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Capitalizing on Stress: Improving Affect and Self-Efficacy Through an Arousal Reappraisal Intervention

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CAPITALIZING ON STRESS: IMPROVING AFFECT AND SELF-EFFICACY THROUGH AN
AROUSAL REAPPRAISAL INTERVENTION

by

ANGEL G. LONG

(Under the Direction of Jeff Klibert)

ABSTRACT

Stress is a non-specific reaction to the body (Jamieson et al., 2018), defined as a feeling of tension when one's personal resources are taxed or exceeded (Folkman & Lazarus, 1985). Coping mechanisms for stress often focus on reducing associated features (Connor-Smith & Flachsbart, 2007). However, stress can produce *challenge states,* mindsets where individuals perceive personal resources as greater than situational demands (Jamieson et al., 2013). Challenge states are more likely to elicit positive behavior (Jamieson et al., 2018) and improved cognitive performance (Jamieson et al., 2010). One prospective mechanism to foster challenge states is *arousal reappraisal,* a cognitive mechanism that encourages individuals to view elevated physiological arousal as a positive resource (Moore et al., 2015). The current study examined the effects of a stress arousal reappraisal intervention on self-efficacy and different dimensions of affect during a stressful task in hopes to gain knowledge about how to improve well-being, optimal functioning and subjective happiness during the course of stress (Delegach & Katz-Navon, 2020; Li et al., 2019). The overarching purpose was to fill gaps within the stress and well-being literature, examining the following questions. Forty-nine undergraduate students participated in the study, and valid data were collected from 40 individuals. All participants underwent stress induction. Participants were then randomly assigned to an intervention task (arousal reappraisal vs. control). Participants in each condition completed a speech-task. Participants completed measurements during baseline (Time 1), post stress induction (Time 2), post intervention (Time 3), and post speech-task (Time 4). A series (x3) of 2 Intervention (Control, Reappraisal) x 4 Time (Time 1, Time 2, Time 3, Time 4) Mixed Factorial ANOVAs were used to analyze the data. State measures of self-efficacy, positive affect, and negative affect served as the dependent variables. Results revealed non-significant interaction effects (Intervention x Time) for each dependent variable. These findings run counter to the prevailing literature. Difficulties managing unique environmental confounds within the study may explain why my findings were divergent. In the discussion, I provide unique insights into how the study can be altered to better evaluate the effects of arousal reappraisal interventions on different indices of well-being.

INDEX WORDS: Stress, Arousal reappraisal, Affect, Self-efficacy

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ANGEL G. LONG

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ANGEL G. LONG

Major Professor:	Jeff Klibert
Committee:	Karen Naufel
	Jessica Brooks

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CHAPTER 1:

INTRODUCTION

Stress is a non-specific reaction to the body when one experiences change (Jamieson et al., 2018). Specifically, stress is defined as a feeling of tension when situational demands outweigh one's capacity to cope (Keech et al., 2021) or when one's personal resources are taxed or exceeded (Folkman & Lazarus, 1985). This response is often experienced as aversive and accompanied by subjective feelings of lack of control (Arble et al., 2019; Bai et al., 2021). Stress is ubiquitous; its consequences range from ordinary troubles (bickering with a spouse) to major stressors (divorce; Bai et al., 2021; Pillow et al., 1996) and occurs in episodic intervals as well as in chronic patterns (Lepore et al., 1997). Stress responses are marked by elevations in physiological arousal including activation of the sympathetic nervous system (Beltzer et al., 2014), rapidly altering cardiac response, increased respiratory response, and enhanced secretion of catecholamines (Jamieson et al., 2018).

The physiological changes of stress are often viewed as uncomfortable, unwanted, or a hindrance to task engagement (Beltzer et al., 2014). In fact, the majority of coping mechanisms for stress focus on reducing the frequency or severity of associated features through many different disengagement coping strategies, like avoidance, denial, wishful thinking, and attempting to change the stressor (Connor-Smith & Flachsbart, 2007; Jamieson et al., 2018). In some cases, stress may fall on a more extreme continuum producing *threat states,* mindsets where individuals experience acute stress and the situational demands are perceived as greater than personal resources. Threat state stress is consistently linked to poor health decisions, cardiovascular diseases (Crum et al., 2020), chronic illnesses, and high mortality rates (Liu et al., 2019).

However, stress can also produce *challenge states,* mindsets where individuals experience acute stress and perceive personal resources as greater than situational demands (Jamieson et al., 2013). During such states, the sympathetic nervous system activation mobilizes energy and bodily resources where needed, increasing cardiac efficiency, responsiveness, visual sensitivity, adrenaline, and noradrenaline (Arble et al., 2019; Dienstbier, 1989; Jamieson et al., 2013; Liu et al., 2019; Mathôt, 2018). Individuals

who experience challenge states during stressful circumstances are more likely to elicit positive behavior and performance outcomes (Jamieson et al., 2018), improved cardiac efficiency (Jamieson et al., 2013), and improved cognitive performance (e.g., sharpness in pattern detection, decision-making tasks; Jamieson et al., 2010).

Moving forward, it will be beneficial to determine processes and pathways to help individuals capitalize on these challenge states. One prospective mechanism to foster challenge states is *arousal reappraisal,* a cognitive mechanism that encourages individuals to view elevated physiological arousal as a positive resource in task completion (Moore et al., 2015). In recent studies, arousal reappraisal increases individual performance on different types of tasks (Beltzer et al., 2014; Jamieson et al., 2010) and decreases specific types of distress (Jamieson et al., 2016). However, it is unknown how arousal reappraisal fosters in cognitive and emotional resources during a stress-inducing task.

Purpose

The current study examined the effects of stress arousal reappraisal on self-efficacy and affect during a mildly stressful task, one consistent with a daily hassle. The overarching purpose of this study was to fill gaps within the stress and well-being literature. Considering these broad goals, this study examined the following questions: (a) do arousal reappraisal interventions increase perceptions of context-specific self-efficacy? and (b) do arousal reappraisal interventions increase ratings of positive affect and decrease ratings of negative affect over the course of the study?

Significance

Although there is much study on the harms of stress, there is far less literature discussing the pathways by which people can capitalize on stress. This study is designed to incorporate reappraised elevated arousal states in hopes to improve affect and self-efficacy. If findings are consistent with expectation, they may easily be incorporated into programs aimed at helping individuals thrive during challenging exercises, engagements, or other forms of social tasks. Although there are many ways to "cope" and suppress elevated arousal, this physiological reappraisal may mitigate discomfort and promote positive outlook. Identifying new pathways by which individuals can use arousal to minimize discomfort

and promote motivation to overcome and grow from stress is clinically beneficial. Specifically, if reappraisal can be used in this manner, clinicians may be able to shape such interventions to combat stress-related difficulties with clients. Ultimately, this study may address a sorely neglected gap in the literature; can elevated stress arousal be used as a tool to increase well-being outcomes?

Definition of Terms

Stress and Arousal. Stress and physiological arousal are defined as a non-specific reaction to the body when one experiences change (Jamieson et al., 2018), including feelings of tension when one perceives situational demands as exceeding their ability to cope (Keech et al., 2021). In the current study, the adapted version of the Trier Social Stress Test (TSST) will serve as the induction task in order to elevate stress and physiological arousal. This validated method induces mild stress similar to a social-cognitive hassle (Kudielka et al, 2007). The induction task will take place for each participant before the interventions.

Time. Time is an abstract concept, defined as an indefinite continued progress consisting of the past, present, and future (Saltzman, 2019). In the current study, the dependent variables, affect and self-efficacy, will be measured at four different time points along with a self-reported stress measure. These time points will be labeled as follows: Time 1 (Baseline), Time 2 (Post Induction), Time 3 (Post Intervention), and Time 4 (Post Task Performance). Time will serve as an independent variable in my study.

Reappraisal. Cognitive reappraisal is a psychological term defined as reframing the meaning of a concept in order to alter its emotional impact (Ford et al., 2017). Research further defines reappraisal as an emotion regulation strategy (Nasso et al., 2020). The current study will manipulate reappraisal in order reframe the meaning of physiological arousal. The reappraisal intervention is a small teaching message adapted from previous research (Moore et al., 2015). This intervention will serve as one level of the intervention independent variable.

Rumination. Rumination is a psychological term defined as repetitive and passive focus on distress and corresponding features (e.g., causes, consequences; Nolen-Hoeksema et al., 2008).

Specifically, rumination involves fixation on negative feelings and problems without active problem solving to alleviate distress (Nolen-Hoeksema et al., 2008). Research highlights rumination as a maladaptive emotional regulation response (Blanke et al., 2021) that juxtaposes more adaptive emotional responses, like reappraisal.

Self-Efficacy. Self-efficacy is defined as one's belief in his/her capability to succeed given situational demands (Chen et al., 2001). Research indicates that self-efficacy is a foundational component of human motivation, performance, and accomplishment (Paersch et al., 2021). However, self-efficacy is better reflected in the context specific indices rather than a generalized series of traits (Bandura, 1977). The current study will assess for a specific form of self-efficacy related to giving a speech. Self-efficacy in this context will serve as a dependent variable.

Affect. Affect is a psychological term describing internal and behavioral representations associated with emotion, mood state, and personality disposition (Barrett & Bliss-Moreau, 2009). It is a broad, general term referencing anything emotional (Barrett & Bliss-Moreau, 2009). Affective structure studies consistently present two dominant affect dimensions: Positive Affect (PA) and Negative Affect (NA; Watson & Clark, 1988). PA is associated with enthusiasm, activity, and pleasurable engagement with the environment, whereas NA is associated with subjective distress and negative states (e.g., disgust, guilt, fear; Watson & Clark, 1988; Wedderhoff et al., 2021). State indices of positive and negative affect will serve as dependent variables in the current study.

Review of Stress Literature

Psychological stress is a feeling of tension when one's personal resources are taxed or exceeded (Folkman & Lazarus, 1985). It may be thought of as anticipating or experiencing adversity in goal-related efforts (Crum et al., 2013), marked by elevations in physiological arousal including elevations of the sympathetic nervous system (Beltzer et al., 2014). From an evolutionary perspective, stress response elicits enhanced physiological and mental functioning to combat adversity and improve chances for survival (Crum et al., 2013). This coordinated response synthesizes glucose to increase energy, increases oxygen circulation, increases muscle strength and endurance, increases cardiac efficiency, and elicits

faster reaction times (Nesse et al., 2016; Jamieson et al., 2013). Furthermore, stress response increases performance on cognitive tasks and enhances memory (Crum et al., 2013; Osborne et al., 2015). This response ultimately functions for a selective advantage, altering multiple aspects of the body in order to effectively cope with adaptive challenges in different situations (Nesse et al., 2007). However, in certain circumstances stress responses may become maladaptive. Specifically, the experience of excessive stress can become problematic.

