to helping you build psychosocial resilience to stress by identifying, understanding, and regulating emotions in healthy ways. I therefore dedicate my pursuit of knowledge about stress and emotion regulation, including this dissertation, to you.

ACKNOWLEDGEMENTS

I want to first and foremost thank my mentor and advisor, Dr. Jeanette M. Bennett, for consistently going above and beyond in ensuring my success as a scientist and for pushing me to become my best self professionally and personally. Her unwavering support, encouragement, and assistance in producing rigorous science and navigating the academic world have been crucial throughout my graduate career. In addition, I am consistently inspired by her passion for research and openness to new ideas. It is not lost on me that I lucked out by having her as my primary mentor, and I am incredibly grateful for it. I am also thankful for Dr. Amy Canevello. In addition to providing me with a great deal of training in social psychology, her mentorship has been integral in my development as a careful theorist and writer. I am grateful for her inquisitive and direct nature that led to all the times she asked, "why?", which challenged me to do the same. I am a more precise, analytical thinker because of her. I am also deeply grateful for Drs. Sara Levens and Jennifer Hartman, who have each contributed to my development as a researcher through their insights and support on this and other projects. I owe many thanks to the labs I have been a part of, as well as my colleagues within them, that have helped me grow and expand my knowledge and skillset as well as my appreciation for inter- and multi-disciplinary work, including the *StressWAVES Biobehavioral Lab*, the *Collaborative for Understanding Social Processes*, and the *Occupational Health Psychology Lab*. I want to express my gratitude to my partner, Matteo, who has helped me regulate my emotions throughout my graduate career in addition to listening to every research idea, encouraging every scientific pursuit, and providing instrumental support to me whenever possible to ensure my success. Thank you to my parents, Susan and David Roos, for consistently stimulating critical thinking, supporting all of my endeavors, and cheering me on throughout graduate school. I am

also endlessly appreciative to Christina Canuto and Samantha Voss for caring for my daughter while I wrote this dissertation. I cannot put into words how critical their roles were in allowing me to complete my PhD during a global pandemic. I also want to thank my beloved four-legged companion, Scarlett, who has provided me with emotional support and reminded me to appreciate life at every turn, even during challenging graduate school moments. Finally, I would like to acknowledge support and funding for this dissertation from the Health Psychology PhD Program, the UNC Charlotte Graduate School, and the P.E.O. Scholar Award.

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LIST OF ABBREVIATIONS

BMI	body mass index
CES-D	center for epidemiological studies-depression
COVID-19	coronavirus disease 2019
CRA	cognitive reappraisal ability
GAD-7	Generalized Anxiety Disorder-7
HIV	human immunodeficiency virus
HPA	hypothalamic-pituitary-adrenal
PROMIS	patient-reported outcomes measurement information system
SLEs	stressful life events

INTRODUCTION

Stress is a ubiquitous experience. Psychological stress occurs when internal appraisal of a situation as threatening or demanding (i.e., a stressor) activates a multifaceted reaction that includes emotional, cognitive, behavioral, and physiological responses. From an evolutionary perspective, stress responses and accompanying negative emotions are adaptive in that they function to motivate organisms to communicate needs and meet situational demands (McEwen, 1998). However, adequate regulation of these systems and timely recovery are imperative to restore homeostasis (McEwen, 1998). Chronic negative emotionality due to stress and resulting long-term exposure to stress-related hormones, as is common in modern society, can result in lasting psychological and physical health problems, such as depression, premature aging, immune system disorders, and metabolic disorders such as diabetes and cardiovascular disease (Graham et al., 2006; Miller & Blackwell, 2006; Tamashiro et al., 2011). However, not everyone experiences worsened health in the face of stress.

Perceptions of, and responses to, potential stressors and emotion-eliciting situations differ between and within individuals, leading to varying outcomes that impact both emotional and physical well-being. In fact, differences in how people respond to stress and situations that induce negative emotions are thought to be a causal mechanism in illness development and health maintenance (Epel et al., 2018). People may attempt to alter their emotional responses, either to create a healthier response or to reduce distress (Lazarus, 1966, 1991; Lazarus & Folkman, 1984; Wolgast et al., 2011). If successful, the efforts are expected to confer more beneficial psychological and physiological responses, and, over time, promote better health (Epel et al., 2018; Gross, 2013; Lazarus, 1966, 1991; Lazarus & Folkman, 1984; McEwen, 1998). Individuals may attempt to manage their emotions by using regulatory strategies to

modify the type or magnitude of their emotional experience (Diamond & Aspinwall, 2003; Gross, 1998). Several emotion regulation strategies are hypothesized as conferring protection against or risk for psychopathology and poor health. Perhaps the most effective emotion regulation strategy for uncontrollable situations involves reappraising, or reframing, situations in a more positive light (Ford & Troy, 2019; Gross, 1998; John & Gross, 2004; Lazarus & Folkman, 1984). However, reappraisal may not be beneficial for all people in all circumstances; instead its utility may depend on the efficacy of a person's attempts (Gross, 2013) and the context in which they reappraise (e.g., low-stress environment vs. in the context of stressful life events or experiences).

The goal of this study is to determine whether reappraisal ability and stressful life events moderate the association between habitual reappraisal and health. Below, I provide background information on the importance of emotion regulation in health and potential avenues by emotion regulation may affect health before explaining the potential roles of reappraisal ability and stressful life events. I then review the importance of investigating these constructs, along with aims and hypotheses for this dissertation.

The Importance of Emotion Regulation in Health

Emotion regulation strategies are the ways in which people exert control over the occurrence, timing, nature, experience, and expression of their emotions (Gross, 2013). Although people may also regulate their emotions in non-stressful circumstances, the convergence between emotion-focused coping and emotion regulation occurs when a person attempts to regulate emotions in response to a stressful event or situation (Compas et al., 2014). Emotion regulation also differs from emotion-focused coping in that while coping involves a

distinct effort by the individual, emotion regulatory processes may be automatic or effortful (Gyurak et al., 2011).

Appropriate and adequate emotion-focused coping or regulation is necessary to manage negative emotional states that, when not managed well, can have detrimental implications for mental health (Campbell-Sills & Barlow, 2007; Cisler et al., 2010; Goldsmith et al., 2013; Mennin et al., 2007). In particular, disordered affect resulting from emotion dysregulation (i.e., a failure to regulate emotions) is a hallmark of mental health disorders such as depression and anxiety (Cisler et al., 2010; D'Avanzato et al., 2013; Joormann & Stanton, 2016). The implications of negative emotionality are even more relevant under conditions of stress, including during a stressor as well as following a stressor (i.e., while recovering). In fact, several theorists argue that excessive negative emotionality resulting from an inability to effectively manage emotions culminates in longer and more severe periods of distress, which eventually evolves into diagnosable depression or anxiety (Aldao et al., 2010; Mennin et al., 2007; Mennin & Fresco, 2010; Nolen-Hoeksema et al., 2008).

Emotion regulation is linked with physical health as well, with the strongest evidence in the development of cardiovascular disease (Appleton & Kubzansky, 2014; Suls & Bunde, 2005). For example, Roy and colleagues (2018) found that chronic stress was associated with cardiovascular disease risk only in individuals with difficulties in emotion regulation. Some evidence has been found with other areas of health as well; maladaptive emotion regulation is implicated in the development and maintenance of chronic pain, and a recent meta-analysis found that the association functioned through greater negative emotionality and anxiety (Koechlin, 2018). Emotion regulation has also been associated with endocrine and immune functioning (for a review, see Lopez et al., 2018). For example, adaptive and maladaptive

strategies are associated with lower and higher systemic inflammation, respectively (Appleton et al., 2013).

Paths from Emotion Regulation to Health

The ability to manage emotions effectively is central to mental health, and deficits in emotion regulation appear to play a role in the development and maintenance of various forms of psychopathology. Negative emotions, although unpleasant to feel in the moment, are functional and serve important purposes by signaling and organizing adaptive behaviors to manage situations (e.g., initiating behavioral change or action to handle the situation, facilitating supportive responses from others; Levenson, 1999; Ohman & Mineka, 2001; Parrott, 1993). However, sometimes negative emotions are excessive for the situation or extend beyond what is necessary and therefore interfere with management of the situation and emotional recovery (Gross, 2015; Sheppes et al., 2015). When it would benefit the individual to modify the magnitude, type, or duration of emotions elicited in or following stressful situations, they can be down-regulated using adaptive regulatory strategies. Doing so effectively allows individuals to correct overwhelming levels of negative emotions, which are present in psychopathology such as depression and anxiety (Compare et al., 2014; McRae, 2016). Indeed, research suggests that disorders like depression are highly linked with emotional reactivity (Carver et al., 2013; van Rijsbergen et al., 2013) and that negative emotionality, such as sadness and fear, are core features of depression and anxiety (American Psychological Association, 2013). Failure to adequately manage emotions, including negative emotions in particular, may therefore be a mechanism by which psychopathology develops (Aldao et al., 2010; Campbell-Sills & Barlow, 2007; Cisler et al., 2010; Compare et al., 2014; Joormann & Stanton, 2016; McRae, 2016).

Because negative emotionality is a core component of depression and anxiety (American Psychological Association, 2013), it is difficult to parse out the unique effects of emotion regulation on physical health independent of mental health. Nonetheless, depression and anxiety are also highly associated with physical health outcomes, and are considered risk factors for cardiovascular disease such as coronary artery disease and stroke, as well as diabetes and obesity (Barlinn et al., 2014; Suls & Bunde, 2005; Trudel-Fitzgerald et al., 2015, 2016, 2017). As such, negative emotions may affect physical health specifically because of their impact on mental health. However, other avenues by which emotion regulation has implications for health may also exist, such as by affecting stress reactivity.

Transactional Theory of Stress and Coping

According to the transactional theory of stress and coping put forth by Lazarus and Folkman (Lazarus, 1966; Lazarus & Folkman, 1984), there are two processes which take place during psychological stress: primary appraisal of a stressor and a secondary appraisal of available coping mechanisms. Due to Lazarus's (1991) focus on the primacy of cognition, the theory asserts that psychological stress first occurs when an internal appraisal of a situation as threatening, challenging, or potentially harmful (i.e., a stressor) occurs, which activates a multifaceted reaction that then contributes to emotional, cognitive, behavioral, and physiological responses (Schlotz et al., 2011).

Distress experienced following the primary stress appraisal then initiates a second process to reduce distress, either by addressing the stressor itself (i.e., action-focused coping) or managing emotions resulting from the stressor (i.e., emotion-focused coping). Whereas controllable situations are best managed using action-focused coping, emotion-focused coping (e.g., reappraisal, acceptance, distancing) is most adaptive in situations that are perceived as

uncontrollable to alleviate negative emotions and potential effects on well-being (Lazarus & Folkman, 1984). By engaging in emotion-focused coping, the person-environment relationship is modified and a secondary appraisal of the stressor takes place. If the coping strategy is effective, the secondary appraisal will result in altered perception of the stressor as less threatening or challenging, thereby influencing the quality and reducing the intensity of the stress response as well as promoting recovery (Lazarus & Folkman, 1984).

Homeostasis, Allostasis, and the Stress Response

To maintain health and internal stability over time (homeostasis), humans must respond and adapt to shifting demands in their environments. On a basic level, homeostatic regulatory processes continually work to keep physiological variables that are required for health, such as blood glucose, core temperature, blood pressure, heart rate, and oxygen levels, within acceptable ranges (i.e., set points). However, when homeostasis is threatened, such as through environmental threats or challenges (i.e., stressors), including those that elicit negative emotions, the functioning of these regulatory processes must change temporarily to meet perceived anticipated and current demands (Kemeny, 2003; McEwen, 1998). Termed allostasis, the body essentially alters its functioning in the short-term to increase chances of adaptation and stability in the long-term, returning to baseline when the demand is met or a response no longer necessary (McEwen, 1998; Sterling & Ever, 1988).

The systems responsible for responding to stress are the hypothalamic-pituitary-adrenal (HPA) axis and the autonomic nervous system, which is comprised of two branches: the sympathetic and parasympathetic nervous systems. When a challenge or threat to physical or psychological safety is perceived by the amygdala, it communicates with the hypothalamus to activate these stress systems to aid in confrontation or avoidance of the demand (Buijs & Van

Eden, 2000; Orem et al., 2019). When the threat is no longer present or has been sufficiently handled, a feedback process occurs that returns regulatory components back to their original set points and limits long-term exposure of tissues to potentially harmful processes (e.g., the immunomodulatory actions of excessive cortisol, a hormone released during stress).

Importantly, stress responses do not only occur in response to the stressor itself, but to an individual's appraisal of the stressor, as indicated by Lazarus and Folkman (1984), and the emotions intertwined therein, which have the potential to continue long after the initial stressor has abated. The prefrontal cortex is responsible for generating new appraisals that regulate emotions, including whether the stressor is no longer present. When a new appraisal is successfully generated, it is communicated back to and modulates activity in the amygdala (Buhle et al., 2014; Buijs & Van Eden, 2000; Orem et al., 2019). Attenuated activity in the amygdala then relays a message to the hypothalamus that a stress response is no longer necessary (Buijs & Van Eden, 2000; Orem et al., 2019). If negative emotions elicited by a stressor are not adequately regulated, then heightened amygdala activity related to exaggerated negative emotional responses may amplify the stress response, and persistent negative emotions may prevent emotional and physiological recovery and return to homeostasis (Orem et al., 2019).

Excessive and long-term exposure to stress hormones, such as cortisol, may lead to cumulative wear and tear on the body, termed allostatic load (McEwen, 2004). Allostatic load is then posited to lead to impaired immune and cardiovascular, metabolic functioning, and even brain nerve cell atrophy (McEwen, 2004; Trudel-Fitzgerald et al., 2017). Although the complete etiology is so far unknown, where, how, when, and the type of resulting systemic effects appear

to be dependent on the nature of the stress responses and how long stress systems have been overactive.

Nonetheless, not everyone who has adverse experiences or those that cause chronic stress experiences dysregulated functioning and worsened health (Bonanno, 2004; McEwen, 1998, 2004). Although it is unclear when the shift between a well-regulated and dysregulated system occurs (Rohleder, 2019), maladaptive changes may be preventable through adequate regulation of stress responses and the negative emotions that accompany it (McEwen, 1998). Because of the inter- and intra-variability in how people respond to potentially stressful, emotion-eliciting situations, it is important to understand factors that may be health-protective, including adaptive ways in which people manage their emotions during stressful situations, such as positive reappraisal.

Reappraisal and Health: What is Known

Positive reappraisal entails attempting to positively reframe an event or situation that was originally perceived as negative. In other words, a person may cognitively reinterpret a seemingly negative event or situation in a more positive light to change its emotional impact (Gross, 1998). Reappraisal is a well-documented emotion regulation strategy that is thought to play a role in the association between stress and health outcomes (Cutuli, 2014; Ellis et al., 2019; Jamieson et al., 2013; Shallcross et al., 2015; Troy et al., 2010). As an antecedent-focused strategy (compared to response-focused), reappraisal can change an emotional state while it is unfolding, before it is finalized (Gross, 1998).

Reappraisal is generally considered beneficial for psychological health; positive reappraisal contributes to adaptive emotion regulation, both when used habitually and in specific contexts. Reappraisal is underutilized in people with depressive and anxiety disorders

(Dryman & Heimberg, 2018), and habitual use is associated with fewer depressive and anxiety symptoms (Garnefski et al., 2001; Hu et al., 2014) as well as greater experience of positive emotions and lesser experience of negative emotions (Gross & John, 2003). Additionally, habitual reappraisal is linked to less emotional reactivity to events in daily life (Gunaydin et al., 2016) and an increased ability to recover from negative experimentally-induced stimuli (Augustine & Hemenover, 2009; Meyer et al., 2012). A daily diary study echoed these conclusions, finding that reappraising an emotionally stressful situation at work buffered against its otherwise negative effects on recovery experiences, such as psychological detachment and relaxation after work (Schraub et al., 2013). Further, a meta-analysis and systematic review found that interventions to increase reappraisal are effective in attenuating subjective distress in response to stress (Liu et al., 2019). Collectively, habitual and situation-specific reappraisal appear to reduce negative affect and contribute to enhanced emotional recovery following exposure to stress and situations that may induce negative affect. Reappraisal therefore appears to be an effective strategy for regulating emotions and promoting psychological health and well-being.

Positive reappraisal may also be beneficial for physical health, at least in part because of its ameliorating effect on negative emotionality and the buffer it provides against stressful situations, as described above. In fact, the experience of stress appears to be a crucial component in the link between reappraisal and physical health. In particular, evidence points to the importance of stressful life events in the association: For example, a meta-analysis conducted in the early 2000's revealed the association between reappraisal and physical health outcomes was nonsignificant; the exception was in the context of stressful circumstances that were uncontrollable, apart from health-related stressors (e.g., managing AIDS; Penley, Tomaka,

& Wiebe, 2002). More recently, self-reported habitual reappraisal has been associated with better physical health outcomes and higher engagement in positive health behaviors in HIV patients (Moskowitz et al., 2009). Habitual positive reappraisal has also been associated with better self-reported physical health, but only in older adulthood, when aging-related social and health problems are of concern (Windsor, 2009). Reappraisal has also been linked with greater reported physical well-being among cancer survivors (Liao et al., 2017). However, no prior empirical support has been found for reappraisal as a significant contributor to physical health or well-being in a healthy, low-stress population. Overall, the findings suggest reappraisal may be beneficial when stress exposure is high, but corroborating research among low-stress individuals is scarce.

Reappraisal Ability and Stressful Life Events: Two Missing Pieces of the Puzzle?

There appears to be two potentially important moderators in the relationship between reappraisal and health. First, attempts to reappraise are not always successful (Ford & Troy, 2019). It is possible that not only whether someone attempts to regulate their emotions using reappraisal matters, but also the efficacy of their attempts (i.e., reappraisal ability), or a combination of both. That is, regardless of how often they try to reappraise or how much effort they devote to it when instructed, some people may be more skilled at generating reappraisals and therefore self-regulating their emotions using reappraisal than others (Ford & Troy, 2019). For example, Denson et al. (2014) posited that attempting to reappraise may result in greater cortisol reactivity because reappraising requires considerable cognitive effort. However, John and Gross (2004) claim that because reappraisal modifies the process of emotion generation before it is fully developed, implementing reappraisal should require relatively few cognitive resources. Both hypotheses may be correct: When done effectively and by people who are

accustomed to it, engaging in reappraisal may require little cognitive effort; however, attempting to reappraise may be cognitively demanding for people who do not typically engage in reappraisal or whose efforts are ineffective, potentially heightening stress responses for those who find reappraisal difficult and less successful.

Reappraisal ability is a theoretically distinct construct from self-reported habitual reappraisal use, and although not a new concept, is still in its nascent stage. Troy, Wilhelm, Shallcross, and Mauss (2010) conducted the first known investigation into reappraisal ability. They found that the ability to effectively reappraise, as measured by changes in self-reported sadness and levels of skin conductance, was protective against depressive symptoms when women were exposed to more stressful life events in the past 18 months (Troy et al., 2010). Sagui and Levens (2016) found that reappraisal ability may also affect aspects of physical health; greater reappraisal ability for negative emotions was associated with lower body mass index and incidence of Type 2 diabetes among men and women. However, the association was only true for people with higher perceived stress reactivity (Sagui & Levens, 2016). Although research regarding reappraisal ability is developing, little research has yet investigated the interactive effects of habitual reappraisal and reappraisal ability on psychological health. Only one known study has examined both tendency to reappraise and ability; a 14-day daily-diary study found that attempting to reappraise more frequently in daily life was cross-sectionally associated with fewer depressive symptoms for individuals that reported their reappraisal attempts as successful, but only for people who have experienced more stressful events in their lifetime (Ford et al., 2017). Among people who reported their reappraisal attempts to be unsuccessful, however, reappraising more frequently was marginally associated with greater depressive symptoms (Ford et al., 2017). It is unclear whether an association between reported

habitual reappraisal and experimentally-assessed reappraisal ability exists and whether it would correspond with the findings. Further, no known research exists that examines the interactive effects of habitual reappraisal and reappraisal ability on other indicators of psychological health or physical health.

