Exploring Relationships between Coping Styles, Alexithymia, and Cardiovascular Emotional Dampening

by

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ABSTRACT

The current study explored potential relationships between three coping styles (problem-focused coping, emotion-approach coping, and emotion-avoidant coping) and two psychological constructs dubbed alexithymia and cardiovascular emotional dampening. Resting blood pressure was collected from twenty-five healthy, normotensive adult college students along with surveys administered to measure alexithymia and levels of usage of the three coping styles. Results showed there was one significant negative correlation between problem-focused coping and alexithymia symptoms, possibly indicating an inverse relationship between alexithymia and problem-focused coping. No other significant correlations related to the hypotheses were found. However, this study was underpowered due to the small sample size, and the results should be considered with the likelihood of a false discovery in mind. Implications of the study are discussed as well as limitations and directions for future research.

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LIST OF ABBREVIATIONS

BP	Blood Pressure
CED	Cardiovascular Emotional Dampening
CSI	Coping Strategy Indicator
FM	Fibromyalgia
IBD	Inflammatory Bowel Disease
M-C C	Marlowe-Crowne Social Desirability Scale Short Form C
MS	Multiple Sclerosis
MTSU	Middle Tennessee State University
TAS-20	Toronto Alexithymia Scale

CHAPTER I: INTRODUCTION

Coping is a key factor in human functioning, allowing one to adapt to their environment and live to see another day, yet so many individuals cope using less than desirable methods. Whether it is escaping reality through video games for days on end, finding pleasure at the end of an empty bottle of alcohol, or exercising to complete exhaustion, there are multiple maladaptive ways to cope with the stress of life. Given the importance of coping, learning how to use adaptive coping strategies is necessary to navigate the trials of life without suffering the consequences of maladaptive coping strategies. However, there are factors that can interfere with one's ability to utilize appropriate coping strategies. As such, alexithymia is one factor found to influence one's selection of coping strategies (Di Tella et al., 2018; Martino et al., 2023; Taskin Yilmaz et al., 2023). Alexithymia is a multidimensional personality construct characterized by (a) difficulty in identifying and describing emotions, (b) difficulty in distinguishing between feelings and bodily sensations resulting from emotional arousal, (c) restricted imagination or fantasy life, and (d) a cognitive style that is externally-oriented (Besharat, 2010; Di Tella et al., 2024; Luminet et al., 2021; Pinna et al., 2020). Alexithymia is prevalent across multiple mental disorders and chronic illnesses (López-Muñoz & Pérez-Fernández, 2020; Saariaho et al., 2016; Tominaga et al., 2013), which brings about concern in regard to coping strategies in individuals with these conditions. Further, there is a psychophysiological construct known as cardiovascular emotional dampening (CED) that exhibits similarities to alexithymia, namely its influence on emotion recognition and emotion processing. CED is a psychophysiological phenomenon characterized by elevated and sustained

resting blood pressure (BP) and reduced affective responding (Loveless et al., 2023; McCubbin et al., 2011, 2014; Pury et al., 2004). However, at the time of writing, the literature on CED is scarce in comparison to alexithymia, yet it has been demonstrated to be an independent phenomenon. Given these constructs' influences on aspects of emotional functioning and the importance of emotion recognition and processing in coping, it is imperative that these concepts be studied together in order to determine what influence, if any, is there on coping strategies in individuals high in alexithymia versus those high in CED.

Coping and Coping Styles

Before diving into the hypotheses, each of these variables must be clearly defined. Firstly, coping is one's utilization of behaviors, thoughts, and emotions to manage internal and external stressors (Algorani & Gupta, 2023; Nielsen & Knardahl, 2014). There are numerous ways one may cope with their environment or in demanding situations. Subsequently, coping styles are one's patterned methodologies of coping with stressors and stressful situations; methodologies/styles include problem-focused strategies and emotion-focused strategies (Lazarus & Folkman, 1984). Coping styles are generally flexible and individuals can use different styles for various situations. Furthermore, there are certain types of coping strategies within the styles that are considered maladaptive, e.g., avoidance, emotional suppression, and disengagement (Algorani & Gupta, 2023; Nielson & Knardahl, 2014). In a sense, one's coping style can be beneficial or harmful depending on what style of coping is used and if it is maladaptive in general or inadequate for the situation in which the individual finds themselves.