When the stress response stays active for too long or repeatedly fluctuates, the body's physiological arousal systems remain elevated (Lepore et al., 1997). Such patterns are consistent with the concepts of chronic and major life stressors. Chronic stress is an ongoing stressor that continuously impacts someone throughout their life (Mattieu & Ivanoff, 2006) and major life stressors are events that elicit a significant or major readjustment (Pillow et al., 1996). Although the stress response is situationally advantageous, certain components are costly for the human body (Nesse et al., 2007). In the event of a major stressor, prolonged arousal may lead to increased illness and immunosuppression (Lepore et al., 1997). Specifically, stress in this case is linked to cardiac disease, liver disease, cancer, and increased medical expenses (Crum et al., 2013). Beyond medical illness, stress is linked to cognitive impairment, increased susceptibility to substance use disorder, higher rates of depression and anxiety (Delegach & Katz-Navon, 2020), and a decreased ability to adjust arousal states during adversity (Crum et al., 2013; Lepore et al., 1997; Lin et al., 2020). The literature is over-represented by studies highlighting the negative effects of chronic and major life stressors. Little is known about how experiences with stress that fall outside the definitional terms of chronic or major life (e.g., hassles) affect different well-being indices.

Stress and Well-being

Well-being is a psychological term that refers to optimal functioning and subjective happiness, including overall evaluation of life quality (Delegach & Katz-Navon, 2020; Li et al., 2019). Interestingly, stress possesses a complicated relationship with well-being. Different types of stressors are differentially related to unique indices of well-being (Kramer et al., 2021; Lepore et al., 1997). Furthermore, frequent

exposure to stress contributes to differing effects on well-being outcomes (Charles et al., 2021).

Regarding the individual person, specialized types of stress navigation approaches are linked to well-being. For example, certain self-regulation strategies modify how individuals experience stress and alter how individuals pursue different well-being outcomes (Delegach & Katz-Navon, 2020). Research shows that promotion-focused strategies (directing thoughts and behaviors toward growth and accomplishment) are associated with positive well-being outcomes, whereas prevention-focused strategies (directing thoughts and behaviors toward safety and security through vigilance and responsibleness) are associated with negative well-being outcomes (Delegach & Katz-Navon, 2020).

Although the relationship is complex, stress can be problematic in terms of achieving well-being; a majority of studies highlight an inverse relationship between stress and well-being outcomes. As an example, research indicates perseverative cognition (e.g., rumination) when anticipating stress is linked to negative well-being (Kramer et al., 2021). Extended arousal during stressful engagements may also lead to negative decisions and difficulty adjusting (Lepore et al., 1997). In fact, stress is linked to absenteeism from work, a decline in productivity, and increased physical and mental illness (Crum et al., 2013; Lepore et al., 1997). These outcomes are all indices of lower well-being (Ryff, 2014). Furthermore, appraising a stressor as more severe is linked to lower levels of well-being (Charles et al., 2021). Overall, stress, especially in the form of major life or chronic stressors, decreases the likelihood of achieving well-being.

However, not all stress is linked to lower well-being. Importantly, stress can also be associated with the promotion of well-being. A smaller subset of studies show that moderate amounts of stress are linked to higher well-being (Charles et al., 2021). Theoretically, researchers are continually exploring how moderate amounts of stress can bolster well-being outcomes. Theory suggests stress can enhance a sense of mastery, deeper relationships, personal growth, initiative, and productivity (Crum et al., 2013; Crum et al., 2020), all of which are associated with higher well-being (Ryff, 2014).

Research studies support this position. Importantly, the *challenge states* of stress are linked to cognitive improvement, such as sharp decision-making (Jamieson et al., 2010). Interestingly, some research suggests even life-threatening stressors can lead to well-being through posttraumatic growth,

eliciting enhanced perceptions of strength and improved relationships (Crum et al., 2020). Furthermore, moderate or manageable amounts of stress may enhance recognition for new possibilities in one's life, greater appreciation for life, and promote spiritual development (Tedeschi & Calhoun, 2004). Moderate, challenge level stress bolsters social adjustment, emotional stability (Dienstbier, 1989) and facilitates approach orientations compared to avoidance orientations in navigating adversity and building resilience (Peters & Jamieson, 2016). Overall, changing one's mindset about stress and its benefits enhances well-being when experiencing ecological stressors (Keech et al., 2021).

Stress and Affect

Stress is influential in the experience of positive and negative affective states (McGowan et al., 2006; Rackoff & Newman, 2020). Positive affect, features of positive emotions and pleasurable experiences with the environment (Watson & Clark, 1988), is an outcome of well-being (Alexander et al., 2021; Cloninger et al., 2012). Positive affect bolsters mental and physical health outcomes. For example, studies indicate that positive emotions predict resilience and extend how long people live (Fredrickson & Losada, 2005). Positive emotions help prevent perseverative thought patterns, cultivate social relationships (Rackoff & Newman, 2020), and enhance self-regulation after self-control depletion (Tice et al., 2007). Furthermore, positive affect is associated with reduced anxiety and depression (Rackoff & Newman, 2020). While positive emotions are a key characteristic to momentary estimates of optimal functioning, they also produce optimal functioning in the long-term (Fredrickson, 2004). Ultimately, positive emotions broaden momentary thought-action approaches and build enduring personal resources (Fredrickson, 2004). These personal resources are durable and accessible when needed (Fredrickson & Losada, 2005). Consequently, accumulating personal resources may further build knowledge, creativity, and resilience (Fredrickson, 2004).

Largely, stress is inversely associated with positive affect/emotions (Mroczek & Almeida, 2004). Stress depletes cognitive resources (Tugade & Fredrickson, 2006), hindering generation of positive emotions. On occasion, stress is positively associated with positive affect, characterized by positive emotions (Watson & Clark, 1988). When stress is perceived as a *challenge*, it often produces a positive

psychological response highlighted by high levels of positive affect (McGowan et al., 2006). Furthermore, *stress mindset* (viewing stress as beneficial) is associated with positive affect (Jamieson et al., 2018). Similarly, individual traits such as positive affect are associated with personal growth from stress (Matthieu & Ivanoff, 2006). In combination, these studies suggest stress is important in the development of positive affect, a unique and influential aspect of well-being.

Alternatively, negative affect consists of subjective reports of distress and unpleasurable engagement with one's environment, characterized by high levels of negative emotions (e.g., fear, worry, sadness; Watson & Clark, 1988). Negative emotions can be debilitating, hindering the way people think and behave. For example, loneliness, a common feature of negative affect, impacts health, such as decreasing mortality, sleep quality, immune response, and physical activity (Newall et al., 2013). Similarly, sadness and anger alter one's judgement (Keltner et al., 1993) and worry is strongly linked to clinical forms of anxiety (Lewis et al., 2019). Furthermore, negative emotional states such as anxiety sensitivity are robust risk factors for clinical anxiety and affective disorders (Viana et al., 2021).

Negative affect is commonly associated with stress, contingent upon the individual and amount of stress one is exposed to (Mroczek & Almeida, 2004). According to the cognitive-transactional model, stress is a process involving appraisals of the threat or challenge (McGowan et al., 2006). If a demand exceeds personal resources, negative psychological responses occur, such as negative affect. Again, studies support this position. Specifically, research indicates that as minor stressors accumulate over a period of time, strong negative affective states emerge (Pillow et al., 1996). In the same vein, perseverative cognitions, those that extend stress over time (e.g., rumination), is associated with negative affect (Kramer et al., 2021) and major stressors are also linked to lower affective states associated with lower life satisfaction (Doré & Bolger, 2018).

Stress and Self-Efficacy

Self-efficacy, one's belief in his or her capacity to succeed given situational demands, is an important indicator of well-being (Ryff, 2014). Self-efficacy is considered a foundational part of human motivation and performance, and is associated with greater initiative, strength of behavior, arousal

regulation, and affect regulation (Goldin et al., 2012; Paersch et al., 2021). Self-efficacy is highly correlated with self-esteem and is positively related to certain motivational traits, such as need for achievement (Chen et al., 2001). While low self-efficacy is associated with avoidance of difficult situations, high self-efficacy is associated with approaching difficult tasks, framing them as a challenge (Karademas & Kalantzi-Azizi, 2003). Furthermore, self-efficacy may be a useful tool for bolstering treatment outcomes associated with certain psychological disorders (Goldin et al., 2012).

Variations in self-efficacy play an important role in the stress process (Chen et al., 2021; Karademas & Kalantzi-Azizi, 2003). Self-efficacy determines how coping behavior is initiated and sustained. Theory strongly suggests inefficacy plays a role in perceiving a situational demand as stressful (Karademas & Kalantzi-Azizi, 2004). Therefore, the relationship between stress and self-efficacy is commonly characterized as inverse. Numerous research studies support this characterization, highlighting that higher self-efficacy is associated with lower stress (Brimmell et al., 2019; Hitches et al., 2021; Turner et al., 2021).

Influential Cognitive Resources

Individual stress responses can be problematic. Commonly, the prevailing research suggests overwhelming and frequent bouts of stress reduce different outcomes of well-being. However, the relationship between stress and well-being outcomes may be contingent upon different cognitive factors. Rumination and arousal-reappraisal may be two concepts that clarify the relationship between stress and well-being outcomes.

Rumination in the Stress Process

Rumination involves passively fixating on distress highlighted by a repetitive negative thinking style (Nolen-Hoeksema et al., 2008). It entails continuously thinking about one's feelings and problems in a negative orientation (King & DeLongis, 2014). This cognitive process is problematic because it exacerbates negative affect, like depression (Lewis et al., 2019). Rumination also interferes with effective problem solving, minimizes engagement in instrumental behaviors, and distorts perceptions of self (Gazzillo et al., 2020), leading to higher levels of risk for psychopathology. Furthermore, rumination

increases anger, and in certain situations increases displaced aggression (Bushman et al., 2005; Rusting & Nolen-Hoeksema, 1998). In terms of managing adversity, rumination delays recovery from stress and heightens reactivity to stressful situations (Ruscio et al., 2015).

By and large, rumination is characterized as a ubiquitous and deleterious method of maintaining and exacerbating problematic features of the stress response process. According to the response styles theory (RST; Nolen-Hoeksema et al., 2008), rumination is a way of responding to stress that prolongs and exacerbates different indices of distress through multiple mechanisms. In terms of navigating adverse events, rumination augments overwhelming bouts of stress by interfering with an individual's ability to engage in instrumental behavior (e.g., mood alleviating activities; Nolen-Hoeksema et al., 2008). Rumination decreases motivation and initiative, while also impairing flexible cognitive control, hindering proactive mechanisms needed to effectively combat stress (Capobianco et al., 2018; Nolen-Hoeksema et al., 2008). The intersection of stress and rumination commonly leads to lower well-being outcomes. For example, rumination as a response to stress is linked to higher depressive symptoms in both adolescents and adults (Alloy et al., 2000; Fowler et al., 2017). In workplace settings, rumination exacerbates stress and leads to lower workplace well-being, including increased depression and lower optimism (von Hippel et al., 2019).