Second, research involving reappraisal and physical health points to stressful experiences as being an important factor. Most researchers identify reappraisal and other beneficial emotion regulation and emotion-focused coping strategies as being particularly important when encountering stressful situations (Bonanno, 2004; Compas et al., 2014; Troy et al., 2010), and findings that have corroborated the hypothesized link between habitual reappraisal and health have done so in the context of stressful situations or events, particularly when the stressor is uncontrollable (e.g., Liao et al., 2017; Penley et al., 2002; Windsor, 2009). Stressful life events, in particular, can be defined as significant, unexpected, and uncontrollable negative events with a distinct onset and duration (Carlson, 2014; Kendler et al., 1999; Tennant, 2002).

Stressful life events often give rise to negative emotions, such as sadness. Although emotions serve important purposes, both in terms of intrapsychic and interpersonal processes (e.g., signaling the need for behavioral change or action, facilitating supportive responses from others), excessive negative emotions in response to stressful life events puts individuals at risk of experiencing depression and anxiety, as well as worsened physical health (Compare et al., 2014; Joormann & Stanton, 2016; Shallcross et al., 2015). It may therefore be even more important to effectively manage negative emotions that can contribute to detrimental health effects following exposure to stressful life events. Previous work has found that difficulty regulating negative emotions after experiencing stressful life events contributes to the risk of

onset for depression (for a review, see Joormann & Stanton, 2016). Conversely, managing emotions effectively may confer resilience (Shallcross et al., 2015). Additionally, whereas action-focused coping strategies are most effective in situations that are controllable, emotion regulation strategies such as reappraisal may be most appropriate and effective following largely uncontrollable stressful life events (Ford & Troy, 2019).

As previously mentioned, Troy et al. (2010) found that exposure to recent stressful life events was a significant moderator in the relationship between cognitive reappraisal ability and depressive symptoms, such that reappraisal ability was not associated with depressive symptoms at low levels of exposure to stressful events, but women with high reappraisal ability exhibited fewer depressive symptoms at high levels of exposure. These results underline the idea that being able to effectively use adaptive emotion regulation strategies is especially important when exposed to more stressful situations. Although the findings by Troy et al. (2010) did not focus on physical health, they highlight the need to recognize that reappraisal may have distinct effects depending on exposure to stressors and the potential importance of incorporating stressful life events as a moderating factor in the study of reappraisal. Despite associations found between positive reappraisal and health in the context of stressful events or situations (described above) there is a paucity of research devoted specifically to investigating the moderating influence of stressful events in the relationship between reappraisal and health.

Aims of this Dissertation

Taken together, there is a significant gap in our understanding of the contexts in which reappraisal may positively affect health. To create a more comprehensive and accurate understanding of whether and how reappraisal contributes to health, the present study

investigates the interactive effects of habitual reappraisal and cognitive reappraisal ability on health outcomes, as well as exposure to stressful life events as an additional moderator.

The aims for this dissertation are to (1) determine how the tendency and ability to use positive reappraisal can influence self-reported psychological and physical health in a health-diverse group of young adults, and (2) ascertain whether exposure to stressful life events contribute to differences in how habitual reappraisal and reappraisal ability affect health outcomes in the same sample.

Hypotheses

Hypothesis 1. An interaction between reappraisal ability and habitual reappraisal will occur for psychological health, as measured by depressive and anxiety symptoms, such that habitual reappraisal will be more beneficial at higher levels of reappraisal ability, and less beneficial at lower levels of reappraisal ability. (See Figure 1 for conceptual model and Figure 2 for hypothesized results). The interaction between reappraisal ability and habitual reappraisal will not be significant when assessing self-reported physical health.

Rationale: Because evidence generally suggests habitual reappraisal as being emotionally beneficial (e.g., Garnefski et al., 2001; Gross & John, 2003), I expect it to be positively associated with psychological health even for individuals with low reappraisal ability. However, when attempts to reappraise are more effective, the benefits should be even greater (Ford et al., 2017). Thus, I expect a stronger positive association for people with higher reappraisal ability. Conversely, because it appears that effects on physical health are context-dependent (e.g., whether the individual is exposed to a stressful situations), I do not expect to see a significant association when stressful life events is not incorporated.

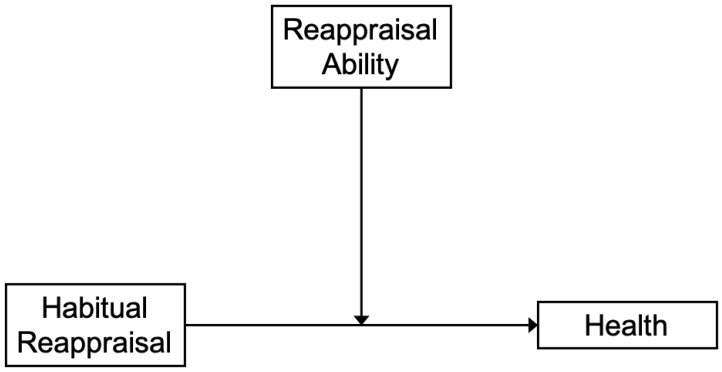

Figure 1. Conceptual model for a two-way interaction between habitual reappraisal and cognitive reappraisal ability for health.

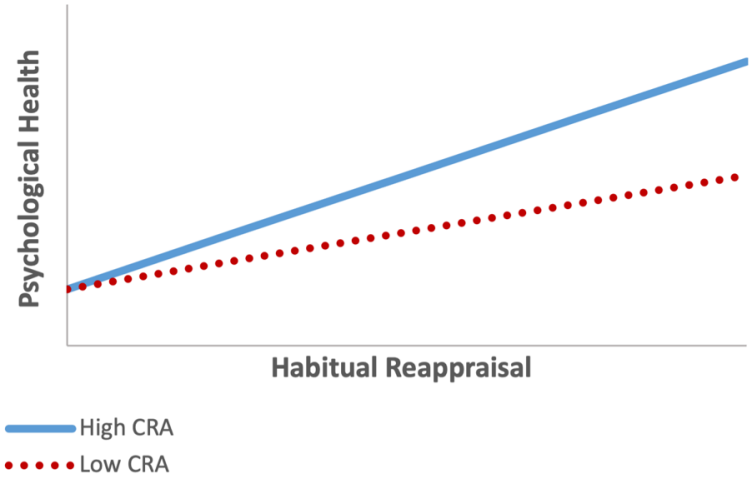

Figure 2. Hypothesis 1 showing a two-way interaction between habitual reappraisal and cognitive reappraisal ability (CRA) for psychological health. An interaction between habitual reappraisal and CRA for physical health is not expected to be significant.

Hypothesis 2. Habitual reappraisal will interact with stressful life events to affect both psychological and physical health. (See Figure 3 for conceptual model).

Hypothesis 2a. For psychological health, the interaction will occur such that for people exposed to more stressful life events, the association between habitual reappraisal and psychological health is stronger. (See Figure 4 for hypothesized results).

Rationale: Because people with fewer stressful life events should be generally psychologically healthier than people with more stressful life events (Kessler, 1997; Mazure, 1998; Toussaint et al., 2016), I expect them to have better psychological health even when habitual reappraisal is low. Since previous research has associated habitual reappraisal with both lesser experience of negative emotions and greater experience of positive emotions even in healthy, low-stress populations (Gross & John, 2003), I expect people with fewer stressful life events to experience better psychological health with higher habitual reappraisal. Additionally, because reappraisal should be even more important in stressful situations (Bonanno, 2004; Compas et al., 2014; Ford et al., 2017; Troy et al., 2010), I expect the association to be stronger for those exposed to more stressful life events.

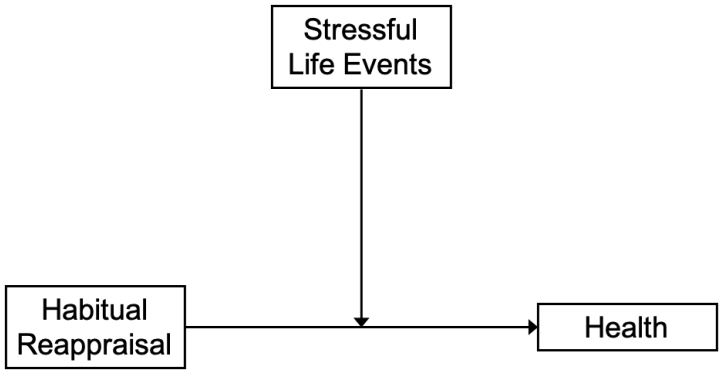

Figure 3. Conceptual model for a two-way interaction between habitual reappraisal and stressful life events (SLEs) for health.

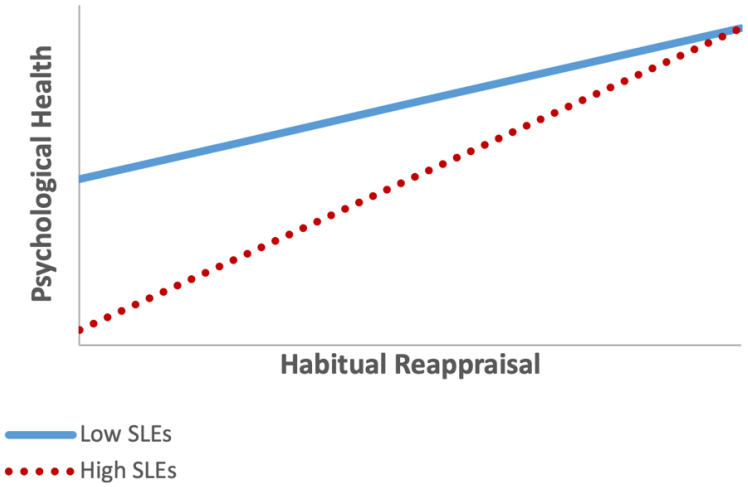

Figure 4. Hypothesis 2a showing a two-way interaction between habitual reappraisal and stressful life events (SLEs) for psychological health.

Hypothesis 2b. For physical health, the association between habitual reappraisal and self-reported physical health will occur for people with more stressful life events, but will not occur for people with fewer stressful life events. (See Figure 5 for hypothesized results).

Rationale: Previous research has not linked habitual reappraisal to physical health in populations that are less likely to encounter, or have not encountered, major stressful situations (e.g., stressful life events), possibly because long-term changes in physical health emerge slowly and require physiological dysregulation, which would not be expected to occur in low-stress situations (Cohen et al., 2007). As such, I expect people with fewer stressful life events to experience similar physical health regardless of their use of reappraisal. Conversely, because exposure to stressful life events presents a situation in which emotion regulation is important to manage distress (Bonanno, 2004; Compas et al., 2014), I expect tendency to reappraise to be more important and health-protective for people who experience more stressful life events.

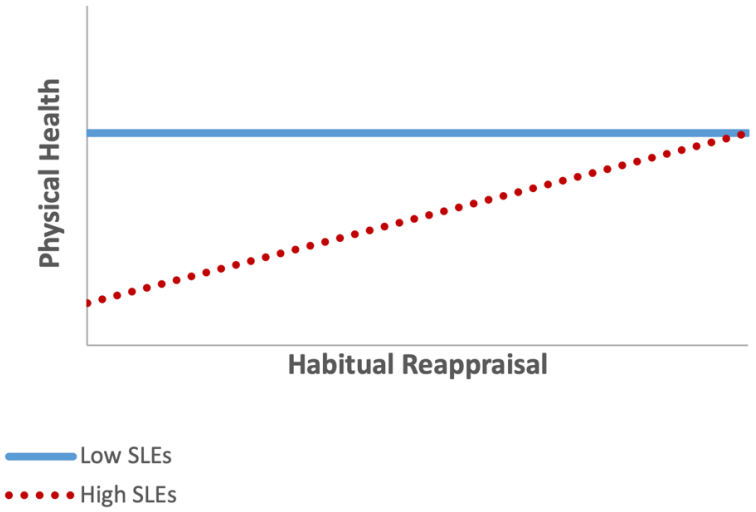

Figure 5. Hypothesis 2b showing a two-way interaction between habitual reappraisal and stressful life events (SLEs) for physical health.

Hypothesis 3. A three-way interaction between habitual reappraisal, reappraisal ability, and stressful life events will occur for both psychological and physical health, such that exposure to more stressful life events will amplify the effects of habitual reappraisal and reappraisal ability on psychological and physical health. (See Figure 6 for conceptual model).

Hypothesis 3a. The effects of stressful life events and habitual reappraisal on psychological health will be stronger for people with greater reappraisal ability, and less strong for people with lower reappraisal ability. (See Figure 7 for hypothesized results.)

Rationale: The assumption when hypothesizing the effects of habitual reappraisal is that people will be effective when they reappraise. Thus, I expect the interactive effects of habitual reappraisal and stressful life events on psychological health (identified in hypothesis 2a) to be true for those with higher cognitive reappraisal ability. Because people who are less effective at reappraising should benefit less from their attempts (Troy et al., 2010), I expect that differences in psychological health in people with low reappraisal ability will hinge on their exposure to stressful life events, with habitual reappraisal only slightly improving their health.

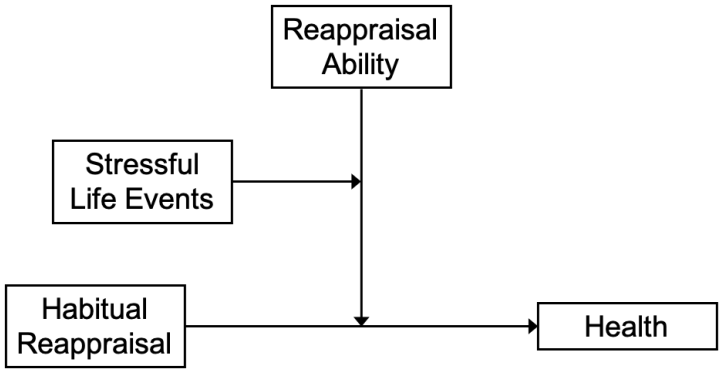

Figure 6. Conceptual model for a three-way interaction between habitual reappraisal, cognitive reappraisal ability and stressful life events for health.

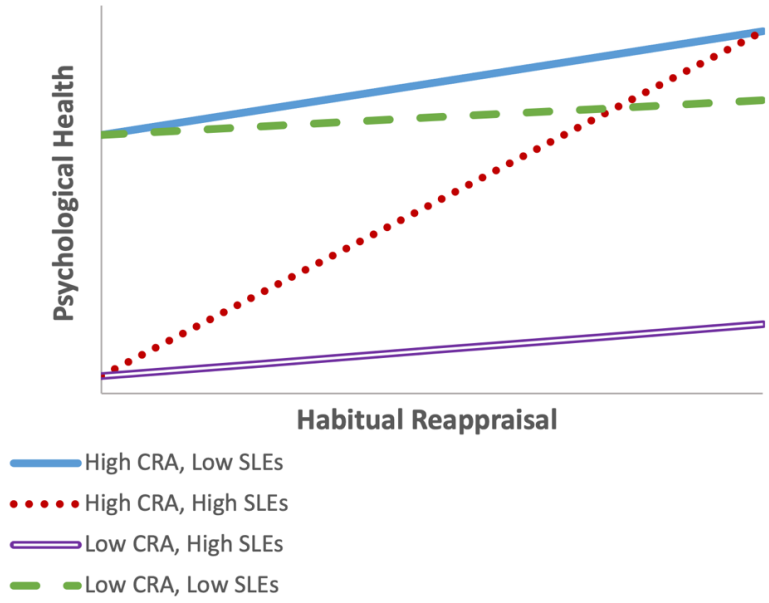

Figure 7. Hypothesis 3a showing a three-way interaction between habitual reappraisal, cognitive reappraisal ability (CRA) and stressful life events (SLEs) for psychological health.

Hypothesis 3b. The effects of stressful life events and habitual reappraisal on physical health will occur only for those who also have higher reappraisal ability; an association will not occur for people with lower reappraisal ability, or those with fewer stressful events regardless of reappraisal ability (see Figure 8 for hypothesized results).

Rationale: Again, the assumption when hypothesizing the effects of habitual reappraisal is that people will be effective when they reappraise. As such, I expect the interactive effects of habitual reappraisal and stressful life events on physical health (identified in hypothesis 2b) to be true for those with higher cognitive reappraisal ability. People who are less effective at reappraising, however, should benefit less from their attempts (Troy et al., 2010). Because attempts to reappraise would need to be effective to change the physiological stress response and affect overall health, I expect people with lower reappraisal ability would likely not experience the health-protective benefits of reappraisal, regardless of how often they attempt to reappraise. That is, differences in physical health in people with low reappraisal ability will hinge on their exposure to stressful life events, with habitual reappraisal conferring no improvement to physical health. Additionally, because previous research has not linked habitual reappraisal to physical health in low-stress populations, I expect people with fewer stressful life events to experience similar physical health regardless of their use of reappraisal or ability.

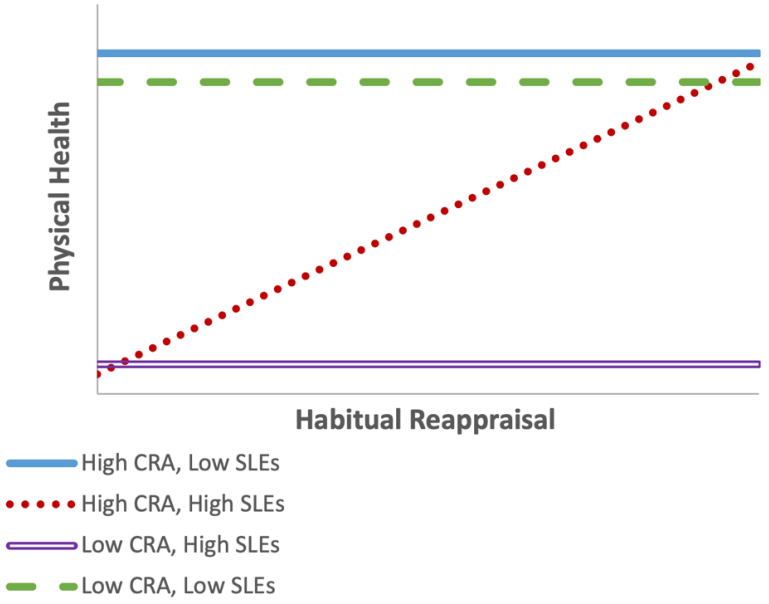

Figure 8. Hypothesis 3b showing a three-way interaction between habitual reappraisal, cognitive reappraisal ability (CRA) and stressful life events (SLEs) for physical health.

Method

Participants

Participants (N = 407) between the ages of 18 and 33 (M_{age} = 19.8 years, SD = 2.5) were included in analyses. The sample predominantly identified as White (n = 251; 61.7%); sixty-six participants were Black (16.2%), 44 were Asian (10.8%), 42 identified as "mixed" or "other" (10.3%), one was American Indian or Alaska Native (0.2%), one was Native Hawaiian or Pacific Islander (0.2%), and two declined to provide their race (0.5%). The majority of the sample identified as women (n = 255; 62.7%), one of whom was a transwoman. Ninety-five (23.3%) of participants completed the study prior to the COVID-19 pandemic. Inclusionary criteria consisted of being between the ages of 18 and 35 and being able to understand and complete the study in English.

Procedures

The present study was completed fully online. Participants were recruited via the Department of Psychological Science's Sona Systems, a University of North Carolina at Charlotte subject pool management software. Students utilizing the Sona Systems software saw a description of the study and had the option to access the study directly using a link. Only people who reported being between ages 18 and 35 years, as indicated by their Sona pre-screen survey responses, were able to see and access the study on Sona. After electronic informed consent was obtained, participants completed an online survey administered via Qualtrics.com. To ensure the negative emotion-inducing videos used in the cognitive reappraisal ability (CRA) task (Troy et al., 2010) would not prime participants to answer other questionnaires more negatively, they first completed questionnaires about their habitual reappraisal use and exposure to stressful life events, followed by questionnaires about their mental and physical health. They

then completed the CRA task, a validated computer-administrated task to assess cognitive reappraisal ability. Participants were compensated with 1 Sona credit which could be used toward completing a research requirement for some classes.

Data Cleaning

The study garnered a total of 842 unique responses after removing duplicate ($N = 16$) and incomplete ($N = 68$) responses. Additional data cleaning included removing data flagged for insufficient effort responding, indicated, in order, by: 1) Effort reported at less than 5 out of 10 for the CRA task, with the question "*How much did you try to follow the instructions given?*" on a scale from 1 (*Not at all*) to 9 (*An extreme amount*) ($n = 125$); 2) getting any questions about the subjects of the CRA videos incorrect ($n = 70$); 3) spending less than 90% of the time on pages consisting of the CRA videos than it would take to watch them ($n = 95$); and 4) not meeting the minimum mean absolute difference criterion ($n = 140$).