The research literature on coping has made significant advances since the Lazarus and Folkman (1984) publication on stress and coping. Modern approaches to coping focus more on problem-focused and emotion-focused coping (Aldwin et al., 2018; Algorani & Gupta, 2023; Carver & Connor-Smith, 2010). With respect to the current literature on coping, there are other distinctions and groupings defined in the literature. Such groupings include engagement and disengagement, proactive and reactive, accommodative and meaning-focused, active and avoidant, and adaptive and maladaptive (Bernard, 2014; Carver & Connor-Smith, 2010; Nielson & Knardahl, 2014). With a lack of an agreed upon set of distinctions to use to describe coping (Guadalupe & DeShong, 2025), this results in difficulty defining and measuring coping styles when there are multiple orientations actively utilized in the literature. Nevertheless, this study utilizes the problem-focused and emotion-focused coping distinction given the extensive amount of research on these coping styles and how prevalent this distinction is used in the coping literature (Aldwin et al., 2018; Carver & Connor-Smith, 2010; Guadalupe & DeShong, 2025). Additionally, the high prevalence of the problem-focused and emotion-focused coping distinction allows for the utilization of a reliable and valid coping measurement that aligns with this distinction, such as the Coping Strategy Indicator (Amirkhan, 1990, 1994).

Emotion-focused and Problem-focused Strategies

Emotion-focused and problem-focused coping was first coined by Lazarus and Folkman in their 1984 publication *Stress, Appraisal, and Coping*. In this publication, Lazarus and Folkman (1984) defined emotion-focused coping as, "...cognitive processes directed at lessening emotional distress and includes strategies such as avoidance, minimization,

distancing, selective attention, positive comparison, and wresting positive value from negative events," (pg. 150). In essence, the goal of emotion-focused coping can be described as decreasing distress through cognitive means. Subsequently, emotion-focused coping can be broken down into two forms: emotion-approach strategies and emotion-avoidant strategies. Emotion-approach strategies can be described as strategies involving intentional processing and expression of emotions in relation to a stressor (Hoyt et al., 2024). These strategies can be beneficial depending on the individual and their circumstances. Examples of emotion-approach strategies comprise of but are not limited to positive reframing, seeking social support, emotional processing, and emotional expression (Bernard, 2014; Hoyt et al., 2024).

On the other hand, emotion-avoidant strategies are generally maladaptive in any situation. They can be described as strategies that involve emotional and/or mental disengagement from a stressor (Livneh, 2019). Examples of emotion-avoidant strategies include but are not limited to distancing, wishful thinking, social isolation, and distraction (Livneh, 2019). However, both emotion-approach and emotion-avoidant strategies can be used maladaptively (or wrongfully) in situations where problem-focused coping is the most beneficial coping strategy. Regarding problem-focused coping, Lazarus and Folkman (1984) stated that, “Problem-focused coping strategies are similar to strategies used for problem solving. As such, problem-focused efforts are often directed at defining the problem, generating alternative solutions, weighting the alternatives in terms of their costs and benefits, choosing among them, and acting," (pg. 152). Essentially, the goal of problem-focused coping is to decrease distress through action directed at the stressor.

Given the emotion-focused vs. problem-focused approach, emotion-focused coping strategies would hypothetically be influenced by the individuals' range of emotions, which is restricted in individuals with alexithymia and CED. Specifically, emotion-focused strategies that utilize emotion recognition and/or emotion processing would hypothetically be affected by these constructs. On the contrary, it is possible that problem-focused coping strategies would be less likely to be deficient in individuals with a restricted range of emotions. However, that would depend on if the specific problem-focused coping strategy involves the utilization of emotion recognition and/or emotion processing or not. Thus, multiple, specific coping strategies across each of the defined coping strategy groups may be affected by emotional range restriction, but it is more likely that the emotion-focused coping strategies would be more affected compared to problem-focused coping strategies.