Despite a wealth of research characterizing the debilitative interaction between stress and rumination, there are few studies to illustrate how stress intersects with rumination to account for changes in positive affect, negative affect, and self-efficacy. There are a handful of studies which strongly suggest that rumination will exacerbate the negative effects of stress on these well-being outcomes. Evidence suggests that the relationship between stress and rumination hinders emotion regulation, increasing negative emotions and predicting depressive symptoms (Fowler et al., 2017; Robinson & Alloy, 2003). Studies consistently highlight the interaction between stress and rumination as an important mechanism to explain increases in diverse expressions of negative affect (King & DeLongis, 2014), and that rumination post-stress prolongs negative affect generated by the stressful event (Wang et al., 2013). Furthermore, studies demonstrate that stress-related rumination partially mediates the association with positive and

negative affect in people with certain mood disorders (Ruscio et al., 2015). Little to no studies have been conducted illustrating the how the intersection between stress and rumination impacts self-efficacy. However, the interaction between stress and rumination does minimize important psychological resources (Rosenbaum et al., 2018). As such, it is expected that self-efficacy may decrease when rumination co-occurs with stressors.

Cognitive Reappraisal and the Stress Response

Reappraisal is a cognitive resource used to reframe the meaning of a specific situation or event to bolster well-being (Troy et al., 2010). It is a regulatory strategy used to change one's emotional response to a situation and is widely accepted as an adaptive coping skill. Essentially, reappraisal alters the way one thinks about a given situation and is often used in everyday life (Mauss et al., 2007). For example, realization of one's shortcomings can be interpreted as an opportunity for growth and improvement rather than indication of failure. When successful, reappraisal leads to better personal and interpersonal successes (Milyavsky et al., 2019).

Overall, cognitive reappraisal is beneficial, with links to lower levels of psychopathology, high positive emotions, and enhanced emotional memory in certain situations (Nook et al., 2020; Yeh et al., 2020). Furthermore, successful reappraisal is associated with better psychological health, reduced interpersonal conflict, and greater well-being (Finkel at al., 2013; Ford et al., 2017; Gross & John, 2003). Overall, reappraisal is advantageous in that it allows for emotional response change without escape or avoidance of the situation (Milyavsky et al., 2019). Thus, it appears to be a central feature of different well-being outcomes, particularly resilience (Ryff, 2014).

Because appraisal plays a key role in emotional health, cognitive reappraisal may generate some advantages in managing the negative effects of stress (Troy et al., 2010). Although negative affect is commonly associated with stress (Mroczek & Almeida, 2004), the inclusion of reappraisal (Ray et al., 2010) often mitigates the debilitative effects of stress, resulting in fewer psychopathological outcomes. Research suggests reappraisal, especially arousal reappraisal, plays a significant role in moderating stress and well-being relationships (Troy et al., 2010). Recent studies indicate that reappraising arousal,

reframing the arousal experienced as a coping resource, improves cardiovascular functioning and heightens perceptions of available cognitive resources (e.g., coping resources; Jamieson et al., 2012). Other research indicates that arousal reappraisal contributes to improved academic performance and improved behavioral displays of affect during performance evaluations (Beltzer et al., 2014; Jamieson et al., 2010). Overall, it appears reappraising arousal buffers the effects of stress on debilitative psychological outcomes and promotes the development of important well-being resources (Troy et al., 2010).

Despite a wealth of research highlighting the protective interaction between stress and reappraisal, there are relatively few studies illustrating how stress intersects with reappraisal to account for changes in positive affect, negative affect, and self-efficacy. However, evidence suggests that the relationship between stress and reappraisal is an important mechanism that has many downstream benefits (Jamieson et al., 2013). For instance, some studies strongly suggest that reappraisal offsets the negative effects of stress and bolsters positive affect and self-efficacy, while also reducing negative affect. Regarding negative affective states, studies demonstrate that the ability to utilize cognitive reappraisal after life stressors reduces negative emotions (Troy et al., 2010) and reappraising stress reduces reactionary negative affect (McHugh et al., 2020). Other studies highlight the benefits of integrating cognitive reappraisal into how individuals experience stress. Specifically, research indicates reappraising stressful events increases positive affect (Rood et al., 2012) and cognitive reappraisal is associated with improved positive affect in relation to daily stress in adults (Richardson, 2017). Furthermore, research indicates that when stress is reappraised, self-efficacy and state self-confidence increases (Sammy et al., 2017). In total, these studies outline the beneficial effects of employing cognitive reappraisal techniques during stressful experiences. However, all of these studies outline the benefits of employing generalized reappraisal techniques. Research has yet to evaluate whether these same benefits are evidenced for arousal reappraisal.

Arousal reappraisal reinterprets arousal as functional, aiding performance in an adaptive manner (Jamieson et al., 2012). While stress arousal is often experienced as aversive (Arble et al., 2019), arousal

reappraisal interprets this state as beneficial, enhancing goal-oriented tasks (Jamieson et al., 2013). Like general reappraisal, both mechanisms reinterpret meaning for an adaptive purpose. However, generally reappraisal is conceptualized as reinterpreting a situation rather than one's internal bodily state, often decreasing SNS arousal (Beltzer et al., 2014). In fact, clinical literature often utilizes this to downregulate arousal (Jamieson et al., 2013). While this type of reappraisal is beneficial (Mauss et al., 2007), arousal reappraisal seeks to capitalize on elevated physiological states rather than downregulate or reduce them. Therefore, there is some evidence to suggest that arousal reappraisal may offer some additive advantages in helping individuals cope with stress.

Current Study

Overall, examining the effects of arousal reappraisal on different well-being outcomes is becoming more prominent. However, there are still several gaps within the literature that need to be addressed. Specifically, research needs to confirm whether arousal reappraisal can capitalize on the effects of stress and enhance well-being. Importantly, few studies, to date, have concluded that arousal reappraisal can increase emotional resources and self-efficacy. There is a need for models that determine whether arousal reappraisal interventions directly reduce the effects of negative psychological outcomes using experimental designs. Results stemming from experimental designs may provide more clinical utility for the use of arousal reappraisal in psychological service and a framework for new models to use arousal reappraisal as a means of promotion, prevention, and intervention for various outcomes. Specifically, by manipulating arousal reappraisal interventions following induced stress and examining changes in affect and efficacy, the study hopes to add experimental evidence for the promotive role of arousal reappraisal on increasing positive well-being outcomes.

In line with the directions of the field, the current study aimed to address gaps within the stress and well-being literature. Guided by the framework of the Challenge and Threat model and reappraisal process (Gross & John, 2003; Jamieson et al., 2010), I expected that (a) stress would negatively impact reports of positive affect, negative affect, and self-efficacy, and (b) implementation of an arousal reappraisal intervention would help individuals recover losses in positive affect and self-efficacy and

minimize negative affect scores compared to the control condition. Therefore, it is expected that there will be an increase in negative affect scores and a decrease in positive affect scores and self-efficacy for all participants from Time 1 (Baseline) to Time 2 (Post Induction). Furthermore, it is expected that arousal reappraisal participants will report higher positive affect and self-efficacy scores but lower negative affect scores at Time 3 (Post Intervention) compared to control participants (See Figures 2, 3). Overall, I expected that individuals in the arousal reappraisal group to report more well-being during the stress recovery process.

CHAPTER 2:

METHODOLOGY

Participants

The sample included undergraduate students from a large southeastern university. Participants were recruited through the SONA system and classrooms. Fifteen time slots were posted each week through the SONA system. Classroom recruitment participants scheduled a time slot with the researcher via email. Time slots were updated every Friday of the week and data collection was held on Mondays, Tuesdays, and Thursdays with five slots per day beginning at 1:00 p.m. Participants received 2 SONA credits for participating in this study and classroom recruitment participants received $20 Amazon gift cards. In order to participate, individuals must have been at least 18 years of age and provided their consent.

To determine adequate power, I ran sample size calculation provided by G*Power (Faul et al., 2009). In running the power analysis, I selected to evaluate sample size for an ANOVA repeated measures within-between interaction model. Within the model, I examined two main effects and a potential interaction. I anticipated a small effect size of 0.23, an alpha level of .05, and a power level of .8 for two groups with responses across 4 time periods. Results for the G*Power analysis indicated a total sample size of 28 with 14 participants equally randomized into the two between subject groups. However, at a conservative level, other methodologists recommend having at least 50 units per condition (Simmons, Nelson, & Simonsohn, 2018). Taking these recommendations into consideration, I moved forward with the study by recruiting a minimum of 28 participants. However, to ensure I could detect small effects I strove to recruit at a maximum of 100 participants. The study took approximately 1 hour to complete. The study ran until December 6th, 2021.

A total of 49 students participated in the study. Nine individuals' responses were excluded due to concerns over observed motivation or attention difficulties (i.e., sleeping, passive participation) noted by the researcher. The final sample included 40 individuals. The average age of participants was 19.53 years. Thirty-two participants identified as a cisgender woman (80%) and 6 as a cisgender man (15%). One

participant identified as Genderqueer/Gender nonconforming (2.5%) and another participant identified as Other (2.5%). Eighteen participants identified as African American/Black (45%), 16 as White/Caucasian (40%), 3 as Multiracial (7.5%), 2 as Asian/Asian American (5%), and 1 as Mexican American/Latina/o (2.5%). Regarding socioeconomic status (SES), 25 participants described themselves as having "some financial resources" (62.5%) and 15 as having "substantial financial resources" (37.5%). Regarding geographic location of reported hometown, 27 participants described their hometown as "urban" (67.5%) and 13 described their hometown as "rural" (32.5%).

Research Design

The current study employed a 2 Intervention (Arousal Reappraisal, Control) x 4 Time (Time 1, time 2, time 3, time 4) experimental mixed-subjects design. All participants were assigned to a stress induction task. Participants were then randomly assigned to an intervention task. Between and within groups comparisons across conditions were analyzed. Participants were measured for state-based assessments of affect and self-efficacy multiple times across the implementation of the study.

I was active in the construction of the process. However, experimenter bias was somewhat controlled for through the use of Qualtrics. Specifically, the Qualtrics survey randomized participants to different groups outside of my purview for the first half of the procedures. I did not find out know who received the intervention until the participants began engaging with the study procedures after the second set of measurements (Time 2). Furthermore, I used a script to minimize experimenter-participant interaction. In addition,

Induction Task. In the current study, the induction task was an adapted version of the Trier Social Stress Test. This test is a validated method to induce mild stress on par with the experience of a social-cognitive hassle (Kudielka et. al, 2007). Once arriving at the laboratory, participants were asked to sit on a couch in a relaxed, comfortable position. Once relaxed, the researcher asked participants to prepare to give a brief speech. The researcher informed participants that their speech *may* be recorded for further study by their peers at the school. The researcher then left the room and allowed participants to prepare their speech for two minutes. Upon return, the researcher provided the participant with the topic of the

speech, "Discuss why you are an attractive person." The researcher informed participants that they would need to speak on this topic for 3 minutes, and the researcher again left the room and allowed participants to prepare. This induction passage can be found in Appendix 1.

Interventions Control Intervention. In the current study, participants were not given a text to read. They were prompted to continue to prepare to give their speech. Participants were left alone for 2 minutes to mimic the time of the reappraisal condition.