Specifically, a mean absolute difference score was calculated for each participant as the average difference between positively and negatively worded items (Hong et al., 2020). Participants were flagged if the absolute difference between positively and negatively worded items in the depressive symptoms scale was less than 0.5 (on a 4-point Likert-type scale of 0 to 3). Although cutoffs are unknown for 20-item scales and for this scale in particular (Hong et al., 2020), a cutoff of 0.5 was chosen based on the liberal assumption that if a participant paid attention to item instructions for oppositely-worded items, they should answer, on average, at least 0.5 points differently. A difference cutoff of at least 0.5 points would also identify long strings of the same response.

Finally, participants were removed if they had more than two missing values per scale for focal measures ($n = 1$ for depressive and $n = 2$ for anxiety symptoms); or if they did not

report their age or reported an age below 18 or above 35 (n = 2). In total, 435 participants were removed due to duplicate or incomplete data, insufficient effort responding, or because they did not meet study criteria, leaving 407 remaining in the final dataset. Missing values were imputed for focal measures using the average of other items for the scale if participants missed two or fewer items per scale (see below).

Self-report Measures

Habitual Reappraisal Use

Tendency to use reappraisal was assessed using the 6-item cognitive reappraisal subscale from the Emotion Regulation Questionnaire (Gross & John, 2003). Sample items include "When I want to feel less negative emotion, I change the way I'm thinking about the situation" and "When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm." Respondents indicate how strongly they agree with statements on a scale from 1 (*Strongly disagree*) to 7 (*Strongly agree*). Internal consistency for the reappraisal subscale was good in this sample (Cronbach's α = .86). See Appendix A.

Stressful Life Events

A collective measure of 37 stressful life events for young adults was created to assess exposure to traumatic and stressful events in this population. Specifically, the questionnaire features the full Life Events Checklist-5 (Weathers et al., 2001) and items from the Trauma History Questionnaire (Hooper et al., 2011) to assess exposure to potentially traumatic experiences, as well as items from the Life Events List (Henderson & Duncan-Jones, 1981) to include other stressful events that are normatively negative and that we might expect a young adult to have experienced. Items added from the Trauma History Questionnaire include being mugged, robbed, experiencing a home break-in, and the loss or death of a pet. Items added from

the Life Events List include negative relationship events (e.g., breakup, divorce), death of someone close in which the cause was not violent or an accident, miscarriage and abortion, job loss and financial issues, serious problems at school, behavioral issues of a family member, and appearing in court. Three additional items were also added to assess law violations, incarceration, and a partner's infidelity. Wording from the Trauma History Questionnaire items were slightly altered (i.e., the items were made into statements instead of questions) to create consistent wording throughout the questionnaire. Scoring was also changed to be consistent across items and will determine exposure to events that happened directly to the participant and recent versus distant timing (i.e., within past 12 months and more than 12 months ago). Total item count for "yes" indicates lifetime exposure to stressful events. Additional information, including instructions and all items, appears in Appendix B.

Depressive Symptoms

The Center for Epidemiological Studies-Depression (CES-D; Radloff, 1977) is a 20-item self-report measure used to assess depressive symptoms, such as dysphoria, anhedonia, fatigue, problems with appetite and sleep, and feelings of worthlessness. Example items include "I felt that I could not shake off the blues even with help from my family or friends" and "I felt that everything I did was an effort." Respondents were asked to rate how frequently they have experienced each feeling or behavior within the past week on a scale ranging from 0 (*Rarely or none of the time; less than 1 day*) to 3 (*Most or all of the time; 5-7 days*). Values were imputed for 19 participants that missed two or fewer items using the mean of their responses in those items' subscales. Total scores were then calculated by summing items. Previous work has identified 16 as the cutoff score identifying risk of clinical depression (Lewinsohn et al., 1997), which provides 87% sensitivity and 70% specificity (Vilagut et al., 2016). In addition, other

work has differentiated between “mild” depressive symptom severity scores (16-23) and “moderate to severe” depressive symptoms (≥24) (Rushton et al., 2002). Figures with depressive symptoms as the outcome display 16 and 24 as thresholds for mild and moderate to severe depressive symptoms, respectively. The CES-D provides good reliability (Radloff, 1977), and demonstrated excellent internal consistency in this sample (Cronbach’s α = .94). See Appendix C.

Anxiety Symptoms

The Generalized Anxiety Disorder-7 (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006) scale is a brief 7-item measure that was used to assess symptoms of generalized anxiety disorder. Participants answered how often they have been bothered by a list of problems over the past 2 weeks on a scale of 0 (*Not at all*) to 3 (*Nearly every day*). Example items include “Feeling nervous, anxious, or on edge,” “Trouble relaxing,” and “Becoming easily annoyed or irritable.” Values were imputed for missed items using the mean of their other responses if participants provided answers for six of the seven items; values were therefore imputed for six participants. The GAD-7 demonstrates good test-retest reliability (intraclass correlation = .83) as well as high sensitivity (89%) and specificity (82%) regarding generalized anxiety using a cutoff score of 5 for mild anxiety and 10 for moderate anxiety (Spitzer et al., 2006). Internal consistency was excellent in this sample (Cronbach’s α = .92). See Appendix D.

Self-Reported Physical Health

The PROMIS scale v.1.1 Global Health Short Form (Hays et al., 2009) is a 10-item global health assessment made available by the Patient-Reported Outcomes Measurement Information System (PROMIS) that was developed to provide global indices of health that are predictive of health care utilization and mortality. Items from the PROMIS scale that reflect the

global physical health factor were used to assess subjective physical health (i.e., overall physical health, physical functioning, pain, and fatigue). Using T-scores calculated from U.S. general population estimates, raw summed scores can be categorized such that scores between 4 and 10 represent "poor" health, 11-12 "fair", 13-15 "good", 16-18 "very good", and 19-20 "excellent" (Hays et al., 2009, 2015). Figures with physical health as the outcome display thresholds for health status categories based on these T-scores; although only whole numbers are possible with PROMIS scoring, the exact cutoff scores are 10.04 for fair health, 12.88 for good health, 15.74 for very good health, and 18.07 for excellent health (Hays et al., 2009, 2015). Three participants were missing values for the physical health subscale. Due to differences in item scoring, mean value imputation was not possible and those participants were therefore excluded in analyses for physical health. Previous work has identified the PROMIS scale as being a valid and reliable tool (Hays et al., 2009). The physical health subscale typically demonstrates good internal consistency (Cronbach's $\alpha = .81$; Hays et al., 2009), however internal consistency for the subscale was lower in this sample ($\alpha = .67$). See Appendix E.

Sociodemographics

Participants provided demographic information (e.g., age, gender identity, race, socioeconomic status). Socioeconomic status was assessed using the MacArthur Scale of Subjective Social Status (Adler et al., 2000; Operario et al., 2004). The scale is displayed as a 9-rung ladder, with which participants were instructed to interpret it as representing *where people stand in the United States*, such that the top of the ladder represents the people who are best off in terms of income, education, and occupational standing, whereas people at the bottom are the worst off. They were told the higher they are on the ladder, the closer they are to the people at the top and the lower they are, the closer to the people at the bottom. Participants were asked to

place themselves on this ladder by clicking on the appropriate rung. Due to a Qualtrics.com error, participants were able to click on more than one rung of the MacArthur ladder. Twenty-seven participants provided two responses; because their responses were successive, means of their two responses were used in analyses. In addition, five participants did not report their socioeconomic status. Smoking status was assessed by comparing "current" smokers with never, former, or social smokers.[1]

Reappraisal Ability Task

The Cognitive Reappraisal Ability (CRA) task (Troy et al., 2010) is a computer-based, validated procedure that was used to experimentally assess participants' ability to effectively manage their negative emotions when watching sad videos. The CRA task consists of watching four 2-minute film clips. The first film clip is an emotionally neutral clip, and the subsequent three clips were pre-tested to induce moderate amounts of sadness (Troy et al., 2010). Each sad film depicts a negative interpersonal interaction. Participants first viewed the 2-minute emotionally neutral film clip, then watched a 2-minute film clip that induces moderate amounts of negative emotion to serve as a baseline. Instructions for the baseline film clip were to watch the video closely. Following the baseline film clip, participants viewed video instructions that described how to regulate their emotions for the next two film clips. Instructions for one of the videos entailed positively reappraising the film clip to alter the participant's emotional response; the other set of instructions matched instructions for baseline. The order of instructions were counterbalanced to ensure there were no confounding effects of the order for instructions or the film clips. That is, participants were randomly assigned to two groups in a within-individual

[1] No statistically significant differences were found between grouping smoking status as indicated compared with grouping current and social smokers together. In addition, participants were asked how many cigarettes they smoked in the past one month; no statistically significant differences were found when comparing the aforementioned groupings with smokers who reported ≥ 1 cigarette/day on average vs. 0.

repeated measures design. The order of the film clips were the same for both groups, but the order of reappraisal instructions were different for the two groups. The first sad film clip served as a sadness baseline for all participants. Group 1 received reappraisal instructions during the second sad film and Group 2 received reappraisal instructions on the third sad film.

After each film clip, participants completed the Discrete Emotions Questionnaire (Harmon-Jones et al., 2016), in which they provided ratings for the greatest amount of eight discrete emotions they experienced while watching the video clip, including three positively-valenced emotions (i.e., happiness, relaxation, and desire) and five negatively-valenced emotions (i.e., sadness, fear, anger, anxiety, disgust). Scoring for the Discrete Emotions Questionnaire was modified from a 7-point Likert scale in its original form to a 9-point Likert scale to be in line with previous scoring for sadness in Troy et al. (2010). See Appendix F for more details.

Reappraisal ability scores were computed by subtracting the mean rating for items representing sad emotions for the reappraised film clip from ratings for the baseline film clip (i.e., nonmanipulated response – manipulated response). Higher positive scores indicate greater reappraisal ability.[2] Sad emotions were the focus of this investigation as opposed to other negatively-valenced emotions as the film clips were specifically pre-tested for sadness and to remain consistent with previous work (Troy et al., 2010).

To ensure participants gave sufficient effort during the CRA task (i.e., watched the videos and tried to follow instructions), Qualtrics.com tracked how long participants remained on each page that contained a video. Participants were also asked what the film clip was about

[2] Participants also reported their subjective assessment of reappraisal success. On average, participants reported moderate success when attempting to reappraise (M = 6.7, SD = 2.3 on a scale of on a scale of 1 [*Not at all*] to 9 [*An extreme amount*]). Self-reported reappraisal success was not associated with reappraisal ability as calculated by their emotional ratings (p = .24), nor was it associated with any outcome variable (p's > .10).

with three answer options, as well as how much they tried to follow the instructions given on a scale of 1 (*Not at all*) to 9 (*An extreme amount*). Participants were excluded if they spent less than 90% of the time on pages consisting of the CRA videos than it would take to watch them, reported effort at less than 5, or if they answered questions about the subjects of the CRA videos incorrectly.

Analytic Plan

Analyses were completed using IBM SPSS Statistics. Two-tailed significance levels were considered significant at $\alpha = 0.05$ and marginally significant at $\alpha = 0.10$. Due to differing metrics among measures, categorical variables (e.g., gender) were coded as 0 or 1 and continuous independent variables, including cognitive reappraisal ability scores were z-scored. Both unstandardized and standardized beta coefficients are reported to aid interpretation (Cohen, Cohen, West, & Aiken, 2003). Exposure to stressful life events was not z-scored for preliminary linear regression analyses, as a one-point increase is already meaningful (i.e., every point means the participant was exposed to one event type).

Samples were summarized using frequencies for categorical variables and descriptive statistics using mean and standard deviation (SD) for continuous variables. Pearson's correlations were performed to evaluate potential covariates. For preliminary analyses, hierarchical multiple regression analyses were conducted to assess the linear associations between the primary independent and dependent variables. PROCESS Macro (Hayes, 2013) model 1 was used to examine interactive effects for hypotheses with two predictor variables (hypotheses 1 and 2), and model 3 for interactions with three predictor variables (hypothesis 3). PROCESS Macro model 12 was used to conduct conditional moderated mediations for supplementary analyses. The significance of indirect effects was determined using bias-

corrected 95% confidence intervals based on 5,000 bootstrap samples (Preacher & Hayes, 2008). PROCESS Macro only produces unstandardized betas; however, all predictors were z-scored prior to analyzing.

Every model was first run unadjusted. Variables representing relevant covariates (see below) were then included for each adjusted model at the same time. Statistics for each model (i.e., run with and without covariates) are reported. Figures are presented with simple slopes for adjusted models if significant. Simple slopes at the mean and at 1 SD above and below the mean are presented for two-way interactions. For three-way interactions, simple slopes at 1 SD above and below the mean (but not at the mean) are presented for ease of interpretation. As previously stated, figures representing models with depressive symptoms are displayed with indicators of thresholds for mild as well as moderate to severe depressive symptoms, respectively (Lewinsohn et al., 1997; Rushton et al., 2002). Figures with physical health as the outcome are displayed with indicators of thresholds for health status categories of poor, fair, good, very good, and excellent calculated using T-scores using U.S. general population estimates (Hays et al., 2009, 2015). Tables with all beta coefficients for each model are provided in Appendix G.

Covariates

Relevant potential confounds for self-reported psychological and physical health were examined via zero-order correlations and means are reported for categorical variables if correlations are significant. Variables correlated with outcome variables at $p < .10$ were included as covariates in analyses. Potential confounds included those known to affect psychological and physical health: age (Kessler et al., 2007), gender (Breslau et al., 2017), race (Roberts et al., 2011), socioeconomic status (Kivimäki et al., 2020; Letourneau et al., 2011), body mass index (Di Angelantonio et al., 2016; Guh et al., 2009; Whitlock et al., 2009), and

smoking status (Milic et al., 2020; Prochaska et al., 2017). Additional variables were created to estimate the effects of participating before (n = 95) or after the start of the COVID-19 global pandemic (n = 312) and the order of instructions for the CRA task (n = 203 for reappraisal instructions first, n = 204 for reappraisal instructions shown second). Baseline emotional responses (i.e., sadness for the first emotion-eliciting video) were also assessed, as people with more depressive symptoms may be more likely to respond with sadness.

Final covariates included age, gender, race, BMI, socioeconomic status, and baseline emotional response. Older age was correlated with worse self-reported physical health (r = -.15, p = .003). Women were more likely to experience more depressive symptoms (r = .20, p < .001; M = 20.5, SD = 13.8 for women, M = 15.0, SD = 11.8 for men), anxiety symptoms (r = .28, p < .001; M = 7.9, SD = 5.8 for women, M = 4.5, SD = 5.1 for men), as well as worse physical health (r = .24, p < .001; M = 15.6, SD = 2.6 for women, M = 16.7, SD = 2.2 for men). Participants who were of a minority race were more likely to report worse physical health (r = -.11, p = .03; M = 16.3, SD = 2.2 for White participants, M = 15.7, SD = 2.9 for participants identifying as a minority race). BMI was correlated with worse physical health (r = -.20, p < .001). Higher socioeconomic status was correlated with fewer depressive and anxiety symptoms (r = -.24, p < .001 and r = -.21, p < .001, respectively), as well as better physical health (r = .31, p < .001). Baseline emotional responses for sadness were correlated with depressive and anxiety symptoms (r = .23, p < .001 and r = .20, p < .001, respectively). Smoking status was not correlated with any outcome, and there were no significant differences between participants that completed the study before and after the pandemic began or order of instructions for the CRA task on any outcome (all p's > .10).[3]

[3] Order of instructions was marginally correlated with cognitive reappraisal ability (r = .09, p = .06), but was unrelated to all outcome variables (p's > .10).

Power Analyses

Power analyses using G*Power (Faul et al., 2009) were conducted to approximate the required N to achieve statistical power in the current study. For interactions with two predictors and four covariates (i.e., hypotheses 1-3), power analyses revealed a required N of 325 to detect a small effect ($f^2 = 0.03$, $\alpha = 0.05$, $1 - \beta = 0.80$). For interactions with three predictors and four covariates (i.e., hypothesis 3), an N of 368 is required. Finally, the supplemental analyses with four predictors and four covariates require an N or 403. Therefore, the current sample of 407 participants was deemed sufficient.

Results

Preliminary Analyses

Descriptive statistics for the sample are displayed in Table 1, and zero-order correlations among all sociodemographic and primary study variables appear in Table 2.

Table 1
Descriptive Statistics of Sample

Variable	*Mean ± SD or N (%)*
Age	19.8 ± 2.5
Gender (female)	255 (62.7%)
Race	
White	251 (61.7%)
Black	66 (16.2%)
Asian	44 (10.8%)
Mixed/other	42 (10.3%
American Indian or Alaska Native	1 (0.2%)
Native Hawaiian or other Pacific Islander	1 (0.2%)
Socioeconomic status	4.3 ± 1.5
Body Mass Index (BMI)	24.5 ± 5.8
Underweight (< 18.5 kg/m^2)	22 (5.4%)
Normal weight (18.5-24.9 kg/m^2)	251 (61.7%)
Overweight (25-29.9 kg/m^2)	82 (20.1%)
Obese (≥ 30 kg/m^2)	52 (12.8%)
Smoking status (current)	41 (10.1%)
Participated during COVID-19 (yes)	312 (76.7%)
CRA task order (standard)	304 (50.1%)
Baseline emotional response to sad video	2.6 ± 1.1
Self-rated reappraisal success	6.7 ± 2.3
Habitual reappraisal	4.9 ± 1.1
Reappraisal ability	-0.2 ± 1.4
Stressful life events (total lifetime)	5.6 ± 4.2
Recent stressful life events (< 12 months)	3.0 ± 2.6
Past stressful life events (≥ 12 months)	2.6 ± 3.0
Depressive symptoms	18.5 ± 13.3
Anxiety symptoms	6.6 ± 5.8
Self-reported physical health	16.1 ± 2.5

Note. N = 407 for all variables except socioeconomic status (n = 402) and self-reported physical health (n = 404). Possible ranges for single-item variables include 0-9 for socioeconomic status and 1 to 9 for self-rated reappraisal success. Possible ranges for summed scores were 0-37 for stressful life events, 0-60 for depressive symptoms, 0-21 for anxiety symptoms, and 4-20 for physical health. Possible scores computed using averaged values include 1-7 for habitual reappraisal, and 1 to 9 for all emotional responses including the items used for the baseline sad response. Reappraisal ability was calculated by subtracting the average response from the reappraised video (range 1-9) from the video with standard instructions (range 1-9), thus giving a possible range from -9 to 9. The actual range for reappraisal ability was -5.25 to 4.25.

Table 2

Zero-Order Correlations Among Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	--													
2. Gender (female)	-.05	--												
3. Race (minority)[a]	-.03	-.01	--											
4. Socioeconomic status[b]	-.16**	-.20***	-.22***	--										
5. Body Mass Index	.20***	-.01	.09†	-.09†	--									
6. Smoking status (current)	.05	-.08	-.15**	.01	-.08	--								
7. Participated during COVID-19 (yes)	-.08	.04	.11*	-.13*	-.09†	.03	--							
8. CRA task order (standard)	.07	-.01	.00	.02	-.03	.01	.01	--						
9. Baseline emotional response to sad video	-.02	-.05	-.04	.07	-.03	-.02	.00	-.02	--					
10. Habitual reappraisal	.00	-.08	.13**	.07	-.08	-.05	.06	.00	.05	--				
11. Reappraisal ability	.05	.03	-.07	.05	.01	.03	-.05	.09†	.36***	.00	--			
12. Stressful life events	.24***	.16**	-.02	-.18***	.05	.12*	.01	-.07	.07	-.08	.03	--		
13. Depressive symptoms	.05	.20***	.07	-.25***	.02	.08	.02	.00	.23***	-.20***	.00	.37***	--	
14. Anxiety symptoms	.05	.28***	-.01	-.23***	.07	.01	.06	-.02	.20***	-.16**	.01	.33***	.75***	--
15. Self-reported physical health[c]	-.15**	-.21***	-.11*	.33***	-.20***	-.06	.02	.02	-.08	.15**	.12*	-.34***	-.59***	-.52***

Note. $N = 407$ unless otherwise indicated. [a]$N = 405$; [b]$N = 402$; [c]$N = 404$ $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. COVID-19 = Coronavirus Disease 2019; CRA = Cognitive Reappraisal Ability. CRA task order is for instructions, since videos were shown in the same order for all participants. Participants were either shown "standard" instructions to watch the video closely first or the reappraisal instructions.