Furthermore, if an individual has repeated experiences of emotional range restriction, it is possible that the individual alters their coping strategies. This alteration could lead to more utilization of emotion-avoidant strategies over emotion-approach strategies. Additionally, the individual repeatedly experiencing emotional range restriction could utilize more problem-focused coping strategies that do not involve emotion recognition or emotion processing, potentially engaging in maladaptive coping strategies to compensate for the lack of coping strategies requiring emotion recognition and/or emotion processing. Further, it is important to note that while emotion-focused and problem-focused coping styles are often described separately, they can work interrelatedly, facilitating one another (Carver & Connor-Smith, 2010). This indicates that individuals can utilize one or the other in different situations. Thus,

supporting the idea that coping is flexible and individuals can utilize a mixture of coping styles in different situations.

Gender and Sex Differences in Coping

Another aspect of coping strategies involves gender and sex differences, in which there are some important distinctions between genders and between sexes. One meta-analysis on sex differences in coping behavior revealed a number of differences between coping behaviors in males and females (Tamres et al., 2002). Researchers found that biological women were more likely to use more coping strategies across a variety of behaviors in comparison to biological men (Tamres et al., 2002). They also found that biological women were more likely than biological men to seek emotional support, to ruminate, and to utilize positive self-talk across a variety of stressors (Tamres et al., 2002). Contrary to Western cultural belief, they found no evidence to support the notion that biological men utilize problem-focused coping more than biological women for any stressor, busting the myth that biological men tend to use problem-focused coping more than emotion-focused coping (Tamres et al., 2002). Furthermore, the authors found that biological men were more likely to use avoidance and ventilation when coping with relationship stressors in comparison to biological women (Tamres et al., 2002). However, it is important to note that the meta-analysis by Tamres et al. (2002) is older in the context of research, thus a newer meta-analysis on coping behaviors between genders and sexes is needed. Despite this limitation, some of the evidence presented by these researchers has been recently demonstrated to occur in men and women, as defined by gender. In a 2019 study, researchers found that there was no significant difference between male and

female participants, as defined by gender, in utilization of problem-focused coping within a Chinese cohort (Chen & Sun, 2019). However, problem-focused coping was found to moderate the relationship between depression and cumulative risk for male participants only (Chen & Sun, 2019); cumulative risk was defined as incorporating multiple risk factors, specifically health pressure, family economic pressure, love and marriage problems, conflicts among family members, work stress, and friend support (Chen & Sun, 2019). Nevertheless, these research articles support the notion that there is no general difference in utilization of problem-focused coping between biological men and biological women.

Despite one myth being busted, recent research supports the idea that men do not utilize the emotion-focused coping strategy 'sharing of emotions' as much as women do. Liddon et al. (2018) found in a U.K. cohort that men (classified by gender) differed from women (also classified by gender) in regard to coping with stress as men focus less on the sharing of emotions compared to women. Cultural factors may play a part into why men do not share their emotions as a way of coping as much as women do. One could hypothesize that alexithymia may be a factor, as well, as males have been historically found to be more alexithymic than females (Levant et al., 2009). In addition to this difference, Liddon et al. (2018) found that women were more likely to comfort eat and utilize prescription medication to cope than men. Alternatively, men were more likely to engage in sex, utilize pornography, and play video games in comparison to women as methods of coping (Liddon et al., 2018). Interestingly, these coping strategies fall into different categories of action and types of coping, but both genders appear to be seeking to increase dopaminergic activation, implying that regardless of gender, a

common method for coping with stressors is seeking out dopaminergic activities. Overall, there are several differences between men and women, whether defined by sex or gender, in regard to coping strategies, but both ultimately seek out the same end goal of coping with their stressors.