Stress Reappraisal Intervention. In the current study, I used a small educational vignette as an intervention to help participants focus on reappraisal efforts. This intervention was adapted from previous research (Moore et al., 2015). The purpose of the intervention was to encourage participants to view elevations in arousal as adaptive and beneficial in completing a task. This type of intervention is advantageous because it is short in duration. The specific educational passage used in this study is offered below:

> *"In stressful situations, like public speaking, our bodies react in very specific ways. The increase in arousal you may feel during stressful situations is not harmful. In fact, recent research has shown that this response to stress can be beneficial and aid performance in stressful situations. Indeed, this response evolved because it helped our ancestors survive by delivering oxygen to where it was needed in the body to help address stressors. Therefore, before and during the upcoming public speaking task, we encourage you to reinterpret your bodily signals and any increases in arousal as beneficial and remind yourself that it could be helping you perform well."*

There are 106 words in the passage. Participants were given two minutes to listen and process this prompt via Qualtrics.

Procedures

The study's procedures are illustrated in Figure 1.0. Students who were registered in SONA had an opportunity to participate in the current study. SONA is an electronic system whereby students can identify and sign up for projects interesting to them. Those interested in my study signed up for an open time slot and were provided with the location of the study. Participants were asked to complete this study

face-to-face. The study was completed in a lab space designed to mirror a psychotherapeutic room. Upon arrival, participants were given an informed consent sheet that explained possible risks and benefits associated with the study. The informed consent sheet also explained confidentiality, compensation, and participation withdrawal guidelines. Participants read over the informed consent document and indicated their consent to participate by providing their signature. After completing the informed consent form, participants were asked to keep any personal belongings in a secure location for the remainder of the study and prompted to use the restroom, if needed.

Once participants settled into the designated area, participants completed a baseline measure (Time 1) of stress, affect, and self-efficacy via a computer. All study data was collected via a Qualtrics survey. Next, participants were administered a stress induction task. The task was an adapted version of the TSST (Kudielka et al, 2007, see above). After completing the induction tasks, participants were asked to complete a post induction measure of stress, affect, and self-efficacy (Time 2). Once the data was entered, participants were randomly assigned to 1 of 2 interventions: control and arousal reappraisal interventions. Post intervention measures on stress, affect, and self-efficacy were administered after participants completed their assigned intervention (Time 3). Next, participants gave a 3-minute speech. Speeches were not recorded, nor were they given to anyone to evaluate. Final measures of stress, affect, and self-efficacy were given (Time 4). Once the data was secured, participants engaged in an active debriefing exercise. The exercise was a 5-minute mindfulness-based task proven to minimize stress (Wilson & DuFrene, 2009; see Appendix 2). The purpose behind this task was to reduce any lingering feelings of distress. Participants were then given a copy of the informed consent to keep for their own records, as well as a debriefing form with free to low-cost mental health resources they could access, if distressed. Participants engaged in a series of short, qualitative manipulation checks at the end of the study.

Figure 1. Map of Methodological Procedures

*Stress-O-Meter, PANAS, NGSE
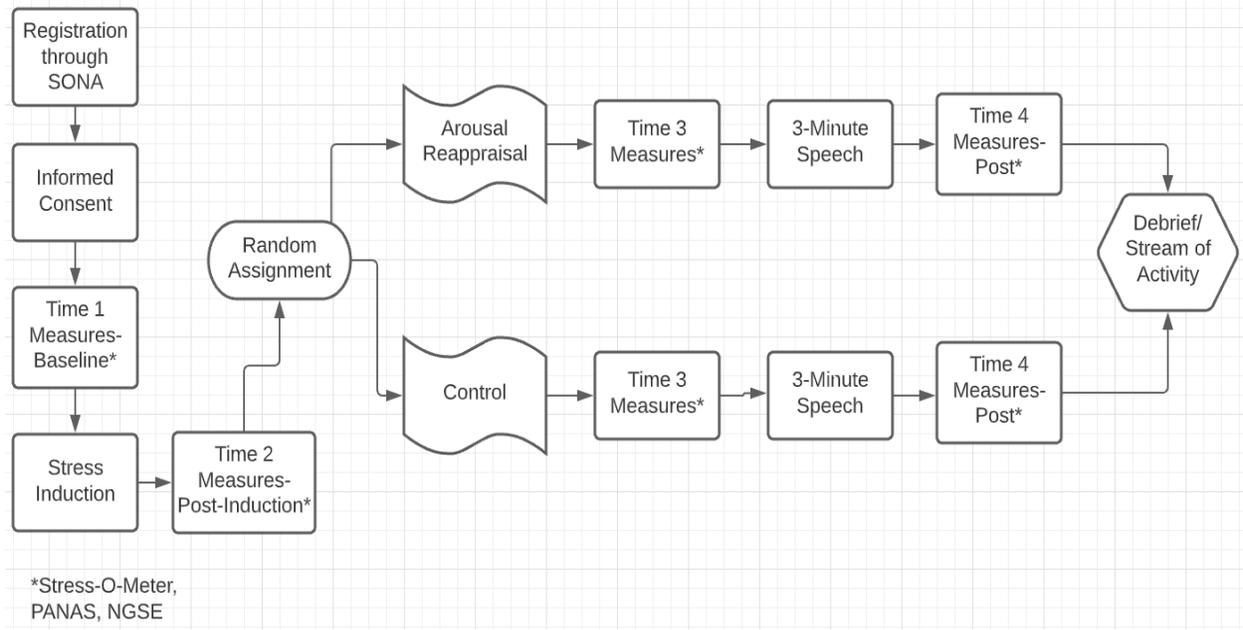
Measures

  Stress-O-Meter. Stress was measured with a single item rating scale (Keegan et al., 2015). This was rated on a scale from 0 (No stress) to 100 (Most Stress) via a slider scale. Individuals slid the bar to the point on the continuum that best reflected their stress level. This is a validated measure of state-based stress commonly used in previous research (Keegan et al., 2015).

  Positive Affect Negative Affect Scales. The PANAS is a 20-item measure of positive and negative emotions resulting from experiences in one's environment (Watson et al., 1988). The PANAS assessed for state indices of positive and negative emotions. In the current study, participants rated the extent they felt interested, distressed, excited, upset, strong, guilty, scared, hostile, enthusiastic, proud, irritable, alert, ashamed, inspired, nervous, determined, attentive, jittery, active, and afraid in the current moment. The scale is comprised of two subscales (Positive Affect [PANAS-PA] and Negative Affect [PANAS-NA]). Each subscale contains 10-items. Participants rate their agreement on each item according to a 5-point Likert scale, with responses ranging from 1 (Very slightly or not at all) to 5 (Extremely). Possible scores for each dimensional scale range from 10 to 50, with higher scores indicating higher positive emotions or negative emotions. These scales are validated measures of current positive and negative emotional states (Rogatko, 2009). These subscales possess good internal consistency ($\alpha > .85$; Crawford & Henry, 2004) and the scales brevity helps mitigate unintentional diluting of intervention/manipulation effects. Furthermore, these scales demonstrate excellent convergent validity with different well-being outcomes (Feldman et al., 2010; Norlander et al., 2005). In the current study, the PANAS-PA score was internally consistent across different time points ($\alpha = .74-.91$). Similarly, the PANAS-NA score was internally consistent across different time points ($\alpha = .81-.90$).

  New General Self-Efficacy Scale (Adapted). The NGSE scale is an 8-item instrument designed to measure general self-efficacy, how well one believes she/he performs in general situational demands (Chen et al., 2001). However, self-efficacy is better assessed through different contexts rather than a general index score (Bandura, 1977). Thus, I adapted the self-efficacy items to better evaluate participants' perceptions of confidence and capabilities in performing speech-related tasks. In total, the

adapted measure contains 8-items. Items are measured on a 5-point rating scale from 1 (Strongly disagree) to 5 (Strongly agree). For the purposes of this study, participants responded about how they perceived their level of self-efficacy in giving speeches in the current moment. Total scores range from 8 to 40 with higher scores reflecting higher levels of self-efficacy in speech giving. Total scores are summative. The NGSE scale demonstrates good internal consistency (α = .86-.90; Chen et al., 2001) and excellent convergent validity with other measures of self-efficacy (Chen et al., 2001). In the current study, the NGSE-A score was internally consistent across different time points (α = .90-.96).

Analytic Plan

Preliminary Analysis. I ran a manipulation check in order to determine if the stress task was effective in eliciting higher reports of stress. A paired-samples t-test was analyzed with Time as the IV (Time 1, Time 2) and Stress as the DV. The DV was the one response on the Stress-O-Meter score. The stress scores were what participants self-reported on the Stress-O-Meter. It was expected that stress should be elevated across time points 1 and 2.

Missing Data. If less than 10% of the data are missing across item responses for the self-report dependent variables, then the data set is said to have low levels of missingness. Considering there were low levels of data missingness (less than 10%), I implemented a participant mean substitution procedure at the item level. Specifically, .02% of data were missing. Of those missing data, there were no clearly identified response patterns, meaning the missing data appeared to be random across items. Four participants reported some level of missingness in their responses. Specifically, I calculated a mean score based on the answered items associated with a single participant's responses on the scale in which the missing data occurred. Then, I substituted the mean score for the missing item value. The use of mean substitution procedures is comparably effective in addressing item-level missingness with other techniques (e.g., case analysis, multiple imputation; Parent, 2013), when the overall levels of missingness is low.

Careless Responding and Screening the Data. I attempted to minimize careless responding by using measures that were 20 items or less. In addition, I also evaluated other metrics to determine for

careless responding. For instance, I evaluated the time it took participants to complete each self-report measure. If participants completed measures in a quick and rushed manner, as indicated by a score lower than 2 standard deviations below the mean, then I evaluated the data looking for concerning patterns (skipping numerous items, responding in the same manner for each item, evaluating the correlations among the items in a survey). In addition, if participants skipped over 30% of the survey items, I removed them from the final sample. Careless responding was also be assessed by an evaluation for outliers. I ran histograms and scatterplots in order to account for outliers. One person was excluded from the final sample because their data was clearly identified as an outlier.

In addition, I added three qualitative questions at the end of the procedure to serve as manipulation checks. These questions were: a) *What do you think the purpose of this study is?* b) *In terms of topics, what do you think the main focus of the study was about?* and c) *Overall, how did the study make you feel?* I asked the first questions in order to gauge participant perceptions of the study's purpose (e.g., did participants understand the purpose was to evaluate cognitive interventions on post-stress well-being outcomes?). I asked the second question in order to gauge participants' perception of the main focus (e.g., did participants believe the focus was the speech task? Did participants believe the focus was the arousal reappraisal intervention or stress perceptions?). I asked the third question in order to gauge participants overall perceptions after the manipulation. For example, surveys measured affect, self-efficacy, and stress, but this qualitative question allowed participants to express their overall feelings toward the study and provided an assessment of whether participants gave genuine responses on dependent variables.

Primary Analysis. I ran a series of Mixed Factorial ANOVAs in order to analyze intervention differences on self-efficacy, positive affect, and negative affect across time. Specifically, I ran 2 Intervention (Control, Reappraisal) X 4 Time (Time 1, Time 2, Time 3, Time 4) ANOVAs. I expected to find differences in DVs (self-efficacy, positive emotions, and negative emotions) at Time 3 (Post Intervention) and Time 4 (Post Task Performance). Because there was more than one level of IV (Intervention), I ran post-hoc comparisons. I expected to find a significant 2-way interaction effect.