Linear Associations Between Primary Study Variables

Habitual Reappraisal. Habitual reappraisal was associated with depressive (b = -2.62, β = -.20, R^2 = .04, p < .001) and anxiety symptoms (b = -0.85, β = -.15, R^2 = .04, p < .001), as well as self-reported physical health (b = 0.36, β = .15, R^2 = .02, p = .004) in unadjusted models. The same associations were reflected in adjusted models (depressive symptoms b = -2.38, β = -.18, ΔR^2 = .03, p < .001; anxiety symptoms b = -0.63, β = -.11, ΔR^2 = .01, p = .02; physical health b = 0.31, β = .12, ΔR^2 = .01, p = .01).

Cognitive Reappraisal Ability. Reappraisal ability was not significantly associated with depressive (p = .99) or anxiety (p = .80) symptoms in unadjusted models, but was associated with physical health (b = 0.29, β = .14, R^2 = .01, p = .02). In adjusted models, reappraisal ability remained significantly associated with physical health (b = 0.43, β = .17, ΔR^2 = .03, p = .001), and was associated with depressive symptoms (b = -1.30, β = -.10, ΔR^2 = .01, p = .05), but not anxiety symptoms (p = .13).

Stressful Life Events. Lifetime exposure to stressful life events was significantly associated with all outcomes in both unadjusted models (depressive symptoms b = 1.19, β = .37, R^2 = .14, p < .001; anxiety symptoms b = 0.46, β = .33, R^2 = .11, p < .001; physical health b = -0.21, β = -.34, R^2 = .12, p < .001) and adjusted models (depressive symptoms b = 0.98, β = .31, ΔR^2 = .09, p < .001; anxiety symptoms b = 0.36, β = .26, ΔR^2 = .06, p < .001; physical health b = -0.16, β = -.27, ΔR^2 = .07, p < .001).

Hypotheses

Interactions Between Habitual Reappraisal and Reappraisal Ability (Hypothesis 1)

An interaction between habitual reappraisal and reappraisal ability was not significant when predicting depressive nor anxiety symptoms, in both the unadjusted (depressive symptoms

p = .51; anxiety symptoms p = .62) and adjusted (depressive symptoms p = .23; anxiety symptoms p = .27) models. The interaction was significant when predicting physical health (ΔR^2 = .01, F(1,400) = 5.14, p = .02), which remained when covariates were added (ΔR^2 = .01, F(1,387) = 5.92, p = .02). Simple slopes for the adjusted model at the mean and at 1 standard deviation (SD) above and below the mean of reappraisal ability showed the effect of habitual reappraisal on physical health was strongest at low (b = 0.51, p < .001) and mean (b = 0.26, p = .03) levels of reappraisal ability, but not at high levels of reappraisal ability (p = .96). See Figure 9.

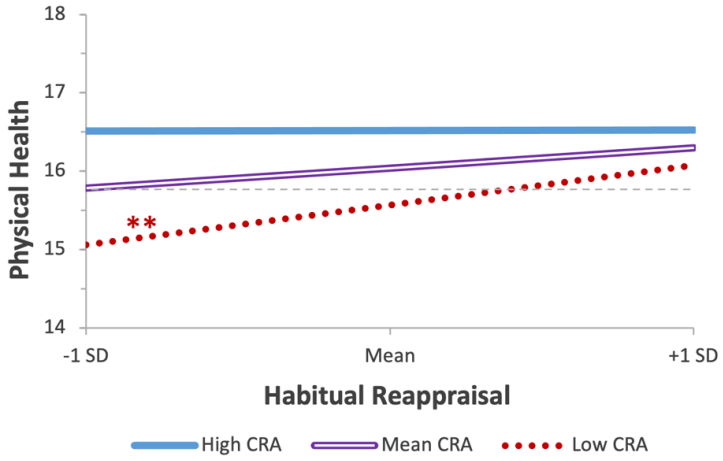

Figure 9. Simple slopes showing a two-way interaction between habitual reappraisal and cognitive reappraisal ability (CRA) for physical health. Higher scores for physical health indicate better health. The gray dashed line represents the threshold at which scores shift from indicating "good" to "very good" health (15.74). *p < .05, **p < 001.

Interactions Between Habitual Reappraisal and Stressful Life Events (Hypothesis 2)

H2a. An interaction between habitual reappraisal and stressful life events was significant when predicting depressive symptoms (ΔR^2 = .02, F(1,403) = 7.56, p = .006), but not anxiety symptoms (p = .15). Controlling for covariates, the interaction for depressive symptoms remained significant (ΔR^2 = .01, F(1,390) = 5.185, p = .02). Simple slopes for the adjusted

model at the mean (5.6) and at 1 SD above (9.8) and below (1.4) the mean of stressful life event exposure showed the effect of habitual reappraisal on depressive symptoms was strongest when exposed to more stressful life events at the mean (b = -2.20, p < .001), or at 1 SD higher (b = -3.58, p < .001), but not when exposed to fewer stressful life events (p = .33). See Figure 10. The interactions for anxiety remained nonsignificant in the adjusted model (p = .13).

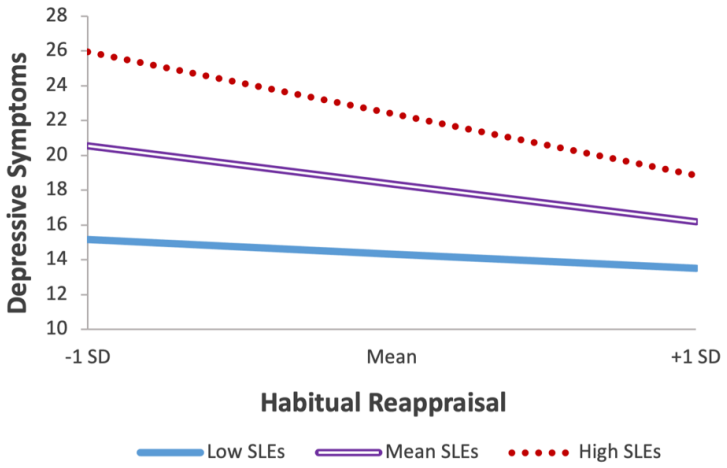

Figure 10. Simple slopes showing a two-way interaction between habitual reappraisal and stressful life events (SLEs) for depressive symptoms. Higher depressive symptoms scores indicate more reported symptoms. The gray dashed lines represent the cutoff score for risk of mild clinical depression (16) and moderate to severe clinical depression (24). *p < .05, **p < 001.

H2b. An interaction between habitual reappraisal and stressful life events was not significant when predicting physical health in neither the unadjusted (p = .24) nor the adjusted model (p = .18).

Interactions Between Habitual Reappraisal, Reappraisal Ability, and Stressful Life Events (Hypothesis 3)

H3a. A three-way interaction between habitual reappraisal, reappraisal ability, and stressful life events was significant when predicting depressive symptoms (ΔR^2 = .01, F(1,399) = 6.88, p = .009). Effects remained when covariates were included in the model (ΔR^2 = .01,

$F(1,386) = 6.04$, $p = .01$). Tests of conditional interactions for the adjusted model at 1 SD above (9.8) and below (1.4) the mean of stressful life event exposure showed the interactive effect of habitual reappraisal and reappraisal ability was significant when exposed to more stressful life events ($b = 1.73$, $p = .01$), but not when exposed to fewer stressful life events ($p = .199$). Simple slopes then revealed that habitual reappraisal and reappraisal ability interacted at greater stressful life event exposure such that the association between habitual reappraisal and depressive symptoms was stronger at lower levels of reappraisal ability ($b = -5.29$, $p < .001$ for ability at 1 SD below the mean), and marginally significant at higher levels of reappraisal ability ($b = -2.10$, $p = .06$ at 1 SD above the mean). See Figure 11. Interactive effects were marginally significant when predicting anxiety symptoms ($\Delta R^2 = .01$, $F(1,399) = 3.10$, $p = .08$) in the unadjusted model, however they were not significant in the adjusted model ($p = .21$).

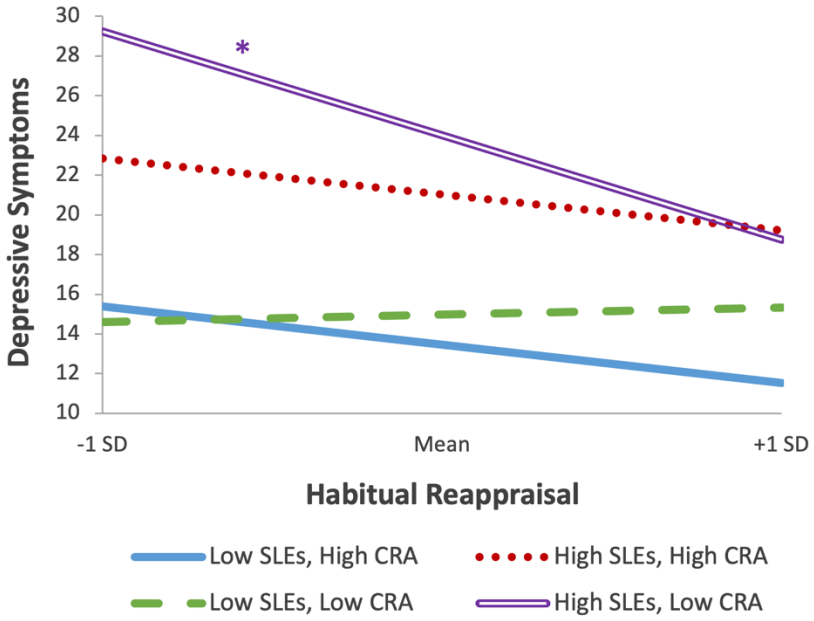

Figure 11. Simple slopes showing a three-way interaction between habitual reappraisal, cognitive reappraisal ability (CRA), and stressful life events (SLEs) for depressive symptoms. Higher depressive symptoms scores indicate more reported symptoms. The gray dashed lines represent the cutoff score for risk of mild clinical depression (16) and moderate to severe clinical depression (24). *$p < .001$

H3b. A three-way interaction between habitual reappraisal, reappraisal ability, and stressful life events was significant when predicting physical health ($\Delta R^2 = .02$, $F(1,396) = 10.03$, $p = .002$), and the effect remained in the adjusted model ($\Delta R^2 = .02$, $F(1,383) = 8.89$, $p = .003$). Tests of conditional interactions for the adjusted model at 1 SD above (9.8) and below (1.4) the mean of stressful life event exposure showed the interactive effect of habitual reappraisal and reappraisal ability was significant when exposed to more stressful life events ($b = -0.50$, $p < .001$), but not when exposed to fewer stressful life events ($p = .33$). Simple slopes revealed that habitual reappraisal and reappraisal ability interacted at greater stressful life event exposure such that the association between habitual reappraisal and physical health was evident at lower levels of reappraisal ability ($b = 0.90$, $p < .001$ for ability at 1 SD below the mean), but not significant at higher levels of reappraisal ability ($p = .69$ at 1 SD above the mean). See Figure 12.

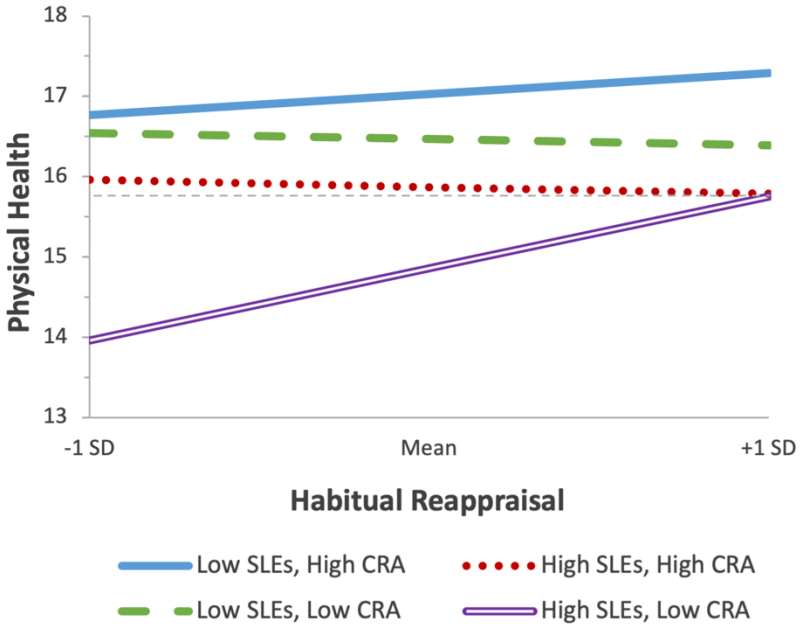

Figure 12. Simple slopes showing a three-way interaction between habitual reappraisal, cognitive reappraisal ability (CRA), and stressful life events (SLEs) for depressive symptoms. Higher scores for physical health indicate

better health. The gray dashed line represents the threshold at which scores shift from indicating "good" to "very good" health (15.74). *$p < .001$

Supplementary Analyses

Analyses were conducted to test a conditional moderated mediation in which depressive symptoms were tested as mediators in the association between habitual reappraisal and physical health, moderated by reappraisal ability and stressful life events (i.e., the three-way interaction from Hypothesis 3a; see Figure 13 for the conceptual model); the reverse was also tested, such that physical health was tested as a mediator in the association between habitual reappraisal and depressive symptoms using the same three-way interaction predicting the mediator (i.e., using the relationship indicated in Hypothesis 3b) and the outcome (model 12 of PROCESS macro; Hayes, 2013). All variables were z-scored for these analyses to aid interpretation. Anxiety symptoms were not examined due to nonsignificant effects when testing Hypothesis 3. Additional exploratory analyses are provided in Appendix H.

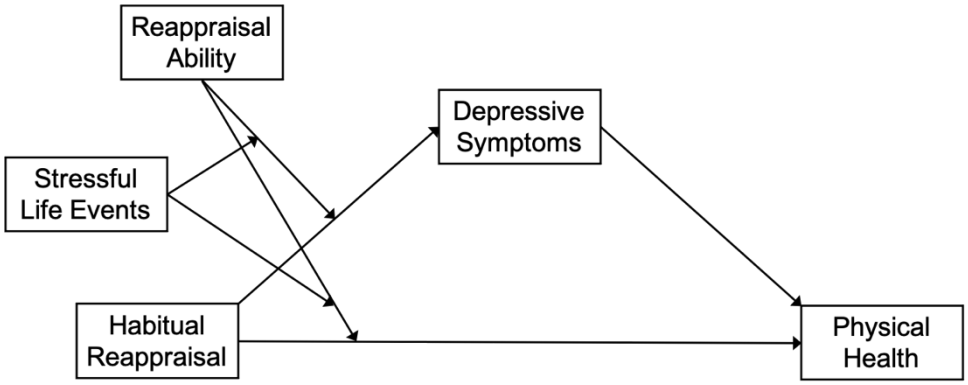

Figure 13. Conceptual model showing a conditional moderated mediation in which a three-way interaction between habitual reappraisal, cognitive reappraisal ability, and stressful life events predicts depressive symptoms, that then contributes to differences in physical health. The reverse model tests physical health as the mediator and depressive symptoms as the outcome.

Examining Depressive Symptoms as a Mediator Between the Three-Way Interaction and Physical Health

A significant conditional moderated mediation was found with depressive symptoms acting as a mediator between habitual reappraisal and physical health, moderated by reappraisal ability and stressful life event exposure (b = -.06, 95% CI [-.13, -0.02]), and the same results were found in the adjusted conditional moderated mediation model (b = -.05, 95% CI [-.11, -.01]). Specifically, in the adjusted model reappraisal ability was not directly associated with depressive symptoms (p = .62) but it was associated with physical health (b = .13, p = .003). Habitual reappraisal and stressful life event exposure were directly associated with both depressive symptoms (b = -.16, p < .001 and b = 0.32, p < .001, respectively), and stressful life events was associated with physical health (b = -.12, p = .004), but habitual reappraisal was not (p = .57). The three-way interaction between habitual reappraisal, reappraisal ability, and stressful life events predicting depressive symptoms reflected the same relationship found above when testing Hypothesis 3a (ΔR^2 = .01, F(1,383) = 6.14, p = .01). Depressive symptoms were then associated with self-reported physical health (b = -.47, p < .001). The interaction was also significant when directly predicting physical health controlling for depressive symptoms (ΔR^2 = .01, F(1,382) = 4.17, p = .04), suggesting that the three-way interaction with regard to physical health may occur both directly as well as indirectly through depressive symptoms (see Figure 14).

Similarly to previously reported results, a test of conditional indirect effects and simple slopes for the adjusted model at 1 SD above (9.8) and below (1.4) the mean of stressful life event exposure revealed that conditional indirect effects were significant when participants were exposed to more stressful life events and had lower reappraisal ability (b = -0.19, 95% CI [.09,

.29] for ability at 1 SD below the mean), but not when exposed to fewer stressful life events, either with high (95% CI [-.02, .16]) or low (95% CI [-0.11, 0.06]) reappraisal ability.

A test of the conditional interaction for the direct interactive model also reflected previous findings (from Hypothesis 3b), such that the interaction was significant when exposed to more stressful life events (b = -0.14, p = .003), but not when exposed to fewer events (p = .69). Simple slopes revealed that habitual reappraisal and reappraisal ability interacted at greater stressful life event exposure such that the association between habitual reappraisal and physical health was evident at lower levels of reappraisal ability (b = 0.17, p = .02 for ability at 1 SD below the mean), but not significant at higher levels of reappraisal ability (p = .19 at 1 SD above the mean).

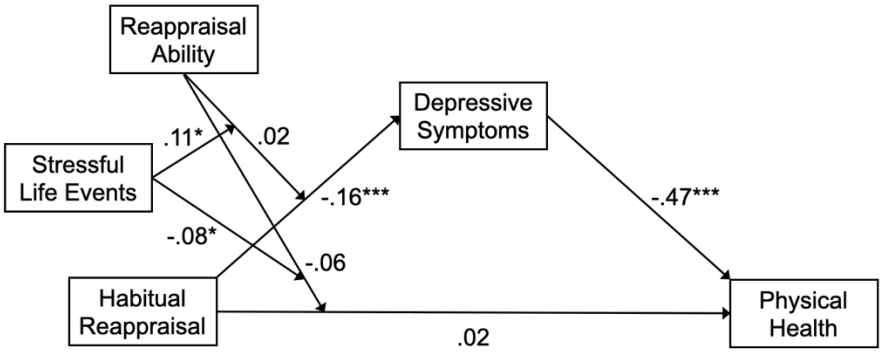

Figure 14. Paths for the conditional moderated mediation model (adjusted for covariates). Paths from moderators indicate the interaction coefficient. A three-way interaction between habitual reappraisal, cognitive reappraisal ability, and stressful life events occurred for depressive symptoms, which then contributes to differences in physical health. The direct interactive model was also significant, such that the three-way interaction occurred to affect physical health regardless of its effect on depressive symptoms.

Reverse Model: Examining Physical Health as a Mediator Between the Three-Way Interaction and Depressive Symptoms

A significant conditional moderated mediation was found with physical health acting as a mediator between habitual reappraisal and depressive symptoms, moderated by reappraisal

ability and stressful life event exposure (b = 0.07, 95% CI [.03, .15]), and the same results were found in the adjusted conditional moderated mediation model (b = 0.06, 95% CI [.02, .13]). Specifically, in the adjusted model habitual reappraisal, reappraisal ability, and stressful life event exposure were all associated with physical health (habitual reappraisal b = .10, p = .03; reappraisal ability b = .16, p = .001; stressful life events b = -.27, p < .001). Habitual reappraisal and stressful life event exposure were also directly associated with both depressive symptoms, controlling for physical health (habitual reappraisal b = -.12, p = .004; stressful life events b = .19, p < .001), but reappraisal ability was not (p = .88). The three-way interaction between habitual reappraisal, reappraisal ability, and stressful life events predicting physical health reflected the same relationship found above when testing Hypothesis 3b and the previously tested conditional moderated mediation (ΔR^2 = .02, F(1,383) = 8.89, p = .003). Physical health was then associated with self-reported depressive symptoms (b = -0.47, p < .001). Unlike the previous tested conditional moderated mediation model, the interaction was not significant when directly predicting depressive symptoms (p = .23), suggesting that the three-way interaction with regard to depressive symptoms may occur indirectly through physical health (see Figure 15).