Alexithymia

The alexithymia construct has been researched intensively, with research extending back to the 1940s, and the term "alexithymia" was coined in the 1970s by Peter Emanuel Sifneos (López-Muñoz & Pérez-Fernández, 2020). Over the past five decades, many researchers have studied the aforementioned construct, leading the field to the present day with many studies on it within the research literature. Alexithymia has been shown to co-occur in a variety of psychological disorders and medical conditions. Exemplars of psychological disorders include psychosomatic disorders, especially Somatoform Disorder, panic attacks and Panic Disorder, depressive disorders, anxiety disorders, Autism Spectrum Disorder, substance use disorders, and eating disorders (Bernard, 2014; López-Muñoz & Pérez-Fernández, 2020; Meza-Concha et al., 2017; Ryan et al., 2021; Tominaga et al., 2013); and exemplars of medical conditions comprise of Fibromyalgia, Multiple Sclerosis, Parkinson's Disease, and several chronic pain syndromes such as Myofascial pain, Chronic Low Back pain, and Migraines (Di Tella et al., 2018; Saariaho et al., 2016; Sonkaya & Ceylan, 2019; Taskin Yilmaz et al., 2023). As such, previous research has found that alexithymia is a noteworthy factor of treatment resistance in psychotherapeutic, but also with evidence that it may influence the affect of psychopharmacological treatments (Pinna et al., 2020). This presents an issue for those with

alexithymia and a co-occurring psychological disorder as there is evidence that not only can it lessen the effect of psychotherapy but may also lessen the effect of psychopharmaceutical treatment. However, there is a lack of conceptualization on how alexithymia could effect psychopharmaceutical treatments. Despite this, one could imply that those with alexithymia and a co-occurring medical condition may face treatment resistance, as well, given the evidence pointing towards resistance to psychopharmaceutical treatment. This implication may be supported by previous research on individuals with chronic pain as alexithymic chronic pain patients reported more pain intensity and disability compared to non-alexithymic patients at an eight-year follow-up (Saariaho et al., 2016).

Furthermore, previous research has presented evidence of associations between alexithymia and multiple functional issues in various parts of the brain. For instance, "[Toronto Alexithymia Scale] TAS-20 scores were found to be higher in patients with [Idiopathic Parkinson Disease] whose UPDRS III scores were higher than 30 ($p < 0.05$)," the UPDRS III being "an examiner rating of motor manifestations of [Parkinson Disease]," (Sonkaya & Ceylan, 2019). The authors speculate this may be due to "a lack of communication between the hemispheres and frontal lobe dysfunctions" as mentioned in previous studies (Sonkaya & Ceylan, 2019). To support this finding, dysfunction in bidirectional interhemispheric communication has been correlated with alexithymia in a previous study (Meza-Concha et al., 2017). Thus, the corpus callosum, the part of the brain responsible for interhemispheric communication, is a crucial area to take account of when looking at dysfunction in the brain in relation to alexithymia. In addition to the corpus callosum, the amygdala has been implicated as previous studies found

hypoactivity during emotional activation in those with alexithymia (Meza-Concha et al., 2017). Important to note, the amygdala is a part of the limbic system and contributes to emotional processing. Moreover, previous research has implicated the limbic system as a whole in dysfunction related to alexithymia. A systemic review of the relationship between social cognition and alexithymia revealed that the current evidence within the literature points towards alexithymic individuals exhibiting reduced activation in the limbic areas of the brain and the prefrontal cortex, which are involved in social cognition (Di Tella et al., 2024). Overall, multiple areas of the brain have shown several types of dysfunction in individuals with alexithymia, potentially supporting the aforementioned studies that implicate alexithymia as negatively influencing psychological disorders and medical conditions.

Gender Differences in Alexithymia

Previous studies have found differences in male and female participants, as defined by gender. The first published meta-analysis exploring gender differences in alexithymia found that compared to women, on average, men scored higher on measures of alexithymia in clinical and nonclinical samples and across several measures of alexithymia (Levant et al., 2009). However, a second meta-analysis on gender differences in alexithymia published in 2024 found evidence that adds an asterisk to the findings of the first meta-analysis. Mendia et al. (2024) found interesting evidence not only between genders, but also between age groups and cultures. Their findings revealed a small magnitude of gender differences in alexithymics and that gender differences have remained relatively constant across time (Mendia et al., 2024). Further, they discussed possible etiological reasons for their findings, citing that differences in

emotional expression and identification between genders have not shifted despite progress towards egalitarianism in some societies (Mendia et al., 2024). Given cultural influences, Mendia et al. (2024) concluded that their results substantiate the proposition that alexithymia is associated with cultures that encourage low emotional expression and self-control for both genders and does not accentuate the identification and communication of emotion.