Because analysis revealed a significant interaction, I used follow-up ANOVAs to assess if differences in reported DVs occur at Time 1 (Baseline), Time 2 (Post Induction), Time 3 (Post Intervention), and Time 4 (Post Task Performance). A p-value of .05 was considered a statistically significant effect.

Figure 2. Hypothesized Findings for Positive Affect and Self-Efficacy

Figure 3. Hypothesized Findings for Negative Affect
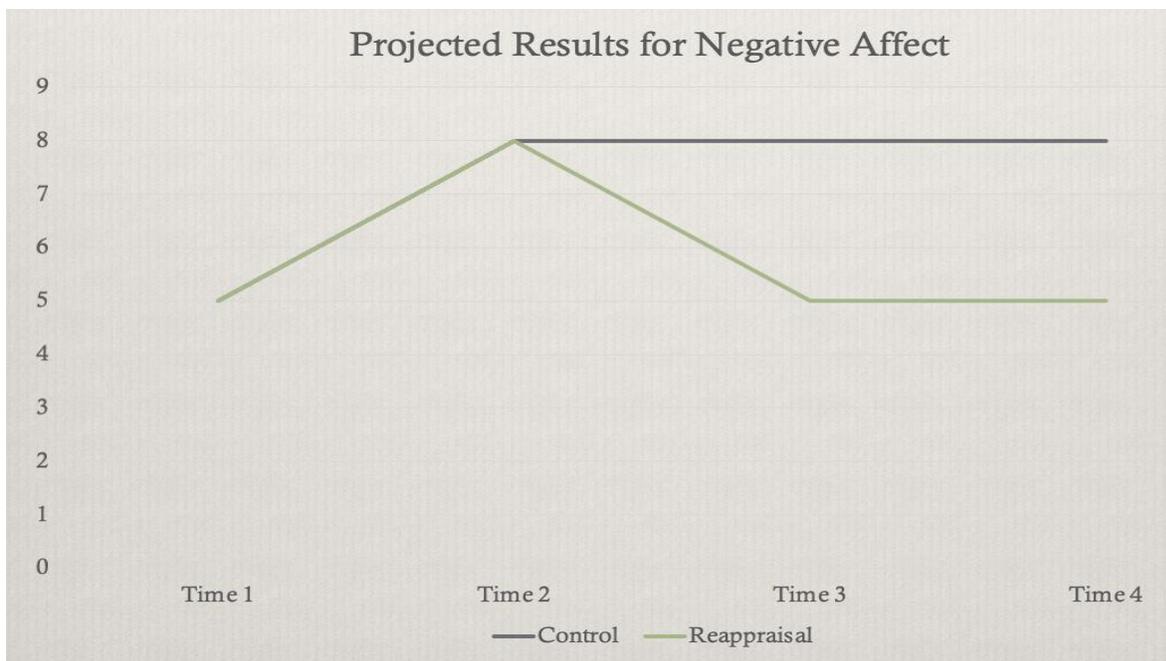
CHAPTER 3:

RESULTS

Preliminary Analysis

   Principle Components Factor Analysis. Because I adapted the NGSE scale to measure for

perceptions of self-efficacy in giving a speech, I decided to evaluate the factor structure of the adapted

measure. To determine the adequacy of the data, KMO and Bartlett's Test of Sphericity were analyzed.

Next, a factor loading threshold for inclusion was set at .4 and above (Stevens, 2012). Finally, the option

to suppress small coefficients was selected; coefficients less than .3 were suppressed. Results revealed a

one factor model. In evaluating KMO and Bartlett's Test of sphericity, data were somewhat appropriate to

be evaluated by a factor analysis (KMO = .7; Bartlett's Test, $p < .05$; Hutcheson & Sofroniou, 1999). The

one factor solution accounted for 54.03% of the variance in the latent construct. Factor loading scores for

each item are depicted in Table 1.

Table 1. Factor Loading Matrix for the Adapted Version of the NGSE

| Items	Factor Loading Score
Item 8. Even when things are tough, I believe I can give a speech quite well.	.852
Item 1. I believe I can accomplish any goal when giving a speech.	.848
Item 6. I am confident that I can perform effectively on my different speech-related tasks.	.789
Item 2. Even under difficult circumstance, I believe I can achieve any speech-related goal.	.764
Item 7. Compared to other people, I believe I can do most speech-related tasks well.	.760
Item 4. I believe I can succeed at most any speech-related endeavors I set my mind.	.724
Item 5. I believe I can successfully overcome many challenges associated with giving a speech.	.623
Item 3. My abilities in giving speeches can lead to positive outcomes.	.428

Bivariate Correlations. I also decided to evaluate correlations among the study's main variables at baseline (Time 1). Results reveal a non-significant relationship between baseline reports of positive affect and negative affect ($r = -.03$, $p = .89$). However, baseline reports of positive affect were positively related to baseline reports of context specific self-efficacy ($r = .4$, $p < .01$). Interestingly, baseline reports of negative affect were not statistically related to baseline reports of context specific self-efficacy ($r = -.2$, $p = .21$).

Manipulation Check. In the current, study I administered a series of manipulation checks consisting of three qualitative questions. The questions were: a) *What do you think the purpose of this study is?*, b) *In terms of topics, what do you think the main focus of the study was about?*, and c) *Overall, how did the study make you feel?* The first question was used to evaluate if participants inferred that the study's purpose was to determine if cognitive interventions impacted growth from stressful events. The purpose behind the second question was to gauge participants' perceptions regarding the study's focus. For example, did participants interpret the focus of the study was to give a speech on attractiveness? Lastly, the purpose of the third question was to assess participants' thoughts and feelings towards the study. For example, did the study cause the participants to feel stressed and anxious? After surveying participants' answers, I noted several major themes. For Question 1, the major themes revolved around helping individuals to be better at giving a speech, changing the way people think about giving a speech, working under pressure, and how to build self-confidence. For Question 2, the major themes revolved around giving a speech, stress management, self-confidence, anxiety, and perceptions of attractiveness. For Question 3, the major themes were interested, nervous, stress, insecure, and fine.

Ultimately, the reported themes were consistent with expectations for the study. Specifically, I expected individuals to feel stressed and anxious given the nature of the tasks. In addition, not one participant indicated that the purpose of the study was to determine how certain cognitive interventions impacted growth from stressful events. This suggests that participants were in the mindset to provide genuine and valid responses to the prompts.

In the current study, I used a stress induction task to increase participants' experience with stress. Particularly, I aimed to induce mild to moderate stress. At a preliminary level, I needed to evaluate whether my stress induction task was effective in this goal. To determine if the stress induction task was effective in increasing stress scores, I ran a 2 (Intervention) X 4 (Time) Factorial ANOVA. Results revealed a significant main effect for Time, $F(3, 108) = 9.73$, $p < .01$, *partial η^2* = .21. In addition, results revealed a non-significant main effect for Intervention, $F(1, 36) = .54$, $p = .47$, *partial η^2* = .02, and a non-significant interaction effect $F(3, 108) = .24$, $p = .87$, *partial η^2* = .01. Figure 4 depicts the interaction effect of Intervention and Time on stress scores.

Figure 4. Depiction of the Interaction between Intervention and Time on Stress
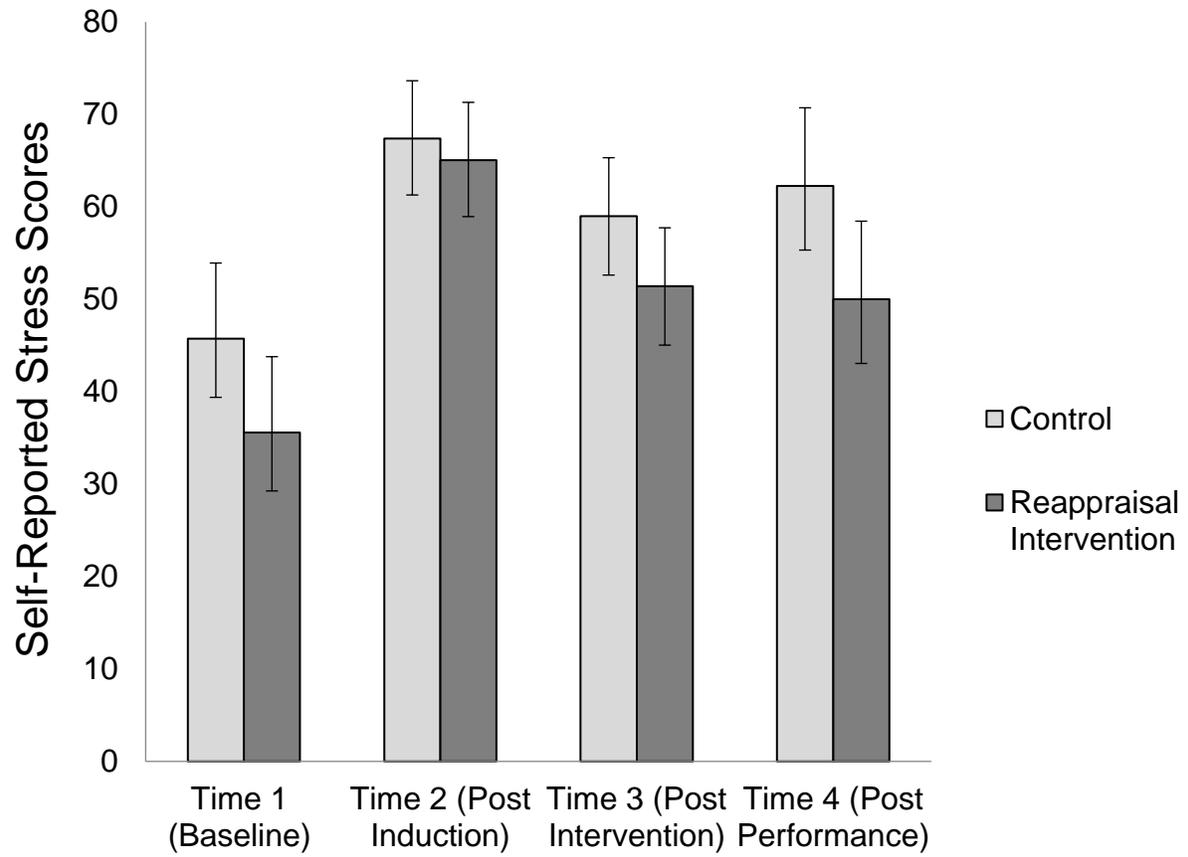
To evaluate whether participants' stress scores increased from Time 1 to Time 2, I ran a paired-samples t-test. Results revealed a significant effect, $t(44) = -5.52$, $p < .01$, where all participants increased stress scores from Time 1 (Baseline, $M = 41$, $SD = 33.14$) to Time 2 (Post-Induction, $M = 65.49$, $SD = 28.06$). Importantly, individuals in the Reappraisal intervention ($M = 35.22$, $SD = 30.45$) reported comparable stress scores to individuals assigned to the Control intervention ($M = 44.05$, $SD = 35.96$) at baseline. This pattern suggests that no pre-group differences existed on self-reports of stress among participants in the Control vs. Reappraisal interventions. In addition, the identified pattern of results indicates that all participants increased self-reports of stress between Time 1 and Time 2, suggesting the stress induction task was effective.