A test of conditional indirect effects and simple slopes for the adjusted model at 1 SD above (9.8) and below (1.4) the mean of stressful life event exposure revealed that conditional indirect effects were significant when participants were exposed to more stressful life events and had lower reappraisal ability (b = -.17, 95% CI [-.29, -.09] for ability at 1 SD below the mean), but not when exposed to fewer stressful life events, either with high (95% CI [-.06, .12]) or low (95% CI [-.08, .11]) reappraisal ability.

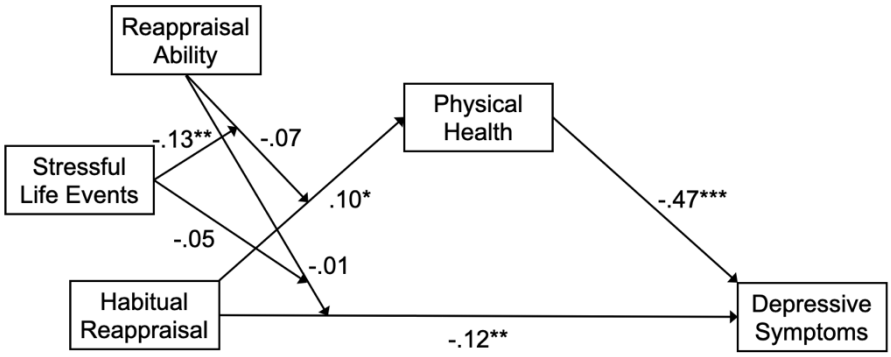

Figure 15. Paths for the reversed conditional moderated mediation model (adjusted for covariates). Paths from moderators indicate the interaction coefficient. A three-way interaction between habitual reappraisal, cognitive reappraisal ability, and stressful life events occurred for physical health, which then contributed to differences in depressive symptoms. The direct interactive model was not significant, although the main effect of habitual reappraisal on depressive symptoms remained significant.

Discussion

Positive reappraisal is typically regarded as an adaptive emotion regulation strategy; however, its utility may depend not only on how often it is implemented (i.e., habitual reappraisal), but also on an individual's *ability* to effectively manage emotions using reappraisal (i.e., reappraisal ability). Further, differential outcomes related to habitual reappraisal and reappraisal ability may depend on the contexts in which reappraisal is used. The goals of this dissertation were to (1) determine whether both the tendency to use reappraisal (i.e., habitual reappraisal) and the efficacy of attempts (i.e., ability) differentially influence self-reported psychological and physical health, and (2) ascertain whether exposure to stressful life events contribute to differences in how habitual reappraisal and reappraisal ability affect health.

Overall, findings partially supported hypotheses. Habitual reappraisal and reappraisal ability significantly interacted for self-reported physical health, but not psychological health (i.e., depressive and anxiety symptoms). However, when stressful life events were included in the model as a three-way interaction, the results were significant for both physical health and depressive symptoms. Interactive effects were marginally significant for anxiety symptoms, but did not remain significant when covariates were added to the model. For models that investigated habitual reappraisal and stressful life events (without reappraisal ability), results demonstrated that habitual reappraisal significantly interacts with stressful life events for depressive symptoms, such that reappraisal appeared to be protective for people exposed to more stressful life events, but the interactions were not significant for anxiety symptoms or physical health.

Additionally, supplemental analyses demonstrated that depressive symptoms acted as a partial mediator in the three-way interaction between habitual reappraisal, reappraisal ability,

and stressful life events predicting physical health, and an alternative model with physical health as the mediator and depressive symptoms as the outcome was also supported. Below, I discuss findings and interpretations for each model beginning with preliminary analyses, then by aim, followed by supplementary analyses. Then, I discuss the larger implications of the findings and their importance to the field, as well as limitations of the study and future directions.

Preliminary Analyses: Main Effects of Habitual Reappraisal, Reappraisal Ability, and Stressful Life Events

Habitual reappraisal was significantly associated with depressive and anxiety symptoms as well as physical health, which remained when covariates were included. These findings are consistent with prior research that has found reappraisal to be underutilized in people with depression and anxiety disorders (Dryman & Heimberg, 2018) and that frequent use is associated with fewer depressive and anxiety symptoms (Garnefski et al., 2001; Hu et al., 2014). However, main effects for physical health were unexpected.

Although links between habitual reappraisal and physical health are theoretically plausible (DeSteno et al., 2013; Gross, 2013), previous research that has corroborated a link between reappraisal and physical health has done so in the context of stressful circumstances, such as in populations coping with health-related stressors like chronic pain, HIV, AIDS, and cancer (Koechlin, 2018; Liao et al., 2017; Moskowitz et al., 2009; Penley et al., 2002). Main effects found in the current data suggest reappraisal may influence physical health even in a nonclinical, young adult population. Even though this sample was not clinically-sourced, it is worthwhile to note that most of these data (76.7%) were collected during the COVID-19 global pandemic that could have uprooted many participants' lives, potentially producing an additional

major stressor. Although completion of the study before or after the pandemic began was not significantly correlated with any outcome, it may still have presented a challenge for many participants.

Additionally, this sample consisted of undergraduates undergoing a transitional life period (i.e., emerging adulthood) that comes with unique challenges (e.g., loss of structure, greater educational and social role requirements; Arnett, 1998, 2000). Recent research has found that rates of depression and anxiety have increased substantially among undergraduates in recent years (Duffy, 2019), which is reflected in these data. Depressive symptoms were relatively high on average (M = 18.5) surpassing the 16 point cutoff indicating risk for clinical depression (Lewinsohn et al., 1997) but with wide variability (SD = 13.3). Similarly, anxiety symptoms met the 5-point cutoff for mild anxiety on average (M = 6.6, SD = 5.8; Spitzer et al., 2006), which suggests that although this was not a clinically-sourced sample, the average participant may have been struggling with their mental health.

Reappraisal ability was significantly associated with self-reported physical health in both unadjusted and adjusted models, and was associated with depressive symptoms in the adjusted model. Reappraisal ability was not significantly associated with anxiety symptoms. This is the first known study to link reappraisal ability with self-reported physical health. Although not hypothesized, reappraisal ability may affect health by influencing the efficacy with which individuals adaptively reappraise negative emotions during and after stressful situations, which can have downstream implications for health by altering physiological stress processes (DeSteno et al., 2013; Lazarus, 1966; Lazarus & Folkman, 1984; Orem et al., 2019). Importantly, emotion regulation can occur explicitly or implicitly (Gyurak et al., 2011); the

capacity to reappraise effectively may therefore confer positive effects on health regardless of explicit effort, as is typically assessed when measuring habitual reappraisal.

The results regarding reappraisal ability and depressive symptoms contrasted prior work by Troy et al. (2010) which found that reappraisal ability, as measured by the same cognitive reappraisal ability (CRA) task used in this study, was associated with depressive symptoms only in the context of greater stressful life events in women. However, the main effects of reappraisal ability on depressive symptoms here depended on whether covariates were included in the model. Specifically, the effect was contingent upon whether gender, socioeconomic status, and baseline sadness were covaried. More research on diverse populations would be helpful to understand how reappraisal ability relates to depressive symptoms.

Reappraisal ability did not confer a main effect on anxiety symptoms. A lack of effect on anxiety may have been due to the emotional nature of the CRA task, which specifically targeted sad emotions. It is possible that a CRA task targeting emotions more relevant to anxiety, such as fear, would have produced different results.

Lifetime exposure to stressful life events were also significantly associated with all outcomes in both unadjusted and adjusted models. These findings are consistent with prior research which has found that greater exposure to stressful life events confers negative effects on mental health and precipitates depression and anxiety diagnoses and relapses (Cleland et al., 2016; Francis et al., 2012; Kendler et al., 1999; Kessler, 1997; Low et al., 2012; Stroud et al., 2008; Tosevski & Milovancevic, 2006) as well as worsened physical health (Cleland et al., 2016; Cohen et al., 2016; Tosevski & Milovancevic, 2006).

Aim 1 (H1) Interactions Between Habitual Reappraisal and Reappraisal Ability

Contrary to Hypothesis 1, habitual reappraisal and reappraisal ability significantly interacted for self-reported physical health, but not for depressive or anxiety symptoms. The interaction for physical health functioned such that for people with average or low levels of reappraisal ability, engaging in reappraisal habitually was associated with better self-reported physical health. That is, for people who are average or less effective at reappraising, it appears that attempting to do so often is beneficial for physical health. However, people at high levels of reappraisal ability showed better health regardless of their reported engagement in habitual reappraisal (see Figure 9). Using T-scores calculated from U.S. general population estimates (Hays et al., 2009, 2015), habitual reappraisal led to a difference in physical health categories such that people with low reappraisal ability fell into the "good" health category when they reported low (1 SD below the mean) levels of habitual reappraisal, whereas when people with low reappraisal ability reappraised often (1 SD over the mean), they surpassed the threshold at which scores shift from "good" to "very good", ending in the same health category as people with high reappraisal ability.

The significant interaction for physical health suggests that habitual reappraisal may be important for physical health for people with average or low reappraisal ability. As previously mentioned, emotions can be regulated either explicitly or implicitly (Gyurak et al., 2011). It may be that people with high reappraisal ability regulate their emotions more automatically and without exerting conscious effort. As such, they may regulate their emotions using reappraisal effectively and thus experience better health, regardless of their reported frequency of attempts. For individuals with average and lower reappraisal ability, however, it appears attempting to reappraise more often is beneficial for health.

Although it was surprising that the interaction was not significant for psychological health, it is possible that the acute effect of the pandemic on mental health was too great for some participants to discern overall differences when stress exposure was not included in the model. That is, although the pandemic presented a major life stressor for most people, some populations were at a particular disadvantage (e.g., low socioeconomic status, essential workers, people without stable off-campus housing) and may have experienced more stressors as a result. Therefore, it is difficult to parse out the unique effects of habitual reappraisal and reappraisal ability on psychological health during a pandemic without taking stressful life events into consideration. However, in a young adult sample, physical health may be less likely to fluctuate compared to mental health. As such, effects on self-reported physical health may represent more stable health levels (i.e., with less variation due to pandemic-related stress when the study was completed).

Aim 2 (H2a, H2b): Interactions Between Habitual Reappraisal and Stressful Life Events

H2a. Psychological Health

As hypothesized, habitual reappraisal and stressful life events significantly interacted to predict depressive symptoms. The association functioned such that habitual reappraisal appears to be protective against depressive symptoms when individuals were exposed to average or high (1 SD above the mean) numbers of stressful life events, whereas people who were exposed to fewer stressful life events had lower levels of depressive symptoms—below the cutoff score for risk of mild clinical depression (Radloff, 1977; Rushton et al., 2002)—regardless of their tendency to reappraise. Importantly, habitual reappraisal appears to have the potential to shift people who have been exposed to more stressful life events (1 SD above the mean) from the

"moderate to severe" depressive symptom category to "mild" (Rushton et al., 2002). (See Figure 10.)

The interaction was not significant for anxiety symptoms. Prior research has found more consistent results with depressive than anxiety symptoms when investigating the link between stressful life events and psychological health (Suliman et al., 2009). It may be due, in part, to certain types of stressors such as those involving health, death, and interpersonal relationships, being more strongly implicated in generalized anxiety disorder (Francis et al., 2012). In addition, anxiety is characterized by persistent and excessive fear of, and worry about, change and uncertainty (American Psychological Association, 2013). Stressful experiences that present stark life changes and that create uncertainty (e.g., sudden death of someone close, divorce, significant financial trouble) may be more strongly related to negative perseverative thinking involved in anxiety disorders than events that have a greater degree of controllability with a distinct beginning and end (e.g., minor law violation, car accident) (Francis et al., 2012). It is also possible that stressful life events are generally more heavily implicated in depression than anxiety disorders regardless of event type. Investigating certain categories of stressful event exposure would shed more light on whether and how reappraisal affects anxiety symptoms in the context of stressful life events.

H2b. Physical Health

Contrary to Hypothesis 2b, the interaction between habitual reappraisal and stressful life events was not significant when predicting self-reported physical health. Previous research has found habitual reappraisal to affect physical health in the context of health-related stressful experiences, such as when managing life-threatening diseases (Liao et al., 2017; Moskowitz et al., 2009; Penley et al., 2002), and in older adulthood (Windsor, 2009). It may be that it is less

likely that the hypothesized association between habitual reappraisal and stressful life events occurs in the sample used here, which consisted of young adults who were primarily healthy. It is also possible that reappraisal ability is a necessary component when investigating the association in a young, primarily healthy population (see results for hypotheses H1, H3b, supplemental models).

Aim 2 (H3) Interactions Between Habitual Reappraisal, Reappraisal Ability, and Stressful Life Events

H3a. Psychological Health

A three-way interaction between habitual reappraisal, reappraisal ability, and stressful life events was significant when predicting depressive symptoms. Specifically, the interaction between habitual reappraisal and reappraisal ability reflected findings from Hypothesis 1, such that habitual reappraisal was associated with fewer depressive symptoms for people with lower levels of reappraisal ability, and that interaction was only significant for people who have been exposed to more stressful life events. People who were exposed to more stressful life events but who had high reappraisal ability did not significantly differ in their level of depressive symptoms as a function of habitual reappraisal, however their levels of depressive symptoms were generally lower than those with low reappraisal ability. People who had experienced fewer stressful life events had lower depressive symptoms regardless of their reappraisal ability and tendency to reappraise (see Figure 11).

In fact, simple slopes revealed that people with fewer stressful life events were generally below the threshold for mild clinical depression (Radloff, 1977) regardless of their habitual reappraisal or reappraisal ability, whereas those with more stressful life events were above the threshold. However, people who had experienced more stressful life events and had high

reappraisal ability appear to remain in the "mild" clinical depression category, whereas their counterparts with low reappraisal ability experience "moderate to severe" depressive symptoms at lower levels of habitual reappraisal, yet appear to have potential to reduce CES-D scores by more than 10 points and shift to the "mild" category with greater habitual reappraisal, suggesting the results here may be clinically meaningful. Together, habitual reappraisal appears to buffer against depressive symptoms for people who have experienced more stressful life events and are less naturally effective when attempting to reappraise. Implications of these findings are discussed in combination with other results in the General Discussion.

The three-way interaction was not significant for anxiety symptoms. As previously mentioned, not all stressful life events may affect anxiety in the same way (Francis et al., 2012). Additionally, the videos used in the CRA task were included to target sad emotions, which are highly implicated in depression. An effect on anxiety may have been apparent had other negative emotions more relevant to anxiety (e.g., fear) been the target of the videos.

H3b. Physical Health

Findings regarding the effects of a three-way interaction between habitual reappraisal, reappraisal ability, and stressful life events on physical health reflected the same pattern as seen with physical health in Hypothesis 1 and with depressive symptoms. Habitual reappraisal was associated with better self-reported physical health for people with lower levels of reappraisal ability, and the interaction was only significant for people who have been exposed to more stressful life events. Simple slopes revealed that individuals who were exposed to fewer stressful life events, regardless of reappraisal ability, as well as people with higher exposure to stressful life events but who had high reappraisal ability all reported scores consistent with "very good" health, which did not significantly differ as a function of habitual reappraisal. For

people who had been exposed to more stressful life events and had low reappraisal ability, however, habitual reappraisal was significantly associated with physical health such that the more often they reported reappraising, the better their physical health. In fact, the physical health of people with habitual reappraisal at -1 SD lower than average and at the average level fell into the "good" health category, while people at +1 SD higher than average habitual reappraisal met the threshold for "very good" health (see Figure 12.)

Supplementary Analyses

Supplemental findings indicated that depressive symptoms acted as a partial mediator in the three-way interaction between habitual reappraisal, reappraisal ability, and stressful life events predicting physical health. The pattern of the association for the mediator matched findings from Hypothesis 3a, such that habitual reappraisal was protective against depressive symptoms for individuals exposed to more stressful life events and with low reappraisal ability, but not for people with higher reappraisal ability or for those exposed to fewer stressful life events, regardless of reappraisal ability. Habitual reappraisal also conferred a main effect on depressive symptoms. Depressive symptoms, in turn, predicted worse physical health. In addition, the interaction was also significant in direct relation to physical health, suggesting other avenues also exist by which the interaction affects health (see Figure 14).

These findings indicate that reappraising often is beneficial for both psychological and physical health for people with low reappraisal ability who have experienced more stressful life events and that the effects on physical health partially function through depressive symptoms. The results here align with research and theory that implicates depression as a risk factor in physical health outcomes (Barlinn et al., 2014; Suls & Bunde, 2005; Trudel-Fitzgerald et al., 2017). The direct effect conferred by the interaction suggest the relationship also functions

through other avenues. For people who have experienced more stressful life events, the tendency to reappraise may be protective for physical health by reducing stress reactivity and promoting recovery. Over time, healthier stress responses and enhanced recovery could limit exposure to stress hormones and reduce the likelihood of experiencing allostatic load, even in the presence of greater life stress.

In addition, an alternative reversed model in which physical health was the mediator and depressive symptoms were the outcome was also supported; a significant indirect three-way interaction was found for physical health, which then affected depressive symptoms. A direct three-way interaction for depressive symptoms, controlling for physical health, was not significant. However, habitual reappraisal's main effects on depressive symptoms remained (see Figure 15). These results suggest that in addition to a pathway in which habitual reappraisal affects depressive symptoms in people with high exposure to stressful life events and low reappraisal ability, which then contributes to physical health, the reverse may also be true such that physical health is influenced by these predictors, which then affects depressive symptoms.

The alternative model fits with the sickness behavior theory of depression (Dantzer, 2009; Dantzer et al., 2008; Maes et al., 2012). Sickness behavior is a phenomenon in which high levels of pro-inflammatory cytokines in the brain lead to a behavioral response characterized by behavioral inhibition, trouble eating and weight loss, anhedonia, fatigue, hyperalgesia, and malaise, as well as neurocognitive symptoms, all of which are also implicated in depression. However, the onset and course of sickness behavior is different than depression (Maes et al., 2012); sickness behavior is produced in response to infection and immune system trauma, although it may also be initiated when stress responses are excessive and do not adequately recover, and may dissipate when the organism returns to homeostasis (Dantzer et al.,

2008; Maes et al., 2012). In this case, reappraisal may be protective for physical health in the presence of more stressful life event exposure by reducing stress reactivity and enhancing recovery, which may limit overall exposure to pro-inflammatory cytokines, therefore reducing the likelihood of experiencing depressive symptoms that may be due to sickness behavior.

General Discussion

The findings from this study suggest that although the tendency to reappraise may be beneficial for depressive symptoms and physical health overall, it is particularly important for individuals who have experienced more stressful life events and who are less effective when attempting to reappraise as indicated by an experimental paradigm. Results for both depressive symptoms and self-reported physical health differed from the pattern that was hypothesized; I expected positive significant effects of habitual reappraisal to be seen for people with people with more stressful life events and high reappraisal ability, such that habitual reappraisal would be more beneficial for people that were more effective at reappraising, yet it appears that reappraising often is particularly important for people who are not typically effective in their reappraisal attempts.

Emotions can be regulated either explicitly or implicitly (Gyurak et al., 2011). People who are more effective at reappraising may use reappraisal to regulate negative emotions without exerting conscious effort to do so and therefore may not recall that they do it often, which would explain why people with higher reappraisal ability experience fewer depressive symptoms and better physical health regardless of their reported tendency to reappraise. Conversely, people who are less effective at reappraising may have to attempt to do so with concerted effort to be successful and confer positive effects on health; they would therefore have explicit memory of using reappraisal in daily life and report doing so. It is also possible

that individuals with greater reappraisal ability are also more effective at regulating their emotions using other adaptive strategies (e.g., acceptance) and may choose to use them in daily life more often than reappraisal. Nonetheless, the current research suggests making an effort to reappraise often may buffer against the potential negative effects of not being an effective reappraiser.

The results also underscore the role of emotion regulation in protecting against worsened health in the context of stressful life events. Theoretically, adaptive emotion regulation strategies, like reappraisal, should be particularly important when people are undergoing or have experienced stressful situations due to the need to down-regulate negative emotionality (e.g., Bonanno, 2004; Compas et al., 2014). Nonetheless, the only known study that specifically investigated the moderating effect of stressful life event exposure was Troy and colleagues (2010), who found that recent exposure to stressful life events interacted with reappraisal ability to affect depressive symptoms in women. The current study supports these results, finding that the association between reappraisal and health is indeed most important for people who have experienced more stressful life events. It expands upon prior research by demonstrating stressful life events as a significant moderator in the association between both reappraisal ability and habitual reappraisal and health, which was broadened to include physical health as well as depressive symptoms. Specifically, findings indicate that being an effective reappraiser may be health-protective when exposed to more stressful life events, and that for people who are not effective reappraisers, attempting to reappraise often may be key to producing a similar protective effect.

The information gained from this investigation points to the potential health benefits of therapeutic and educational interventions to increase both reappraisal use and ability. Many

interventions for reappraisal training exist. Cognitive behavioral therapy (CBT) recognizes reappraisal as a core skill central to emotion regulation that can be developed. In addition to individualized therapy, interventions outside of therapy also appear to be effective. A recent randomized controlled trial found that a single-session, conflict-focused reappraisal intervention, in which college-aged participants adopted the perspective of a neutral third-party, was effective in increasing adaptive emotion regulation strategy use and improving depressive symptoms (Rodriguez et al., 2020).

Longer interventions outside of therapy have been particularly helpful for at-risk populations. For example, another randomized controlled trial used a web-based peer-to-peer cognitive reappraisal platform, which involved posting descriptions of stressful situations they were experiencing and their thoughts and receiving quick (< 9 mins median response time) reappraisal support from other users. Participants must have used the platform for at least 25 minutes/week for three weeks. They found significant improvements in frequency of reappraisal use and decreases in depressive symptoms, with a greater comparative benefit for individuals with elevated depressive symptoms prior to the intervention (Morris et al., 2015). Findings here indicate that therapy and these types of interventions targeting reappraisal skills could be particularly beneficial for people who have experienced moderate to high exposure to stressful life events, although intervention studies specifically targeting these individuals is necessary to determine their efficacy. Effective reappraisal interventions could buffer against the negative effects of stressful life events by enhancing individuals' ability to manage their negative emotions and stress responses, and therefore confer better protection against depression and worsened physical health. In addition, it may be helpful to not only train in how to use

reappraisal, but also educate about when or in which situations it may be most useful (e.g., uncontrollable stressors at a time when emotions are less intense).

Hypotheses regarding anxiety symptoms were not supported by the data. The lack of significant results with anxiety may have been due to the emotions targeted in the Emotion Regulation Questionnaire and the CRA task. Fearful and anxious emotions are most relevant to anxiety disorder symptoms (Cisler et al., 2010), however the Emotion Regulation Questionnaire specifically references sadness and anger as examples of negative emotions that can be regulated (Gross & John, 2003). Just as sadness is relevant to depression, it is possible that providing example emotions that are more relevant to anxiety in the questionnaire would garner results that are more pertinent to anxiety. This would also explain why in a meta-analysis by Aldao et al. (2010), habitual reappraisal was consistently and robustly associated with depression but marginally associated with anxiety. Similarly, the CRA task focused on inducing sad emotions. It is possible that using the same paradigm with videos designed to induce emotions more relevant to anxiety, such as fear, would produce different results.

What makes reappraisal effective?

The apparent benefits of having high reappraisal ability regardless of reported tendency to reappraise beg the question: Why are some individuals better at reappraising than others? To successfully regulate emotions, people first must be able to accurately identify, understand, and track their ongoing or anticipated emotional responses, whether that is done implicitly or explicitly (Gross, 2013), which may require higher levels of emotional intelligence (Bucich & MacCann, 2019; Peña-Sarrionandia et al., 2015; Zysberg & Raz, 2019). They must then activate a goal to change their emotion, which also may be done either consciously or unconsciously (Gross, 2013; McRae et al., 2012). Additional individual and context-dependent factors then

play a role; for example, people that believe emotions are malleable (i.e., have incremental beliefs about emotions) are more likely to try to change them and have success when they do (Tamir et al., 2007). Individuals must also be able to generate a different, believable reappraisal, which may require creativity and perspective-taking. The strategy must also match its context appropriately. Strategies aimed at managing emotions, like reappraisal, are most adaptive in uncontrollable situations, when changing one's behavior or taking action would not substantially change the situation; it is not as functional when taking action could change the situation and remove the stressor altogether (Carver et al., 1989; Ford & Troy, 2019; Kobylińska & Kusev, 2019; Lazarus & Folkman, 1984).

In addition, reappraisal may be more effortful and less effective during and immediately following major stressors, whereas it is effective when undergoing more minor stressors (e.g., daily hassles) and when the emotional intensity of a major stressor has abated to a more manageable level. For example, prior research has found that distraction is most effective when emotional intensity is high compared to reappraisal when emotional intensity is low (Sheppes & Gross, 2011). Finally, other goals must not compete with the motivation to change an emotion (Gross, 2013). Negative emotions often serve a purpose (Levenson, 1999; Ohman & Mineka, 2001; Parrott, 1993). For example, after experiencing a stressor, people may want to reduce their negative emotions; however, they may also want to use their emotions as motivation to reflect on how to respond better next time they experience a similar stressor, or as means to bond with someone else who is experiencing similar emotions. If other goals compete with the goal to change an emotion, attempts at regulation may be thwarted.

Limitations and Future Directions

Correlational Nature

These data were correlational, so causation cannot be inferred. For example, it may be only that emotion regulation not only influences likelihood for developing depression, but that people who are depressed lack the ability to effectively regulate emotions (Joormann & Stanton, 2016; Joormann & Vanderlind, 2014). Although other research has found that attempting to reappraise is still beneficial for promoting emotional recovery in people with greater depressive symptoms (Shapero, 2019), less is known about emotion regulation ability. It is possible that psychopathology may limit the development of emotion regulation capacity, particularly since disorders like depression can have detrimental effects on executive functioning, which is necessary to cognitively generate reappraisals amid difficult circumstances (Joormann, 2010; Joormann & Gotlib, 2010; Joormann & Stanton, 2016; Joormann & Vanderlind, 2014). Longitudinal research that assesses habitual reappraisal, reappraisal ability, exposure to stressful life events, and health over time could help shed light on directionality. Additionally, ecological momentary assessment (EMA) studies could allow for the investigation into habitual reappraisal and reappraisal ability in the context of stressors in real-time.

Generalizability

Results may not be generalizable to populations that have fewer psychopathological symptoms or are clinically-sourced, older, or from different cultural backgrounds. As previously discussed, although the sample was not clinically sourced, average depressive and anxiety symptoms surpassed the cutoff scores indicating risk for clinical depression and mild anxiety, although there was wide variability. As such, it is possible that effects may be not generalize to populations with less incidence of psychopathological symptoms. Similarly, effects may be

greater for clinical populations. In addition, this sample was relatively young. Because health changes over the lifespan, and developmental variations in emotion regulation exist (Zimmermann & Iwanski, 2014), future research on a variety of age groups will be beneficial. Finally, culture, which entails a set of behavioral norms and cognitions shared by a group of people that is distinct from others, inevitably also influences its group members' cognitions and emotions (Lehman et al., 2004). As such, cultural differences also manifest in whether individuals choose to use reappraisal (Matsumoto et al., 2008), although differences in efficacy are yet unknown.

Measurement

This study relied primarily on self-reported measures for which affective states could have influenced responses. Global physical health was also self-reported. Although self-reported health is highly correlated with healthcare utilization and is substantially predictive of disease incidence and mortality (Jylhä, 2009), future research should examine objective markers of physical health, such as markers of cardiovascular and immune system functioning.

This study was strengthened by the use of an experimental measure of reappraisal ability rather than self-reported efficacy. Nonetheless, some participants noted qualitatively that the videos used in the CRA task were outdated or did not seem authentic. One participant noted, "more up-to-date videos would be helpful to keep the participant engaged." Another stated, "Maybe when choosing videos, make sure they are live actual events with real human emotion. I found it hard to sympathize with actors." Others, however, "liked the videos." One participant said, "The video segments really made me feel emotional depending on the clips and let me ponder about how I would actually interact in those situations with those characters." Future

studies could pilot the use of more recent videos, assessed for perceived authenticity as well as emotionality, to more reliably incite emotional responses in participants.

Incorporating Additional Emotions and Regulation Strategies

This study did not incorporate other regulatory strategies, although they may contribute to reappraisal use and ability. For example, because reappraisal involves reconsidering the meaning of a situation, it requires that individuals engage with their experience with some degree of vulnerability (Ford & Troy, 2019; Sheppes, 2014). Additionally, attentional deployment, which involves attending to aspects of a situation, is necessary for reappraisal to take place (Gross & Thompson, 2007). Therefore, a willingness to engage with a stressful or emotional experience is likely to be affected by an individual's tendency to cope using approach or avoidance strategies (Roth & Cohen, 1986). Similarly, mindfulness of one's emotional experiences may also influence the extent to which individuals recognize they are experiencing a negative emotional state, the causes of that emotional state, and self-compassion and empathy for others connected with the stressful situation may affect the ability to generate more positive appraisals of the situation (Diedrich et al., 2016; vanOyen Witvliet et al., 2010). Future studies would benefit by examining other regulatory strategies as well to determine if they affect one's propensity or ability to use reappraisal. In addition, flexibility in strategies used to regulate emotions may also play a role in health and is worthy of investigation (Bonanno & Burton, 2013).

Further, when situations are highly intense, they may be challenging to reappraise. Adding the cognitive effort of reappraising with a lack of success may generate additional negative emotions that could contribute to greater risk for poor health (Ford & Troy, 2019). In fact, distraction may be more adaptive in the short term, whereas reappraisal is appropriate

when the stressor is perceived as less intense or becomes less intense over time (Shafir et al., 2015; Sheppes et al., 2011; Sheppes & Gross, 2011).

This study also focused on one emotion—sadness—and did not incorporate multiple emotional states. Specifically, future studies could employ the same reappraisal ability task with videos that induce other types of negative emotions to understand if the ability to reappraise other emotions, such as fear, may be more closely related to anxiety, or if the ability to reappraise all negative emotions influences health in a cumulative manner.

Additionally, reappraisal can not only decrease negative emotions, but also increase positive emotions (Troy et al., 2019), which may contribute to resilience. For example, the Broaden-and-Build Theory of Positive Emotions (Fredrickson, 1998, 2001) posits that positive emotions may affect health directly (e.g., by speeding recovery from stress) and indirectly (e.g., by building personal resources). Although evidence for those relationships remains inconsistent, future research would benefit from taking a differentiated emotion approach to understand the unique and interactive effects of habitual reappraisal and reappraisal ability for positive emotions as well as other negative emotions.

Potential Mechanisms

Future research should also investigate mechanisms by which the factors explored in this study affect health. This dissertation focuses on alterations in physiological responses and recovery as responsible for the effects of emotion regulation on health in the context of stress, however there are likely multiple avenues by which emotions and emotion regulation affect health. Behaviorally, affective states can serve as a heuristic influencing health-related decision-making by providing an implicit source of information about the risk perception and importance of a health behavior (for a review, see DeSteno et al., 2013). Therefore, the tendency and ability

to manage those affective states may similarly influence decisions that have implications for health. Relatedly, when emotions related to a stressor are not managed adequately via adaptive regulatory efforts, individuals may turn to less adaptive coping strategies, such as substance abuse (Kober, 2014). These mechanisms should be investigated in future research in lab-based studies (e.g., using an acute stress reactivity paradigm) and by assessing health behaviors and health-related decision-making through EMA studies.

Interpersonally, the use of adaptive emotion regulation strategies can impact psychological and physical health by affecting relationship functioning. Positive, high quality relationships are important for health, partly because they have implications for the level of social connectedness and support individuals receive, which are known predictors of positive adjustment and health during times of stress (Cohen & Pressman, 2004; Cohen & Wills, 1985; Hostinar, 2015; Umberson & Karas Montez, 2010). Prior research has found that adaptive emotion regulation strategy use promotes healthier social functioning, while maladaptive strategies undermine it (Cutuli, 2014; Gross & John, 2003). Investigating interpersonal functioning and relationship health therefore presents another opportunity for identifying mechanisms responsible for the findings discussed here.

Conclusions

Theories related to stress, coping, and emotion regulation identify the effective use of adaptive regulatory strategies, such as reappraisal, as imperative for both psychological and physical health, particularly in the context of stressful experiences. However, corroborating research as to the contextual influence of stressful life events is limited and no known research had yet investigated whether the ability to reappraise effectively confers an additional effect in the link between habitual reappraisal and health. This dissertation provides a novel contribution

to the field of emotion regulation and health by addressing significant gaps in knowledge pertaining to the interactive effects of habitual reappraisal and reappraisal ability, as well as the influence of stressful life event exposure. Findings revealed that habitual reappraisal may protect against depressive symptoms and worsened self-reported physical health for people exposed to stressful life events, and that reappraising often appears to be even more important when people are less effective in their attempts. This dissertation provides initial support for both ability and tendency to use reappraisal as integral to understanding emotion regulation and health, and clarifies moderate to high stressful life event exposure as contexts under which reappraisal may be most useful.

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Appendix A: Emotion Regulation Questionnaire

Reference:

Gross, J.J., & John, O.P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. Journal of Personality and Social Psychology, 85, 348-362.

Scoring:

Respondents answer each item on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). Items 1, 3, 5, 7, 8, 10 make up the Cognitive Reappraisal facet. Items 2, 4, 6, 9 make up the Expressive Suppression facet. Scoring is kept continuous. Each facet's scoring is kept separate.

Instructions:

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 B: Stressful Life Events

References:

LEC-5

Gray, M., Litz, B., Hsu, J., & Lombardo, T. (2004). Psychometric properties of the Life Events Checklist. *Assessment, 11*, 330-341.

Weathers, F. W., Blake, D. D., Schnurr, P. P., Kaloupek, D. G., Marx, B. P., & Keane, T. M. (2013). *The Life Events Checklist for DSM-5 (LEC-5)*. Instrument available from the National Center for PTSD at www.ptsd.va.gov

LEL

Henderson, A. S., Byrne, D. G. and Duncan-Jones, P. (1981). *Neurosis and the social environment.* New York: Academic Press.

THQ

Hooper, L. M., Stockton, P., Krupnick, J., & Green, B. L. (2011). The development, use, and psychometric properties of the Trauma History Questionnaire. *Journal of Loss and Trauma, 16,* 258-283.

Description:

This questionnaire features the full LEC-5 scale to assess exposure to *DSM-5* traumatic events, and items from the LEL and THQ to include other stressful events that are normatively negative and that we might expect a young adult to have experienced. Three additional items were also added to assess infidelity, law violations, and incarceration. Scoring was changed to determine exposure to events that happened directly to the participant and timing (i.e., within past 12 months and more than 12 months ago). Wording from items THQ were slightly altered to align with the wording for other items (i.e., converted item from questions into statements).

Scoring:

Total item count for "yes" will indicate lifetime exposure to stressful events.

Instructions:

Listed below are difficult or stressful things that sometimes happen to people. For each event, please indicate whether it happened to you and when. Give your best guess if you are not sure.

	Event	No	Yes, within the past 12 months	Yes, more than 12 months ago
1	Natural disaster (for example, flood, hurricane, tornado, earthquake)			
2	Fire or explosion			
3	Transportation accident			
4	Serious accident at work, home, or during recreational activity			
5	Exposure to toxic substance (for example, dangerous chemicals, radiation)			

6	Physical assault (for example, being attacked, hit, slapped, kicked, beaten up)			
7	Assault with weapon (for example, being shot, stabbed, threatened with a knife, gun, bomb)			
8	Sexual assault (rape, attempted rape, made to perform any type of sexual act through force or threat of harm)			
9	Other unwanted or uncomfortable sexual experience			
10	Combat or exposure to a war-zone (in the military or as a civilian)			
11	Captivity (for example, being kidnapped, abducted, held hostage, prisoner of war)			
12	Life-threatening illness or injury			
13	Severe human suffering			
14	Sudden violent death (for example, homicide, suicide)			
15	Sudden accidental death			
16	Serious injury, harm, or death you caused to someone else			
17	Any other very stressful event or experience			
Events from Life Events List (LEL) that are normatively negative and that we might expect a young adult to have experienced:				
18	Broken off an engagement to be married or experienced a breakup from an intimate relationship			
19	Death of someone you were close to, in which the cause was not violent or accidental. For example, a death resulting from cancer or heart disease. (Note, this is different than your answers to questions 14 and 15.)			
20	Separation or divorce (if you have been married)			
21	Breakup with a close friend			
22	An important relationship (for example, with your spouse, a close friend, your boss, or a family member) got significantly worse			
23	**(Women)** Had an abortion			

	(Men) Your wife, partner or girlfriend had an abortion			
24	**(Women)** Had a miscarriage or stillbirth **(Men)** Your wife, partner or girlfriend had a miscarriage or stillbirth			
25	Lost a job or been involuntarily unemployed			
26	Serious problems or disappointment at school or in an educational course (university, training program, etc.)			
27	Significant financial trouble			
28	The behavior of a member of your family been a significant problem for you			
29	You or someone you are close to had to appear in court as a defendant, a witness in a criminal case, or as party to a lawsuit			
Additional events from Trauma History Questionnaire (THQ) that are normatively negative, that we might expect a young adult to have experienced, and that are not already addressed by previous items:				
30	Someone tried to take something directly from you by using force or the threat of force, such as a stick-up or mugging			
31	Someone attempted to rob you or actually robbed you (i.e., stolen your personal belongings)			
32	Someone attempted to or succeeded in breaking into your home when you were <u>not</u> there			
33	Someone attempted to or succeed in breaking into your home while you <u>were</u> there			
34	A pet (animal) to whom you were attached died, or got lost, or you had to give it away			
Additional items:				
35	Involved in minor law violations (e.g., traffic violations, disturbing the peace)			
36	Involved in major law violations, been arrested, or gone to jail			
37	Found out that a partner in a serious intimate relationship was unfaithful			

Appendix C: Center for Epidemiological Studies – Depression

Reference:

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. ***Applied Psychological Measurements, 1*****, 385-401.**

Scoring:

Total scores are found by summing items.
Items 4, 8, 12, and 16 are reverse-scored.

Instructions:

Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

0 = Rarely or none of the time (less than 1 day)
1 = Some or a little of the time (1-2 days)
2 = Occasionally or a moderate amount of time (3-4 days)
3 = Most or all of the time (5-7 days)

During the past week:
1. I was bothered by things that usually don't bother me.
2. I did not feel like eating; my appetite was poor.
3. I felt that I could not shake off the blues even with help from my family or friends.
4. I felt that I was just as good as other people. **(Reversed)**
5. I had trouble keeping my mind on what I was doing.
6. I felt depressed.
7. I felt that everything I did was an effort.
8. I felt hopeful about the future. **(Reversed)**
9. I thought my life had been a failure.
10. I felt fearful.
11. My sleep was restless.
12. I was happy. **(Reversed)**
13. I talked less than usual.
14. I felt lonely.
15. People were unfriendly.
16. I enjoyed life. **(Reversed)**
17. I had crying spells.
18. I felt sad.
19. I felt that people dislike me.
20. I could not get “going.”

Appendix D: Generalized Anxiety Disorder-7

Reference:

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A Brief Measure for Assessing Generalized Anxiety Disorder: The GAD-7. *Archives of Internal Medicine, 166(*10), 1092. https://doi.org/10.1001/archinte.166.10.1092

Scoring:

Total scores are found by summing items.

0 = Not at all
1 = Several days
2 = Over half the days
3 = Nearly every day

Over the last 2 weeks, how often have you been bothered by the following problems?

1. Feeling nervous, anxious, or on edge
2. Not being able to stop or control worrying
3. Worrying too much about different things
4. Trouble relaxing
5. Being so restless that it's hard to sit still
6. Becoming easily annoyed or irritable
7. Feeling afraid as if something awful might happen

If you checked off any problems, how difficult have these made it for you to do your work, take care of things at home, or get along with other people?

- Not difficult at all
- Somewhat difficult
- Very difficult
- Extremely difficult

Appendix E: PROMIS Global Health Short Form

Reference:

Hays, R. D., Bjorner, J., Revicki, D.A., Spritzer, K., & Cella, D. (2009). Development of physical and mental health summary scores from the Patient Reported Outcomes Measurement Information System (PROMIS) global items. *Quality of Life Research, 18(*7), 873-880.**

Scoring Information:

Items are scored on a 1-5 scale, except for the last question which is on a 0-10 scale.
Item 10 should be recoded such that the score ranges from 1 to 5, as follows: (0 No pain =5; 1, 2, or 3 =4; 4, 5, or 6 =3; 7, 8, or 9 =2; 10 worst pain imaginable =1)
After recoding, the Global Physical and Mental Health Scores are calculated as follows:
Global Physical Health score = SUM G03 + G06 + G07 + G08
Global Mental Health score = SUM G02 + G04 + G05 + G10

This questionnaire is about your health. Please answer each question with the most appropriate response for you.