Primary Analysis

I ran three 2 (Intervention) X 4 (Time) Factorial ANOVAs to determine changes in positive affect, negative affect, and self-efficacy scores by interventions (Reappraisal, Control) and across time (Time 1 [Baseline], Time 2 [Post Induction], Time 3 [Post Intervention], Time 4 [Post Task Performance]). In terms of group composition, 18 participants were randomly assigned to the Control intervention and 22 participants were randomly assigned to the Reappraisal intervention.

Positive Affect. Results revealed a non-significant main effect for Time, $F(3, 114) = 1.49$, $p = .22$, *partial* $\eta^2 = .04$. In addition, results revealed a non-significant main effect for Intervention, $F(1, 38) = .14$, $p = .706$, *partial* $\eta^2 = .01$, and a non-significant interaction effect, $F(3, 114) = .31$, $p = .82$, *partial* $\eta^2 = .01$. Figure 5 depicts the interaction pattern between levels of time and intervention groups on positive affect scores. Because there was not a significant interaction effect, there is no impetus to probe how differences in positive affect scores vary by intervention group across time.
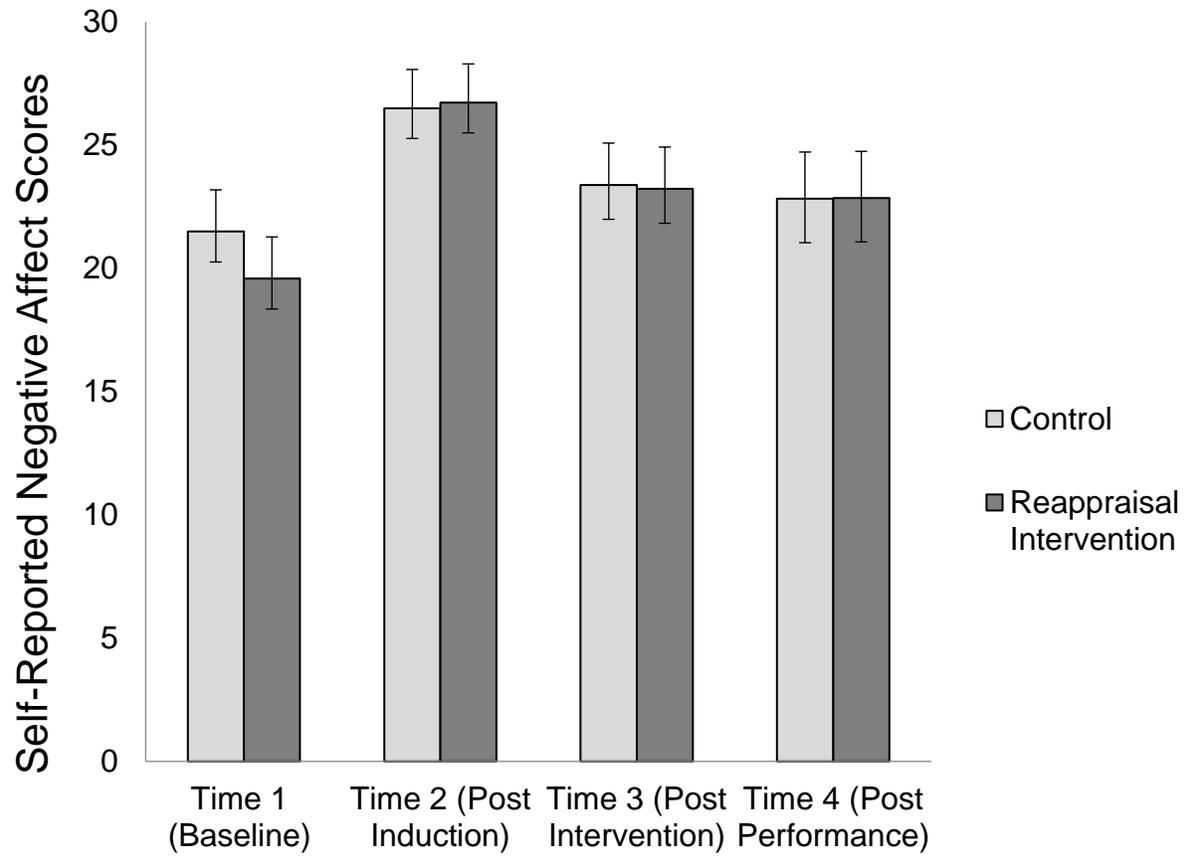
Figure 5. Depiction of the Interaction between Intervention and Time on Positive Affect
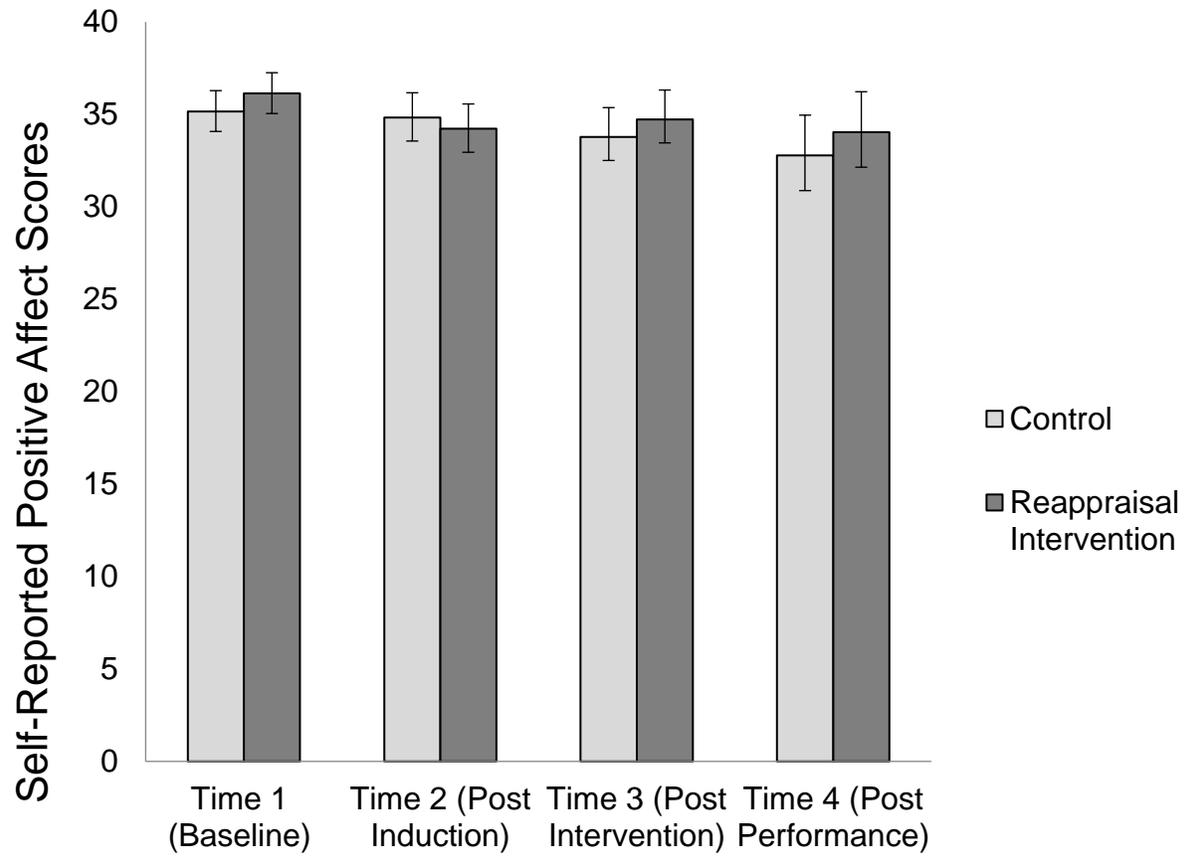
To rule out potential explanations for a non-significant interaction effect, I evaluated whether intervention group differences occurred at baseline and post induction using a series of independent samples t-tests. First, I evaluated whether intervention group differences occurred at baseline (Time 1) on positive affect scores. Results revealed a non-significant difference in positive affect scores, $t(38) = -.6$, $p = .56$. Similar results were revealed in examining potential differences at Post Induction (Time 2); results revealed a non-significant difference on positive affect scores, $t(38) = .33$, $p = .75$. In combination, these results suggest no pre-group or post induction differences on positive affect scores between groups, which is consistent with the expectation.

Negative Affect. Results revealed a significant main effect for Time, $F(3, 114) = 13.88$, $p < .01$, *partial* $\eta^2 = .27$. In addition, results revealed a non-significant main effect for Intervention, $F(1, 38) = .06$, $p = .81$, *partial* $\eta^2 = .01$, and a non-significant interaction effect $F(3, 114) = .54$, $p = .66$, *partial* $\eta^2 = .01$. Figure 6 depicts the interaction pattern between levels of time and intervention groups. Because there was not a significant interaction effect, there is no impetus to probe how differences in negative affect scores vary by intervention and time.

Figure 6. Depiction of the Interaction between Intervention and Time on Negative Affect

To rule out potential explanations for a non-significant interaction effect, I evaluated whether intervention group differences occurred at baseline and post induction using a series of independent samples t-tests. First, I evaluated whether intervention group differences occurred at baseline (Time 1) on negative affect scores. Results revealed a non-significant difference in negative affect scores, $t(38) = .93$, $p = .36$. Similar results were revealed in examining potential differences at Post Induction (Time 2); results revealed a non-significant difference on negative affect scores, $t(38) = -.12$, $p = .91$. In combination, these results suggest no pre-group or post induction differences on negative affect scores, which is consistent with the expectation.