	Please respond to each item by marking one box per row	**Excellent**	**Very good**	**Good**	**Fair**	**Poor**
Global 01	In general, would you say your health is:	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
Global 02	In general, would you say your quality of life is:	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
Global 03	In general, how would you rate your physical health?	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
Global 04	In general, how would you rate your mental health, including your mood and your ability to think?	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
Global 05	In general, how would you rate your satisfaction with your social activities and relationships?	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
Global 09	In general, please rate how well you carry out your usual social activities and roles. (This includes activities at home, at work and in your community, and responsibilities as a parent, child, spouse, employee, friend, etc.)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
		Completely	**Mostly**	**Moderately**	**A Little**	**Not At All**
Global 06	To what extent are you able to carry out your everyday physical activities such as walking, climbing stairs, carrying groceries, or moving a chair?	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
	In the past 7 days	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
Global 10	How often have you been bothered by emotional problems such as feeling anxious, depressed or irritable?	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
		None	**Mild**	**Moderate**	**Severe**	**Very Severe**
Global 08	How would you rate your fatigue on average?	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
Global 07	How would you rate your pain on average?	☐ 0 No Pain ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 Worst Imaginable Pain				

Appendix F: Cognitive Reappraisal Ability Task

Reference for CRA Task:

Troy, A. S.,Wilhelm, F. H., Shallcross, A. J., & Mauss, I. B. (2010). Seeing the Silver Lining: Cognitive Reappraisal Ability Moderates the Relationship Between Stress and Depressive Symptoms. *Emotion*, *10*(6), 783–795. http://doi.org/10.1037/a0020262

Reference for Discrete Emotions Questionnaire:

Harmon-Jones, C., Bastian, B., & Harmon-Jones, E. (2016). The Discrete Emotions Questionnaire: A New Tool for Measuring State Self-Reported Emotions. *PLoS ONE 11*(8): e0159915. doi:10.1371/journal.pone.0159915

Task Videos:

Neutral Film:
https://www.youtube.com/watch?feature=player_embedded&v=tZSq3r1_k6g

Sad Film 1:
https://www.youtube.com/watch?feature=player_embedded&v=x6BMqKUuQyI

Sad Film 2: https://www.youtube.com/watch?feature=player_embedded&v=TbgiUqtqJcE

Sad Film 3:
https://www.youtube.com/watch?feature=player_embedded&v=mxGqHhv2M4U

***Note:* To avoid confounding emotion regulation effects with habituation to the sad film clips or regression to the mean, participants were randomly assigned to two groups in a within-individual repeated measures design. The order of the film clips were the same for both groups, but the order of reappraisal instructions were different for the two groups. The first sad film clip served as a sadness baseline for all participants. Group 1 received reappraisal instructions during the second sad film and Group 2 received reappraisal instructions on the third sad film. Each film clip will be followed by a two-minute recovery period.**

Film Clip Instructions:

Baseline sad film:
Please watch the following film clip carefully.

Positive reappraisal:
Please watch the following film clip carefully. This time, as you watch, try to think about the situation you see in a more positive light. You can achieve this in several different ways. For example, try to imagine advice that you could give to the characters in the film clip to make them feel better. This could be advice that would help them think about the positive bearing this event could have on their lives. Or, think about the good things they might learn from this experience. Keep in mind that even though a situation may be painful in the moment, in the long run, it could make one's life better, or have unexpected good outcomes. In other words, try to think about the

situation in as positive terms as you possibly can. This can be difficult at times, so it is very important that you try your best. It is very important that you carefully watch the film clip, but think about it from a positive perspective.

Discrete Emotions Questionnaire (Harmon-Jones, Bastian, & Harmon-Jones, 2016) to be shown directly after each film clip:
Please report the GREATEST amount of each of these emotions you experienced during the film clip. ***Discrete Emotions Questionnaire is shown***

1	2	3	4	5	6	7	8	9
Not at all				Somewhat				Extremely

Anger **(Ag)**
Wanting **(Dr)**
Dread **(Ax)**
Sad **(S)**
Easygoing **(R)**
Grossed out **(Dg)**
Happy **(H)**
Terror **(F)**
Rage **(Ag)**
Grief **(S)**
Nausea **(Dg)**
Anxiety **(Ax)**
Chilled out **(R)**
Desire **(Dr)**
Nervous **(Ax)**
Lonely **(S)**
Scared **(F)**
Mad **(Ag)**
Satisfaction **(H)**
Sickened **(Dg)**
Empty **(S)**
Craving **(Dr)**
Panic **(F)**
Longing **(Dr)**
Calm **(R)**
Fear **(F)**
Relaxation **(R)**
Revulsion **(Dg)**
Worry **(Ax)**
Enjoyment **(H)**
Pissed off **(Ag)**
Liking **(H)**

***Note:* Ag = Anger; Dg = Disgust; F = Fear; Ax = Anxiety; S = Sadness; Dr = Desire; R = Relaxation items; H = Happiness. Scoring for the Discrete Emotions Questionnaire was modified from a 7-point Likert scale in its original form to a 9-point Likert scale to be in line with previous scoring for sadness in Troy et al. (2010).**

To be shown after each film clip:
What was the previous film clip about? _____

On a scale from 1 (not at all) to 9 (an extreme amount):
How much did you try to follow the instructions you were given?
How difficult was it to follow the instructions you were given?
How successful were you at following the instructions you were given?

Appendix G: Tables for All Models

Table 1
Linear Multiple Regression Model for Habitual Reappraisal and Depressive Symptoms

Variable	*b*	*SE*	*β*	(adj.) R^2	*p*	95% CI [LL, UL]
Unadjusted Model						
Habitual reappraisal	-2.62	0.65	-.20	.04	< .001	[-3.90, -1.34]
Adjusted Model						
Age	0.19	0.26	.03		.47	[-0.32, 0.69]
Gender (female)	4.18	1.28	.15		.001	[1.65, 6.70]
Race (minority)	1.70	1.31	.06		.20	[-0.88, 4.26]
SES	-1.84	0.42	-.21		< .001	[-2.67, -1.01]
Body mass index	-0.05	0.11	-.02		.64	[-0.26, 0.16]
Baseline response	3.16	0.54	.27		< .001	[2.10, 4.21]
Habitual reappraisal	-2.38	0.63	-.18	.03	< .001	[-3.61, -1.15]

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video.

Table 2
Linear Multiple Regression Model for Habitual Reappraisal and Anxiety Symptoms

Variable	*b*	*SE*	*β*	(adj.) R^2	*p*	95% CI [LL, UL]
Unadjusted Model						
Habitual reappraisal	-0.85	0.28	-.15	.02	.003	[-1.41, -0.29]
Adjusted Model						
Age	0.08	0.11	.03		.50	[-0.15, 0.30]
Gender (female)	2.92	0.56	.24		< .001	[1.82, 4.02]
Race (minority)	-0.31	0.57	-.03		.59	[-1.43, 0.82]
SES	0.05	0.05	.05		< .001	[-1.05, -0.33]
Body mass index	-0.69	0.18	-.18		.30	[-0.04, 0.14]
Baseline response	1.21	0.24	.24		< .001	[0.75, 1.67]
Habitual reappraisal	-0.63	0.27	-.11	.01	.02	[-1.17, -0.09]

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video.

Table 3
Linear Multiple Regression Model for Habitual Reappraisal and Physical Health

Variable	*b*	*SE*	*β*	(adj.) R^2	*p*	95% CI [LL, UL]
Unadjusted Model						
Habitual reappraisal	0.36	0.12	.15	.02	.004	[0.12, 0.61]
Adjusted Model						
Age	-0.10	0.05	-.100		.04	[-0.20, -0.01]
Gender (female)	-0.83	0.24	-.159		.001	[-1.31, -0.35]
Race (minority)	-0.39	0.25	-.074		.12	[-0.88, 0.10]
SES	0.41	0.08	.254		< .001	[0.26, 0.57]
Body mass index	-0.06	0.02	-.136		.004	[-0.10, -0.02]
Baseline response	-0.27	0.10	-.121		.009	[-0.47, -0.07]
Habitual reappraisal	0.31	0.12	.120	.01	.01	[0.07, 0.54]

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. Physical health is scored such that higher scores indicate better health.

Table 4
Linear Multiple Regression Model for Reappraisal Ability and Depressive Symptoms

Variable	*b*	*SE*	*β*	(adj.) R^2	*p*	95% CI [LL, UL]
Unadjusted Model						
Reappraisal ability	-0.01	0.66	-.00	.00	.99	[-1.32, 1.30]
Adjusted Model						
Age	0.19	0.26	.04		.47	[-0.32, 0.70]
Gender (female)	4.57	1.30	.17		< .001	[2.01, 7.13]
Race (minority)	0.75	1.31	.03		.57	[-1.82, 3.32]
SES	-1.95	0.42	-.23		< .001	[-2.78, -1.12]
Body mass index	-0.01	0.11	-.01		.95	[-0.22, 0.21]
Baseline response	3.49	0.58	.30		< .001	[2.35, 4.62]
Reappraisal ability	-1.30	0.66	-.10	.01	.05	[-2.59, 0.00]

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video.

Table 5
Linear Multiple Regression Model for Reappraisal Ability and Anxiety Symptoms

Variable	*b*	*SE*	*β*	(adj.) R^2	*p*	95% CI [LL, UL]
Unadjusted Model						
Reappraisal ability	-0.07	0.29	.01	.00	.80	[-0.49, 0.64]
Adjusted Model						
Age	0.08	0.11	.03		.49	[-0.14, 0.30]
Gender (female)	3.03	0.56	.25		< .001	[1.92, 4.14]
Race (minority)	-0.57	0.57	-.05		.32	[-1.68, 0.55]
SES	-0.72	0.18	-.19		< .001	[-1.08, -0.36]
Body mass index	0.60	0.05	.06		.20	[-0.03, 0.15]
Baseline response	1.32	0.25	.26		< .001	[0.83, 1.82]
Reappraisal ability	-0.43	0.29	-.07	.01	.13	[-1.00, 0.13]

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video.

Table 6
Linear Multiple Regression Model for Reappraisal Ability and Physical Health

Variable	*b*	*SE*	*β*	(adj.) R^2	*p*	95% CI [LL, UL]
Unadjusted Model						
Reappraisal ability	0.29	0.13	.12	.01	.02	[0.04, 0.54]
Adjusted Model						
Age	-0.11	0.05	-.11		.03	[-0.21, -0.01]
Gender (female)	-0.92	0.24	-.18		< .001	[-1.40, -0.45]
Race (minority)	-0.26	0.24	-.05		.30	[-0.74, 0.22]
SES	0.42	0.08	.26		< .001	[0.27, 0.58]
Body mass index	-0.07	0.02	-.15		.001	[-0.11, -0.03]
Baseline response	-0.40	0.11	-.18		< .001	[-0.62, -0.19]
Reappraisal ability	0.43	0.12	.17	.03	< .001	[-3.61, -1.15]

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. Physical health is scored such that higher scores indicate better health.

Table 7
Linear Multiple Regression Model for Stressful Life Events and Depressive Symptoms

Variable	*b*	*SE*	*β*	(adj.) R^2	*p*	95% CI [LL, UL]
Unadjusted Model						
Stressful Life Events	1.19	0.15	.37	.14	< .001	[0.90, 1.47]
Adjusted Model						
Age	-0.21	0.26	-.04		.41	[-0.71, 0.29]
Gender (female)	3.16	1.25	.12		.01	[0.69, 5.62]
Race (minority)	1.23	1.25	.05		.32	[-1.22, 3.68]
SES	-1.65	0.41	-.19		< .001	[-2.45, -0.85]
Body mass index	-0.02	0.10	-.01		.86	[-0.22, 0.19]
Baseline response	2.76	0.52	.24		< .001	[1.74, 3.78]
Stressful life events	0.98	0.15	.31	.09	< .001	[0.69, 1.27]

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video.

Table 8
Linear Multiple Regression Model for Stressful Life Events and Anxiety Symptoms

Variable	*b*	*SE*	*β*	(adj.) R^2	*p*	95% CI [LL, UL]
Unadjusted Model						
Stressful Life Events	0.46	0.07	.33	.11	< .001	[0.33, 0.59]
Adjusted Model						
Age	-0.07	0.11	-.03		.41	[-0.29, 0.15]
Gender (female)	2.52	0.55	.21		.01	[1.44, 3.60]
Race (minority)	-0.39	0.55	-.03		.32	[-1.47, 0.69]
SES	-0.60	0.18	-.16		< .001	[-0.96, -0.25]
Body mass index	0.06	0.05	.06		.86	[-0.03, 0.15]
Baseline response	1.07	0.23	.21		< .001	[0.62, 1.52]
Stressful life events	0.36	0.07	.26	.06	< .001	[0.23, 0.49]

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video.

Table 9
Linear Multiple Regression Model for Stressful Life Events and Physical Health

Variable	*b*	*SE*	*β*	(adj.) R^2	*p*	95% CI [LL, UL]
Unadjusted Model						
Stressful Life Events	-0.21	0.03	-.34	.12	< .001	[-0.26, -0.15]
Adjusted Model						
Age	-0.04	0.05	-.03		.47	[-0.13, 0.06]
Gender (female)	-0.65	0.24	-.13		.007	[-1.12, -0.18]
Race (minority)	-0.33	0.24	-.06		.16	[-0.80, 0.14]
SES	0.38	0.08	.23		< .001	[0.23, 0.53]
Body mass index	-0.06	0.02	-.15		.001	[-0.10, -0.03]
Baseline response	-0.20	0.10	-.09		.04	[-0.40, -0.01]
Stressful life events	-0.16	0.03	-.27	.07	< .001	[-0.22, -0.11]

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. Physical health is scored such that higher scores indicate better health.

Table 10
Hypothesis 1 Moderation Model Results for Depressive Symptoms

Variable	*b*	*SE*	*p*	95% CI [LL, UL]
Unadjusted Model				
Habitual reappraisal	-2.54	0.66	< .001	[-3.84, -1.24]
Reappraisal ability	-0.65	0.66	.92	[-1.35, 1.22]
Habitual reappraisal X reappraisal ability	0.39	0.59	.51	[-0.76, 1.54]
ΔR^2	.00			
F	0.44			
Adjusted Model				
Age	0.22	0.26	.39	[-0.28, 0.72]
Gender (female)	4.34	1.28	.001	[1.83, 6.86]
Race (minority)	1.47	1.31	.26	[-1.09, 4.04]
SES	-1.80	0.42	< .001	[-2.62, -0.97]
Body mass index	-0.54	0.11	.61	[-0.27, 0.16]
Baseline response	3.63	0.57	< .001	[2.50, 4.75]
Habitual reappraisal	-2.26	0.64	< .001	[-3.51, -1.00]
Reappraisal ability	-1.44	0.65	.03	[-2.73, -0.16]
Habitual reappraisal X reappraisal ability	0.66	0.56	.23	[-0.43, 1.76]
ΔR^2	.00			
F	1.43			

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. Primary predictor variables were z-scored.

Table 11
Hypothesis 1 Moderation Model Results for Anxiety Symptoms

Variable	*b*	*SE*	*p*	95% CI [LL, UL]
Unadjusted Model				
Habitual reappraisal	-0.83	0.29	.004	[-1.39, -0.26]
Reappraisal ability	0.54	0.29	.85	[-0.51, 0.62]
Habitual reappraisal X reappraisal ability	0.13	0.26	.62	[-0.38, 0.63]
ΔR^2	.00			
F	0.25			
Adjusted Model				
Age	0.09	0.11	.44	[-0.13, 0.31]
Gender (female)	2.97	0.56	< .001	[1.87, 4.08]
Race (minority)	-0.39	0.57	.50	[-1.51, 0.74]
SES	-0.68	0.18	< .001	[-1.04, -0.32]
Body mass index	0.05	0.05	.32	[-0.05, 0.14]
Baseline response	1.37	0.25	< .001	[0.88, 1.86]
Habitual reappraisal	-0.58	0.28	.04	[-1.13, -0.03]
Reappraisal ability	-0.48	0.29	.09	[-1.05, 0.08]
Habitual reappraisal X reappraisal ability	0.27	0.24	.27	[-0.21, 0.75]
ΔR^2	.00			
F	1.23			

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. Primary predictor variables were z-scored.

Table 12
Hypothesis 1 Moderation Model Results for Physical Health

Variable	*b*	*SE*	*p*	95% CI [LL, UL]
Unadjusted Model				
Habitual reappraisal	0.32	0.13	.01	[0.07, 0.56]
Reappraisal ability	0.32	0.12	.01	[0.08, 0.57]
Habitual reappraisal X reappraisal ability	-0.25	0.11	.02	[-0.47, -0.03]
ΔR^2	.01			
F	5.14			
Adjusted Model				
Age	-0.12	0.05	.02	[-0.21, -0.02]
Gender (female)	-0.90	0.24	< .001	[-1.37, -0.42]
Race (minority)	-0.32	0.24	.19	[-0.80, 0.16]
SES	0.40	0.08	< .001	[0.25, 0.55]
Body mass index	-0.06	0.02	.005	[-0.10, -0.02]
Baseline response	-0.44	0.11	< .001	[-0.65, -0.22]
Habitual reappraisal	0.26	0.12	.03	[0.02, 0.49]
Reappraisal ability	0.48	0.12	< .001	[0.23, 0.72]
Habitual reappraisal X reappraisal ability	-0.25	0.10	.02	[-0.46, -0.05]
ΔR^2	.01			
F	5.92			

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. Primary predictor variables were z-scored. Physical health is scored such that higher scores indicate better health.

Table 13
Hypothesis 2 Moderation Model Results for Depressive Symptoms

Variable	*b*	*SE*	*p*	95% CI [LL, UL]
Unadjusted Model				
Habitual reappraisal	-2.25	0.60	< .001	[-3.43, -1.06]
Stressful life events	4.77	0.60	< .001	[3.58, 5.95]
Habitual reappraisal X stressful life events	-1.70	0.62	.006	[-2.91, -0.48]
ΔR^2	.02			
F	7.56			
Adjusted Model				
Age	-0.20	0.25	.39	[-0.69, 0.29]
Gender (female)	2.97	1.23	.001	[0.56, 5.39]
Race (minority)	1.81	1.46	.26	[-0.63, 4.24]
SES	-1.51	0.40	< .001	[-2.30, -0.72]
Body mass index	-0.04	0.10	.61	[-0.24, 0.16]
Baseline response	2.78	0.51	< .001	[1.78, 3.78]
Habitual reappraisal	-2.21	0.59	< .001	[-3.37, -1.05]
Stressful life events	4.02	0.61	< .001	[2.82, 5.21]
Habitual reappraisal X stressful life events	-1.37	0.61	.02	[-2.55, -0.19]
ΔR^2	.01			
F	5.19			

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. Primary predictor variables were z-scored.

Table 14
Hypothesis 2 Moderation Model Results for Anxiety Symptoms

Variable	*b*	*SE*	*p*	95% CI [LL, UL]
Unadjusted Model				
Habitual reappraisal	-0.71	0.27	.01	[-1.24, -0.18]
Stressful life events	1.87	0.27	< .001	[1.34, 2.39]
Habitual reappraisal X stressful life events	-0.40	0.28	.15	[-0.94, 0.14]
ΔR^2	.00			
F	2.12			
Adjusted Model				
Age	-0.07	0.11	.55	[-0.28, 0.16]
Gender (female)	2.47	0.55	< .001	[1.39, 3.55]
Race (minority)	-0.25	0.55	.65	[-1.34, 0.83]
SES	-0.57	0.18	.002	[-0.92, -0.22]
Body mass index	0.05	0.05	.25	[-0.04, 0.14]
Baseline response	1.07	0.23	< .001	[0.63, 1.52]
Habitual reappraisal	-0.57	0.26	.03	[-1.09, 0.05]
Stressful life events	1.49	0.27	< .001	[0.96, 2.03]
Habitual reappraisal X stressful life events	-0.41	0.27	.13	[-0.94, .12]
ΔR^2	.00			
F	2.35			

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. Primary predictor variables were z-scored.

Table 15
Hypothesis 2 Moderation Model Results for Physical Health

Variable	*b*	*SE*	*p*	95% CI [LL, UL]
Unadjusted Model				
Habitual reappraisal	0.30	0.12	.01	[0.07, 0.53]
Stressful life events	-0.83	0.12	< .001	[-1.07, -0.60]
Habitual reappraisal X stressful life events	-0.14	0.12	.24	[-0.10, 0.38]
ΔR^2	.00			
F	1.38			
Adjusted Model				
Age	-0.04	0.05	.44	[-0.13, 0.06]
Gender (female)	-0.63	0.24	.009	[-1.09, -0.16]
Race (minority)	-0.40	0.24	.09	[-0.88, 0.67]
SES	0.36	0.08	< .001	[0.21, 0.51]
Body mass index	-0.06	0.02	.002	[-0.10, -0.02]
Baseline response	-0.20	0.10	.04	[-0.40, -0.01]
Habitual reappraisal	0.28	0.11	.02	[0.05, 0.50]
Stressful life events	-0.67	0.12	< .001	[-0.90, -0.44]
Habitual reappraisal X stressful life events	-0.16	0.12	.18	[-0.07, 0.38]
ΔR^2	.00			
F	1.85			

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. Primary predictor variables were z-scored. Physical health is scored such that higher scores indicate better health.

Table 16
Hypothesis 3 Unadjusted Three-Way Interaction Model Results for Depressive Symptoms

Variable	*b*	*SE*	*p*	95% CI [LL, UL]
Habitual reappraisal	-2.24	0.61	< .001	[-3.44, -1.04]
Reappraisal ability	0.07	0.61	.90	[-1.13, 1.28]
Stressful life events	4.94	0.61	< .001	[3.75, 6.12]
Habitual reappraisal X reappraisal ability	0.02	0.56	.98	[-1.09, 1.11]
Habitual reappraisal X stressful life events	-1.76	0.62	.005	[-2.97, -0.54]
Reappraisal ability X stressful life events	-0.44	0.61	.47	[-1.63, 0.75]
Habitual reappraisal X reappraisal ability X stressful life events	1.61	0.61	.009	[0.40, 2.81]
ΔR^2	.00			
F	1.38			

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. Primary predictor variables were z-scored

Table 17
Hypothesis 3 Adjusted Three-Way Interaction Model Results for Depressive Symptoms

Variable	*b*	*SE*	*p*	95% CI [LL, UL]
Age	-0.09	0.25	.72	[-0.58, 0.40]
Gender (female)	2.82	1.23	.02	[0.40, 5.23]
Race (minority)	1.57	1.23	.20	[-0.85, 3.99]
SES	-1.45	0.40	< .001	[-2.23, -0.67]
Body mass index	-0.06	0.10	.55	[-0.26, 0.14]
Baseline response	3.24	0.54	< .001	[2.17, 4.30]
Habitual reappraisal	-2.17	0.60	< .001	[-3.35, -0.99]
Reappraisal ability	-1.12	0.62	.07	[-2.34, 0.10]
Stressful life events	4.12	0.60	< .001	[2.93, 5.31]
Habitual reappraisal X reappraisal ability	0.30	0.54	.57	[-0.77, 1.36]
Habitual reappraisal X stressful life events	-1.36	0.60	.02	[-2.54, -0.19]
Reappraisal ability X stressful life events	-0.35	0.58	.55	[-1.49, 0.79]
Habitual reappraisal X reappraisal ability X stressful life events	1.44	0.59	.01	[0.29, 2.59]
ΔR^2	.01			
F	6.04			

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. Primary predictor variables were z-scored.

Table 18
Hypothesis 3 Unadjusted Three-Way Interaction Model Results for Anxiety Symptoms

Variable	*b*	*SE*	*p*	95% CI [LL, UL]
Habitual reappraisal	-0.70	0.27	.01	[-1.24, -0.17]
Reappraisal ability	0.07	0.27	.80	[-0.47, 0.61]
Stressful life events	1.91	0.25	< .001	[1.38, 2.45]
Habitual reappraisal X reappraisal ability	0.03	0.27	.92	[-0.47, 0.52]
Habitual reappraisal X stressful life events	-0.41	0.28	.14	[-0.95, 0.14]
Reappraisal ability X stressful life events	-0.02	0.27	.94	[-0.56, 0.52]
Habitual reappraisal X reappraisal ability X stressful life events	0.49	0.27	.08	[-0.06, 1.03]
ΔR^2	.01			
F	3.10			

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. Primary predictor variables were z-scored.

Table 19
Hypothesis 3 Adjusted Three-Way Interaction Model Results for Anxiety Symptoms

Variable	*b*	*SE*	*p*	95% CI [LL, UL]
Age	-0.04	0.11	.72	[-0.26, 0.18]
Gender (female)	2.49	0.55	< .001	[1.41, 3.58]
Race (minority)	-0.32	0.55	.57	[-1.41, 0.77]
SES	-0.55	0.18	.002	[-0.90, -0.20]
Body mass index	0.05	0.05	.29	[-0.04, 0.14]
Baseline response	1.22	0.24	< .001	[0.74, 1.70]
Habitual reappraisal	-0.53	0.27	.05	[-1.06, -0.00]
Reappraisal ability	-0.41	0.28	.14	[-0.96, 0.14]
Stressful life events	1.50	0.27	< .001	[0.97, 2.04]
Habitual reappraisal X reappraisal ability	0.20	0.24	.41	[-0.28, 0.68]
Habitual reappraisal X stressful life events	-0.39	0.27	.15	[-0.92, 0.14]
Reappraisal ability X stressful life events	0.10	0.26	.70	[-0.41, 0.61]
Habitual reappraisal X reappraisal ability X stressful life events	0.33	0.26	.21	[-0.19, 0.85]
ΔR^2	.00			
F	1.59			

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. Primary predictor variables were z-scored.

Table 20
Hypothesis 3 Unadjusted Three-Way Interaction Model Results for Physical Health

Variable	*b*	*SE*	*p*	95% CI [LL, UL]
Habitual reappraisal	0.27	0.12	.02	[0.04, 0.50]
Reappraisal ability	0.27	0.12	.03	[0.04, 0.50]
Stressful life events	-0.88	0.12	< .001	[-1.11, -0.66]
Habitual reappraisal X reappraisal ability	-0.15	0.11	.15	[-0.36, 0.06]
Habitual reappraisal X stressful life events	0.16	0.12	.17	[-0.07, 0.39]
Reappraisal ability X stressful life events	0.18	0.12	.13	[-0.05, 0.41]
Habitual reappraisal X reappraisal ability X stressful life events	-0.37	0.12	.002	[-0.60, -0.14]
ΔR^2	.02			
F	10.03			

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. Primary predictor variables were z-scored. Physical health is scored such that higher scores indicate better health.

Table 21
Hypothesis 3 Adjusted Three-Way Interaction Model Results for Physical Health

Variable	*b*	*SE*	*p*	95% CI [LL, UL]
Age	-0.07	0.05	.15	[-0.16, 0.02]
Gender (female)	-0.61	0.23	.01	[-1.06, -0.15]
Race (minority)	-0.33	0.23	.16	[-0.79, 0.13]
SES	0.34	0.07	< .001	[0.20, 0.49]
Body mass index	-0.05	0.02	.005	[-0.09, -0.02]
Baseline response	-0.36	0.10	< .001	[-0.57, -0.16]
Habitual reappraisal	0.25	0.11	.03	[0.03, 0.47]
Reappraisal ability	0.40	0.12	.001	[0.16, 0.63]
Stressful life events	-0.69	0.11	< .001	[-0.91, -0.46]
Habitual reappraisal X reappraisal ability	-0.16	0.10	.10	[-0.37, 0.04]
Habitual reappraisal X stressful life events	0.15	0.11	.17	[-0.07, 0.38]
Reappraisal ability X stressful life events	0.11	0.11	.32	[-0.11, 0.33]
Habitual reappraisal X reappraisal ability X stressful life events	-0.33	0.11	.003	[-0.55, -0.11]
ΔR^2	.02			
F	8.89			

Note. SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. Primary predictor variables were z-scored. Physical health is scored such that higher scores indicate better health.

Table 22

Supplemental Unadjusted Model Examining Depressive Symptoms as The Mediator and Physical Health as The Outcome

Predictors	On Depressive Symptoms				On Physical Health			
	b	SE	*p*	95% CI	*b*	SE	*p*	95% CI
Habitual reappraisal	-.17	.05	< .001	[-.26, -.08]	.02	.04	.63	[-.06, .10]
Reappraisal ability	.02	.05	.62	[-.07, .11]	.12	.04	.004	[.04, .20]
Stressful life events	.38	.05	< .001	[.29, 0.47]	-.16	.04	< .001	[-.60, -.43]
Habitual reappraisal X reappraisal ability	-.00	.04	.96	[-.08, .08]	-.06	.04	.09	[-.13, .01]
Habitual reappraisal X stressful life events	-.13	.05	.003	[-.22, -.04]	-.01	.04	.91	[-.09, .08]
Reappraisal ability X stressful life events	-.05	.05	.26	[-.14, .04]	.04	.04	.27	[-.04, .12]
Habitual reappraisal X reappraisal ability X stressful life events	.12	.05	.008	[.03, .21]	-.08	.04	.04	[-.16, -.01]
Depressive symptoms					-.51	.04	< .001	[-.60, -.43]
ΔR^2	.01				.01			
F	7.20				4.33			

Note: SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. All variables were z-scored. Physical health is scored such that higher scores indicate better health.

Table 23

Supplemental Adjusted Model Examining Depressive Symptoms as The Mediator and Physical Health as the Outcome

Predictors	On Depressive Symptoms				On Physical Health			
	b	SE	*p*	95% CI	*b*	SE	*p*	95% CI
Age	-.01	.02	.67	[-.05, .03]	-.03	.04	.06	[-.06, .00]
Gender (female)	.20	.09	.03	[.02, .38]	-.15	.08	.08	[-.31, .02]
Race (minority)	.11	.09	.34	[-.07, .29]	-.08	.08	.33	[-.24, .08]
SES	-.11	.03	< .001	[-.17, -.05]	.09	.03	.002	[.03, .14]
Body mass index	-.00	.01	.65	[-.02, .01]	-.02	.01	.001	[-.04, .01]
Baseline response	.23	.04	< .001	[.15, .31]	-.04	.04	.31	[-.11, .04]
Habitual reappraisal	-.16	.05	< .001	[-.25, -.07]	.02	.04	.57	[-.06, .10]
Reappraisal ability	-.06	.05	.15	[-.16, .03]	.13	.04	.003	[.04, .21]
Stressful life events	.32	.05	< .001	[.23, .41]	-.12	.04	.004	[-.21, -.04]
Habitual reappraisal X reappraisal ability	.02	.04	.63	[-.06, .10]	-.06	.04	.12	[-.13, .01]
Habitual reappraisal X stressful life events	-.11	.05	.02	[-.19, -.02]	.01	.04	.77	[-.07, .09]
Reappraisal ability X stressful life events	-.04	.04	.40	[-.12, .05]	.03	.04	.49	[-.05, .10]
Habitual reappraisal X reappraisal ability X stressful life events	.11	.04	.01	[.02, .19]	-.08	.04	.04	[-.16, -.00]
Depressive symptoms					-.47	.05	< .001	[-.56, -.38]
ΔR^2	.01				.01			
F	6.14				4.17			

Note: SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. All variables were z-scored. Physical health is scored such that higher scores indicate better health.

Table 24

Supplemental Unadjusted Model Examining Physical Health as The Mediator and Depressive Symptoms as The Outcome

Predictors	On Physical Health				On Depressive Symptoms			
	b	SE	*p*	95% CI	*b*	SE	*p*	95% CI
Habitual reappraisal	.11	.05	.02	[.02, .20]	-.12	.04	.003	[-.20, -.04]
Reappraisal ability	.11	.05	.02	[.02, .20]	.08	.04	.06	[-.00, .15]
Stressful life events	-.35	.05	< .001	[-.44, -.26]	.20	.04	< .001	[.12, .29]
Habitual reappraisal X reappraisal ability	-.06	.04	.15	[-.14, .02]	-.03	.04	.37	[-.10, .04]
Habitual reappraisal X stressful life events	.06	.05	.17	[-.03, .16]	-.10	.04	.01	[-.18, -.02]
Reappraisal ability X stressful life events	.07	.05	.13	[-.02, .16]	-.02	.04	.67	[-.10, .06]
Habitual reappraisal X reappraisal ability X stressful life events	-.15	.05	.002	[-.24, -.06]	.05	.04	.21	[-.03, .13]
Physical health					-.50	.04	< .001	[-.58, -.41]
ΔR^2	.02				.00			
F	10.03				1.55			

Note: SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. All variables were z-scored. Physical health is scored such that higher scores indicate better health.

Table 25

Supplemental Adjusted Model Examining Physical Health as The Mediator and Depressive Symptoms as the Outcome

Predictors	On Physical Health				On Depressive Symptoms			
	b	SE	*p*	95% CI	*b*	SE	*p*	95% CI
Age	-.03	.02	.15	[-.06, .01]	-.02	.02	.21	[-.05, .01]
Gender (female)	-.24	.10	.01	[-.42, -.06]	.09	.08	.29	[-.08, .25]
Race (minority)	-.13	.10	.16	[-.31, .05]	.05	.08	.57	[-.11, .21]
SES	.14	.03	< .001	[.08, .19]	-.05	.03	.10	[-.10, .01]
Body mass index	-.02	.01	.005	[-.04, -.01]	-.01	.01	.05	[-.03, .00]
Baseline response	-.14	.04	.001	[-.23, -.06]	.16	.04	< .001	[.09, .23]
Habitual reappraisal	.10	.05	.03	[.01, .19]	-.12	.04	< .001	[-.19, -.04]
Reappraisal ability	.16	.05	.001	[.06, .25]	.01	.04	.004	[-.08, .09]
Stressful life events	-.27	.05	< .001	[-.36, -.18]	.19	.04	< .001	[.11, .27]
Habitual reappraisal X reappraisal ability	-.07	.05	.11	[-.15, .01]	-.01	.04	.75	[-.08, .06]
Habitual reappraisal X stressful life events	.06	.04	.17	[-.03, .15]	-.08	.04	.06	[-.15, .00]
Reappraisal ability X stressful life events	.04	.04	.32	[-.04, .13]	-.02	.04	.67	[-.09, .06]
Habitual reappraisal X reappraisal ability X stressful life events	-.13	.04	.003	[-.22, -.04]	.05	.04	.23	[-.03, .12]
Physical health					-.47	.05	.23	[-.56, -.38]
ΔR^2	.02				.00			
F	8.89				1.45			

Note: SES = Socioeconomic status. Baseline response refers to sadness reported in response to the first (baseline) emotion-eliciting video. All variables were z-scored. Physical health is scored such that higher scores indicate better health.

Appendix H: Exploratory Analyses

Troy et al. (2010) Replication

In the seminal study of reappraisal ability using the Cognitive Reappraisal Ability (CRA) Task, Troy and colleagues (2010) found that reappraisal ability moderated the association between recent exposure to stressful life events on depressive symptoms in women, such that reappraisal ability for sad emotions was associated with lower levels of depressive symptoms for women with greater recent exposure to stressful life events, however reappraisal ability was not associated with depressive symptoms for women who reported fewer recent stressful life events. In the study by Troy et al. (2010), results held when using habitual reappraisal and emotional reactivity as covariates. Using the same analyses (N = 255), results (using stressful life events that occurred within the past 12 months) were not significant in the current study, either in unadjusted (p = .80) or adjusted models (p = .81 with covariates used in this dissertation, p = .97 with covariates used by Troy and colleagues: habitual reappraisal; and change in sadness from the neutral film to the baseline film). In sum, I could not replicate the results found by Troy and colleagues (2010).

Of note, the original and current studies both used the same experimental CRA task with the same videos. The scales used to assess recent stressful life event exposure and depressive symptoms were similar, but not identical; Troy and colleagues used the Life Experiences Survey (Sarason, Johnson, & Siegel, 1978) and the Beck Depression Inventory (Beck & Steer, 1984). Other key differences between the original and present study include: *N*s of 65 vs. 255; community vs. university sample; inclusion criterion of at least one event in the past three months vs. no stressful event inclusion criterion; average age of 34.9 (SD = 11.8) years vs. 19.7 (SD = 2.5) years.

Reappraisal Ability of Positive Emotions and Other Negative Emotions

Although the CRA task targeted sad emotions, the ability to change positive emotions (i.e., happiness, relaxation, and desire) and other negative emotions (i.e., anger, anxiety, fear, disgust) in addition to sadness during the CRA task was also explored as potential predictors of mental and physical health. All covariates used in the dissertation were included in adjusted models except baseline sadness; in models exploring negative emotions other than sadness, combined baseline negative emotions except sadness were used as a covariate, and combined baseline positive emotions were used as a covariate in analyses exploring positive emotions.

Regression analyses showed reappraisal ability for all negative emotions were associated with depressive symptoms (b = 2.43, β = .18, ΔR^2 = .03, p < .001), anxiety symptoms (b = 1.25, β = .21, ΔR^2 = .05, p < .001), and self-reported physical health (b = -0.33, β = -.13, ΔR^2 = .02, p = .01). However, the associations were no longer significant in the adjusted models (p's > .10). Similarly, reappraisal ability for all negative emotions *except sadness* were associated with depressive symptoms (b = 2.42, β = .20, ΔR^2 = .04, p < .001), anxiety symptoms (b = 1.22, β = .23, ΔR^2 = .05, p < .001), and self-reported physical health (b = -0.41, β = -.18, ΔR^2 = .03, p < .001), but the associations did not remain significant in the adjusted models (p's > .10).

Reappraisal ability for all positive emotions was not significantly associated with any outcome in unadjusted models (p's > .10) but was marginally significantly associated with depressive symptoms in the adjusted model (b = -2.23, β = -.09, ΔR^2 = .01, p =.09). The association was no longer significant when baseline negative emotions were included in the model, suggesting that although the ability to regulate positive emotions using reappraisal may be associated with lower levels of depressive symptoms, that effect erodes when negative emotions are accounted for in the model.

Hypotheses that included reappraisal ability (hypotheses 1 and 3) were also tested. Two-way interactions that included reappraisal ability for combined positive emotions or combined negative emotions (except sadness) with habitual reappraisal were not significant for any outcome (p's > .10). Similarly, three-way interactions between habitual reappraisal, reappraisal ability (for positive and other negative emotions), and exposure to stressful life events were also not significant (p's > .10). Additionally, two-way interactions were examined that explored the interactive effects of reappraisal ability for positive emotions and reappraisal ability for all negative emotions (including sadness) for all outcomes, as well as three-way interactions that included habitual reappraisal, and separately, stressful life event exposure. None were significant (p's > .10).

Relevance of Stressors in Videos to Participant Experiences

The content of the CRA Task baseline video involved a husband admitting infidelity to his wife and the wife's emotional response. Analyses were conducted to determine whether a participant's personal experience with a partner's infidelity affected their emotional responses to this video. Experiencing infidelity was not significantly correlated with ratings of sadness to the baseline video (p = .48) but was correlated with ratings of anger (r = .19, p < .001). Infidelity experience was also associated with reappraisal ability for anger, controlling for baseline anger (b = .17, β = .03, p = .051). Neither emotional responses to the baseline nor reappraisal ability or any emotional response differed as a function of serious romantic breakup experiences (p's > .10).

Differences Between Pre-COVID-19 and COVID-19 Completers

Chi-square analyses revealed significant differences between participants that completed the study before and after the pandemic began by race; participants who completed the study

after the pandemic were more likely to be of a minority race compared to before the pandemic began (X^2 (1, N = 405) = 4.9, p = .03; 28.4% pre-COVID; 41.0% during COVID). T-tests showed that participants who completed the study after the pandemic began were also more likely to report a lower socioeconomic status (t(405) = -2.7, p = .008; pre-COVID M = 4.6, SD = 1.6; during COVID M = 4.2, SD = 1.5), exposed to more recent (< 12 months) stressful life events (t(405) = 2.2, p = .03; pre-COVID M = 2.5, SD = 2.6; during COVID M = 3.2, SD = 2.6) and marginally more likely to have a higher body mass index (t(405) = 1.8, p = .07; pre-COVID M = 25.4, SD = 6.1; during COVID M = 24.2, SD = 5.7). There were no significant differences for age, gender, exposure to lifetime stressful life events, habitual reappraisal, reappraisal ability, or any outcome (all p's > .10).

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