Context Specific Self-Efficacy. Results revealed a significant main effect for Time, $F(3, 114) = 8.20$, $p = .01$, *partial η^2* $= .18$. In addition, results revealed a non-significant main effect for Intervention, $F(1, 38) = .24$, $p = .63$, *partial η^2* $= .01$, and a non-significant interaction effect $F(3, 114) = .99$, $p = .40$, *partial η^2* $= .03$. Figure 7 depicts the interaction pattern between levels of time and intervention groups. Because there was not a significant interaction effect, there is no impetus to probing how differences in positive affect scores vary by intervention and time.
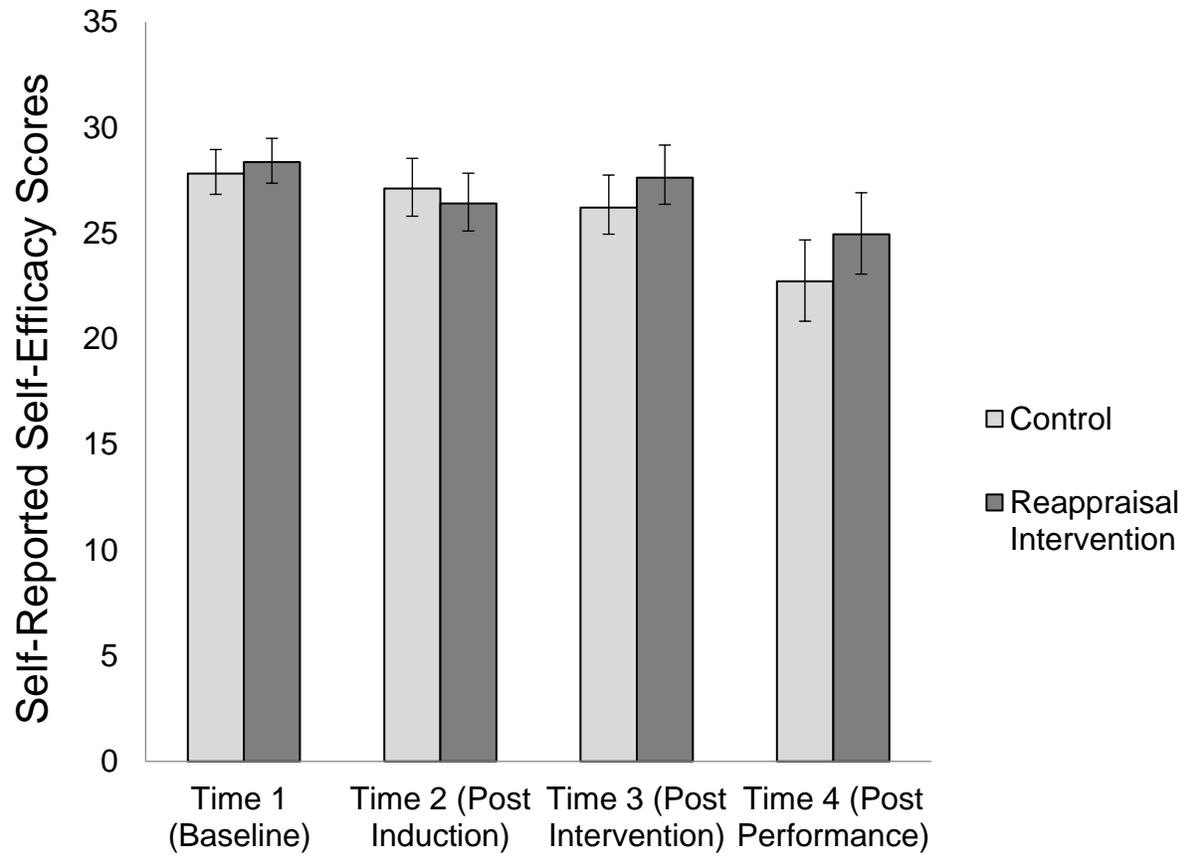
Figure 7. Depiction of the Interaction between Intervention and Time on Self-Efficacy

To rule out potential explanations for a non-significant interaction effect, I evaluated whether intervention group differences occurred at baseline and post induction using a series of independent samples t-tests. First, I evaluated whether intervention group differences occurred at baseline (Time 1) on self-efficacy scores. Results revealed a non-significant difference in self-efficacy scores, $t(38) = -.35$, $p = .73$. Similar results were revealed in examining potential differences at Post Induction (Time 2); results revealed a non-significant difference on self-efficacy scores, $t(38) = .36$, $p = .72$. In combination, these results suggest no pre-group or post induction differences on self-efficacy scores, which is consistent with the expectation.

Exploratory Analysis

Due to difficulties with recruitment via SONA, I needed to adjust my recruitment procedures to obtain a viable sample. As such, I was able to obtain a small grant to recruitment participants through classrooms. These participants were compensated differently from those who were recruited through SONA. Specifically, I paid classroom participants with a $20 Amazon gift card. The difference in compensating strategy may have differentially impacted the motivation and attitudes of participants. Therefore, as an exploratory measure, I decided to run a series of 2 (Intervention) X 4 (Time) Factorial ANCOVAs, with recruitment strategy as the covariate, to determine changes in positive affect, negative affect, and self-efficacy scores by interventions (Reappraisal, Control) and across time (Time 1 [Baseline], Time 2 [Post Induction], Time 3 [Post Intervention], Time 4 [Post Task Performance]). In terms of recruitment group composition, 9 participants were recruited through SONA and 31 participants were recruited through classrooms.

Positive Affect. Results revealed a non-significant main effect for Time, $F(3, 129) = .52$, $p = .67$, *partial* $\eta^2 = .01$, Intervention, $F(1, 43) = .08$, $p = .78$, *partial* $\eta^2 = .01$, and Recruitment Strategy, $F(1, 43) = .25$, $p = .62$, *partial* $\eta^2 = .01$. Similarly, results revealed two non-significant interaction effects. Specifically, I found a non-significant interaction effect for Time X Intervention, $F(3, 129) = .33$, $p = .8$, *partial* $\eta^2 = .01$, and Time X Recruitment Strategy, $F(3, 129) = .201$, $p = .895$, *partial* $\eta^2 = .01$. Because there was not a significant interaction Time X Intervention effect, there is no impetus to probing how

differences in positive affect scores vary by intervention and time. These findings were similar to those identified in the primary analysis section, suggesting recruitment strategy did not impact how participants reported positive affect scores.

Negative Affect. Results revealed a non-significant main effect for Time, $F(3, 129) = 1.84$, $p = .14$, *partial η^2* $= .04$, Intervention, $F(1, 43) = .1$, $p = .32$, *partial η^2* $= .02$, and Recruitment Strategy, $F(1, 43) = .32$, $p = .57$, *partial η^2* $= .01$. Similarly, results revealed two non-significant interaction effects. Specifically, I found a non-significant interaction effect for Time X Intervention, $F(3, 129) = .61$, $p = .61$, *partial η^2* $= .01$, and Time X Recruitment Strategy, $F(3, 129) = .33$, $p = .8$, *partial η^2* $= .01$. Because there was not a significant Time X Intervention interaction effect, there is no impetus to probing how differences in negative affect scores vary by intervention and time. These findings were similar to those identified in the primary analysis section, suggesting recruitment strategy did not impact how participants reported negative affect scores.

Context Specific Self-Efficacy. Results revealed a significant main effect for Time, $F(3, 129) = 3.35$, $p = .02$, *partial η^2* $= .07$. Alternatively, results revealed a non-significant main effect for Intervention, $F(1, 43) = .704$, $p = .41$, *partial η^2* $= .02$, and Recruitment Strategy, $F(1, 43) = 1.88$, $p = 1.8$, *partial η^2* $= .04$. In addition, results revealed two non-significant interaction effects. Specifically, I found a non-significant interaction effect for Time X Intervention, $F(3, 129) = .83$, $p = .48$, *partial η^2* $= .02$, and Time X Recruitment Strategy, $F(3, 129) = 1.79$, $p = .15$, *partial η^2* $= .04$. Because there was not a significant Time X Intervention interaction effect, there is no impetus to probing how differences in self-efficacy scores vary by intervention and time. These findings were similar to those identified in the primary analysis section, suggesting recruitment strategy did not impact how participants reported self-efficacy scores.

CHAPTER 4:

DISCUSSION

Review of Purpose

The current study aimed to investigate the effects of arousal reappraisal on change in positive affect, negative affect, and self-efficacy scores. I sought to answer two main questions: (a) do arousal reappraisal interventions increase perceptions of context-specific self-efficacy? and (b) do arousal reappraisal interventions increase ratings of positive affect and decrease ratings of negative affect over the course of the study? Stress is a ubiquitous experience; however, less is known about the pathways by which people may capitalize on stress. Reappraising elevated arousal states may be beneficial in promoting well-being (Jamieson et al., 2010), specifically through emotional and self-efficacy related outcomes.

Effectiveness of Stress Induction Task

I ran a 2 (Intervention) X 4 (Time) Factorial ANOVA to determine if the stress induction task was effective. Importantly, results indicate that all participants reported increases in stress scores from baseline (Time 1) to post induction (Time 2). This finding demonstrates that the stress induction task produced the expected effects. Additionally, it provides support for the use of the adapted Trier Social Stress Test (Tuguade & Fredrickson, 2007) as a reliable method for inducing moderate amounts of stress, consistent with the experience of a hassle. In order to expand upon my finding, future studies may benefit from including more objective measures of stress such as cortisol saliva samples (Degroote et al., 2020) and heart rate as a means to evaluate whether my stress induction task is equally effective in evoking the intended effects. This could provide more accurate insights on how long the intended effect lasts, as well as how my task influences physiological changes associated with stress arousal, like hormone modulation. Modifying the task to induce a greater intensity of stress, consistent with the experience of an acute stress, may also benefit future studies. While the current task induces minor, daily hassle-level stress, it will be beneficial to determine if this task can be modified to induce different types of stress, such as an acute stressor.

Primary Analysis

Differences in Positive Affect. I ran a 2 (Intervention) X 4 (Time) Factorial ANOVA to evaluate changes in positive affect scores by intervention and across time. Analyses revealed no statistically significant main effects for time or intervention. In addition, the findings suggest that there were no significant interaction effects between time and intervention groups. Thus, findings suggest that arousal reappraisal did not interact with experiences of stress across multiple time points to account for differences in self-reported positive affect scores.

Interestingly, these findings seem to be inconsistent with the literature. Often, stress is inversely related with positive affect (Mroczek & Almeida, 2004). Although significant stress was induced, positive affect did not decrease across time nor intervention, contrasting some of the long held beliefs regarding how stress can impact different positive mood and emotion states (Rackoff & Newman, 2020). Given these findings, it is proposed that stress, as induced by my procedures, was not perceived as a challenge state (McGowan et al., 2006) by participants, which detracted from the likelihood of increasing positive affective states. One explanation for this lack of reappraisal is placement of the intervention. Specifically, the reappraisal intervention was enacted *during* the stressful event. Some research suggests placement of cognitive-based interventions in the context of a stressful event moderates the impact of stress on positive affect (Quoidbach et al., 2015). For instance, some affect regulation strategies are more effective when given at the beginning, during, or after a stressful experience. As a result, it is quite possible that placement of my intervention during the stressful task might not be well suited to increase positive affect. Thus, it may be beneficial to re-examine this study with the intervention placement *prior* to the stressful event. Further, it may be beneficial to increase the strength of the intervention. An audio recording of a short arousal reappraisal intervention may have led to passive-listening, without participants actively engaging with the instructions or listening completely to the reappraisal narrative. It might be important for researchers to have participants listen and read the reappraisal narrative out loud to ensure more effective processing. Finally, it is possible that the short, psychoeducational nature of the intervention may not be powerful enough to affect how participants process and emotionally interact with different

types of stressors. Moving forward, it would be interesting to determine if different types of reappraisal interventions (psychoeducation vs. practice of skill) affect participants' responses to stress and perceptions of positive affect.

Negative Affect. Using a 2 (Intervention) X 4 (Time) Factorial ANOVAs, I evaluated whether changes in negative affect scores were impacted by time and intervention. Although analyses revealed a statistically significant main effect for time, no main effect was found for intervention. Furthermore, there was non-significant interaction effect, suggesting that the arousal reappraisal intervention did not impact negative affect scores at any time point during the study when compared to the control intervention.

One explanation for the lack of interaction effect is that participants were not effectively able to utilize cognitive resources to reappraise physiological arousal. Specifically, stress depletes cognitive resources (Tugade & Fredrickson, 2006), which increases difficulties engaging in cognitive change techniques. Further, suffering from fatigue effects may have led to increases in depleted mental energy. The study employed 4 time periods of survey assessment, consisting of three measures each time. I noticed visual frustration and participants expressed audible frustration at the repeated survey measurements. It is feasible that participants became overburdened by measurement procedures, especially when trying to prepare for a speech and concentrate on reappraising their physiological arousal. Overall, participants' observed frustration and mental energy may have impacted their ability to successfully benefit from the reappraisal task and minimize their experience with negative affect. If re-examined in the future, one way to overcome this obstacle would be to condense the study's procedures. Specifically, eliminating Time 3 measurement after the intervention may allow participants to allocate mental resources on reappraisal instead of survey measurement, while also minimizing fatigue effects prior to the speech task.

Interestingly, there was an overall lack of variability in affect. The lack of differences in affective states across time periods was a little concerning. Overall, I expected more variability as stress and cognitive interventions substantially influence different emotion-based outcomes in the literature. To explain the lack of affective variability, I theorize that the PANAS may be limited in scope. Specifically,

the PANAS only measures 20 affective domains, which is a relatively small number given the scope of emotions individuals experience in response to stress. For instance, emotions like hope, insecurity, shame, and excitement are not measured in the PANAS, but may be important in understanding how individuals experienced the different tasks within the study. Moving forward, researchers should use more comprehensive measures of affective states, such as those noted in the Modified Differential Emotions Scale (Fredrickson, Tugade, Waugh, & Larkin, 2003), in answering this study's questions.

Context Specific Self-Efficacy. I ran a 2 Intervention (Arousal Reappraisal, Control) X 4 Time (Time1, Time 2, Time 3, Time 4) Factorial ANOVA to determine changes in self-efficacy scores by intervention and across time. While analyses revealed a statistically significant main effect for time, no main effect was found for intervention. Furthermore, there was a non-significant interaction effect, suggesting that participants in the arousal reappraisal did not differ from the control group participants in self-efficacy scores at different time points.

Overall, these findings are largely inconsistent with the prevailing literature, which suggests that arousal reappraisal interventions offset the debilitative effects of stress and bring about more positive outcomes (Beltzer et al., 2014; Jamieson et al., 2010). A major reason for these inconsistent findings is due to the small sample size of the study. When evaluating the findings, it is possible that lack of power from the small sample size may have negatively affected my ability to detect meaningful differences through the analyses. It is quite possible that differences in intervention groups existed at moderate or low effect sizes, however, because of low sample size my analyses were not able to pick up on these differences. Furthermore, there were numerous no-shows and multiple participants were dropped due to validity concerns, which negatively affected the overarching power of the study. Interestingly, although statistically non- significant, it is worth noting that arousal reappraisal group data were trending in the expected direction in comparison to control group data. Moving forward, it will be important for future studies to utilize a larger sample size in order to increase the possibility of finding moderate and small effect sizes.

Context Specific Self-Efficacy Measure

One unique feature of this study was the use of an adapted New General Self-Efficacy scale (NGSE). In designing the study, there was a shortage of psychometrically sound measures to assess for specific self-efficacy in performing speech-related tasks. Because contextual self-efficacy is a better indicator for different well-being outcomes compared to general index measures (Bandura, 1977), I adapted the General Self-Efficacy scale to assess for context specific state self-efficacy. To establish adequate psychometric properties, I ran a principal components factor analysis. Results revealed a stable, one-factor structure, accounting for over 50% of the variance in the latent construct, indicating solid factorial validity, especially considering the low sample size. Additionally, it was found that baseline reports of this measure were positively correlated to baseline reports of positive affect, which provides some convergent validity for the measure.

Based on these findings, the NGSE-A scale appeared appropriate to utilize in the study. Nevertheless, it will be important to further evaluate this measure by investigating its adequacy for use in different settings and contexts. For example, this scale measured scores from a speech task stemming from a social stressor. It may be beneficial to examine this scale in non-stress-based speech tasks. Additionally, future research needs to evaluate more comprehensive dimensionality and reliability estimates of the measure among the factor level items using larger sample sizes. In line with this, the scale may benefit from additional items, contributing to more comprehensive measurement, capturing key items underlying self-efficacy geared toward giving a speech.

Clinical Implications

The arousal reappraisal intervention advocates for the inclusion of reappraising elevated arousal states into programs aimed at helping individuals thrive during challenging exercises, engagements, or social tasks. However, the current study's findings indicate further evaluation is needed to determine if arousal reappraisal is an important mechanism to bolster well-being. In the current study, an arousal reappraisal intervention did not increase positive affect, decrease negative affect, or increase self-efficacy in a stressful context. Future researchers and clinicians should be cautious of utilizing arousal reappraisal

interventions to improve well-being. Before arousal reappraisal interventions can be applied as a practical approach to increase well-being outcomes like affect and self-efficacy, more concrete data needs to be evaluated and confirmed. Specifically, future research should utilize the intervention prior to the stressful task, condense the study's procedures to reduce cognitive overload, increase power through sample size, and ultimately generate more experimental evidence to fill gaps in the stress and well-being literature between these constructs.

Limitations

The current study included additional limitations worth noting. One issue encountered during the study included a large number of participants ($n = 17$) failing to show up for their scheduled appointment. These no-show individuals were recruited primarily through SONA and it is unknown whether participants who did not show were systematically different than those who participated. Specifically, it is unknown if these potential differences may have affected the findings of the study. Importantly, future research should consider creative methods of increasing participant attendance. Another limitation was a lack of demographic diversity. For example, 80% of the participants were cisgender women and 15% were cisgender men. African American/Black and White/Caucasian participants consisted of 85% of the sample. It is important that future studies re-examine this procedure with more diverse samples, including participants who identify as gender, sexual, and other ethnic minorities (e.g., Latinx, Asian American, Native Americans). Furthermore, most participants were younger, averaging 19.53 years in age. As the arousal reappraisal intervention for this study included use of general cognitive reappraisal skills, it may be beneficial to re-examine the study design with participants that have more developed brain structures (i.e., pre-frontal cortex) and cognitive abilities (i.e., flexible thinking). It is also important to note data for this study relied mostly on self-perception and self-report surveys. Self-reports are prone to demand characteristics and social desirability concerns. In order to validate the study's findings, it would be beneficial for future studies to utilize behavioral measures of affective states and self-efficacy.

COVID-19 Pandemic. The COVID-19 pandemic directly impacted a loss of power. Specifically, the pandemic negatively affected recruitment and reduced the number of participants, weakening optimal

ability to detect small, moderate, and large effect. Instead of collecting data from 100 individuals, I was only able to collect serviceable data from 40 participants. Detection of moderate and small effect sizes was negatively impacted by low sample size, which in turn led to low power. In addition, the pandemic required atypical procedures (e.g., masks, sanitation) for the safety of the participants and the researcher. For instance, it is unknown how mask wearing throughout the study affected the potential to detect significant findings. It will be important to re-examine whether data collected during this study is more sensitive to individual COVID-19 attitudes, beliefs, and anxieties compared to non-pandemic procedures. For example, pandemic-related anxiety may have impacted cognitive resources during individuals' participation. Furthermore, related anxiety may have increased reluctance to fully participate in the study. This may have led to higher distractibility and added frustration, which, in turn, may have made it more difficult for participants to fully attenuate to the reappraisal intervention and survey measurements. Overall, the COVID-19 protocols, fears, and corresponding attitudes may have interfered with the ability to detect significant results and to fully explore the effectiveness of the arousal reappraisal intervention in the context of this study.

General Conclusions

The current study revealed a few interesting findings to advise future work in the stress and well-being area. First, I was able to induce stress using an adapted version of the Trier Social Stress Task. However, the arousal reappraisal intervention did not have a significant effect on affect or self-efficacy outcomes across time. Future studies examining stress and well-being should utilize different stress manipulations and behavioral measures to better examine this relationship. Additionally, more research on arousal reappraisal is needed before acknowledging the practical use of arousal reappraisal interventions on stressful contexts. Analysis on arousal reappraisal did not determine any significant interactions on positive affect, negative affect, or self-efficacy across time conditions or in comparison to control groups. Although these findings did not support the expected outcomes, they provide insight on future research directions involving stress, positive affect, negative affect, and self-efficacy.

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APPENDIX A

STRESS INDUCTION TASK

Stress Induction Task: Please read the response below directly to the participant.

> "We would now like to ask you to participate in a verbal task. Please mentally prepare yourself to give a three minute speech on a to-be-determined topic. Your speech may be video recorded. Your recorded speech may be shown to peers in another study for evaluation. I am going to leave the room for a few minutes to prepare the video recording equipment and get the topic of your speech. While I am away please prepare yourself mentally to give a three minute speech. When I return, I will give you the topic of the speech you are to give."

After giving these instructions, the research assistant will leave the room for approximately 2 minutes. When the research assistant returns to the participant, he/she will give the participant the following instructions:

> "I have identified the chosen topic for your speech. I would like for you to discuss "Why you are an attractive person" in your speech. I am going to give you a few more minutes to collect your thoughts. I am going to leave the room to complete a few more things. While I am away, please think about your attractive qualities and how you can incorporate them in a three minute speech. When I come back I will give you the go-ahead to give your speech. When you give your speech, please look into the camera and speak very clearly about why you are an attractive person. Again, I will let you know when to begin when I come back."

The research administer will leave for 2 minutes When the two minutes are up the research assistant will enter the room and use the following prompt.

> "Before giving your speech, please answer one survey question."

After the participant responds to the survey question, please relay the following info:

> "Okay, given certain time constraints, we have decided to discontinue the speech. We will no longer ask you to give the speech. Please stay seated and we will proceed to the next task shortly."

APPENDIX B

DEBRIEFING EXERCISE

Instructions: I am going to ask you to complete one last exercise. It should take only five minutes to complete.

Prompt: Just take a second to settle comfortably into your chair and let your eyes shut. Just continue to follow the sound of my voice, and if you find your mind drifting, simply notice it, and then come back to the sound of my voice. Now what I'd like you to do is let your mind trace the steps it took you to get here today.

Picture that process... getting up this morning... the routine of getting ready. Try to notice it like you're watching a movie of yourself. Maybe you had plenty of time to do the things you had to do today, maybe you were in a hurry. See if you can remember your thoughts and concerns as you were preparing to get here today... All the things during the day that you need to do.

Now, sort of push forward in time as you move closer to getting here. See if you can remember what your body felt like when you got here... recall the places you passed, people you saw... just let them all tick through your mind one by one as you imagine passing them by.

And now, picture yourself arriving here... at this lab. Gently watch the interactions you had with others as you participated in the study. Just notice each one. And then finally notice settling into where you find yourself, right now. And what I'd like you to do now is see if you can imagine that all of the strands of activity that brought you here today are like some kind of colorful fibers connected to you.

Just imagine that these strands of activity that brought you to this moment gently begin to drop away with each inflow and outflow of your breath. Just breathe... and let yourself continue to notice those colorful strands dropping off slowly, until it's just you sitting here right now.

Let yourself become aware of your body and your breath. And drawing your attention to your breath, take three very gentle, full breaths... Trying to notice each small detail of breathing... And when you are ready, slowly return your awareness to the room, and open your eyes.