Additionally, other studies have findings that support the notion of men being more alexithymic on average compared to women. Males were found to be more alexithymic in a longitudinal study of chronic pain patients conducted by Saariaho et al. (2016). Furthermore, Nam et al. (2020) found evidence to suggest that alexithymic males perform worse on emotion-recognition tasks such as the RMET compared to alexithymic females. However, it is important to note that other studies did not find evidence of gender differences in relation to alexithymia (Bernard, 2014; Casagrande et al., 2019; Fantini-Hauwel et al., 2011). Overall, despite the mixed findings across publications, two meta-analyses conducted in the 21st century confirm a small magnitude of differences between genders in regard to the alexithymia construct. Therefore, gender must be considered when studying alexithymia.

Cardiovascular Emotional Dampening

Cardiovascular emotional dampening was coined by McCubbin et al. (2011) as a term to explain the inverse relationship between elevated resting BP and reduced emotional response. Multiple studies have explored this phenomenon and have associated blood pressure-related emotional dampening to reduced emotional responsivity (Delgado et al., 2014; Pury et al., 2004), reduced emotion recognition in auditory and visual modalities (Shukla et al., 2019;

Shukla & Pandey, 2024), reduced cognitive empathy (Loveless et al., 2023), increased risk-taking behavior (Loveless et al., 2018; McCubbin et al., 2018, 2020), increased pain analgesia (Bruehl & Chung, 2004; McCubbin et al., 2006), and decreased sensitivity to social pain (Inagaki et al., 2018). CED currently does not have a substantive amount of research literature behind it, thus making it an obscure topic. However, given its similarity in outcome in comparison to alexithymia, it should be further studied to compare and contrast it to alexithymia.

Despite CED's similarities to alexithymia, there are crucial differences between the two constructs. The overt difference of CED in comparison to alexithymia is the involvement of the cardiovascular system and the co-occurrence of high resting BP with reduced affective responding. Previous studies have postulated that emotional dampening may lead to complications in interpersonal relationships that may result in repetitive activation of the Sympathetic Nervous System (SNS) in response to said stressor, which may lead to the development of hypertension (McCubbin et al., 2014, 2018; Shukla & Pandey, 2024). Likewise, hypertension is a notorious factor in the development of cardiovascular disease (CVD) and accounts for more CVD-related deaths as compared to other risk factors that are modifiable (Moiz et al., 2024). Needless to say, it is imperative that research on CED continues in order to reduce the chances of the development of hypertension and to increase affective responding in those with this psychophysiological phenomenon.

Further, previous research on CED has speculated the involvement of Neurovisceral Integration, a model posited by Thayer and Lane (2000) that focuses on emotion regulation and dysregulation. The Neurovisceral Integration (NVI) model combines the affective, autonomic,

and attentional systems into a structural and functional network to explain emotion regulation and dysregulation from a neurological perspective (Thayer & Lane, 2000). Although NVI was originally used to explain over-emotionality, as seen in anxiety disorders, it can apply to under-emotionality, as well. In the case of CED, NVI is theorized to explain how efferent (brain to body) signaling is regulated by afferent (body to brain) inhibitory baroreceptor signaling in addition to potential altered functioning in the central autonomic network (CAN), which is responsible for receiving and incorporating visceral, humoral, and environmental information as well as coordinating autonomic, behavioral, and endocrine responses (Loveless et al., 2023; Thayer & Lane, 2000). A key player in this model is the baroreceptor, which is a specialized interoceptor responsible for relaying sensory information regarding BP to the brain via two cranial nerves, the Vagus nerve and the Glossopharyngeal nerve (Inagaki et al., 2018). The baroreceptor's significance in NVI lies in its ability to relay feedback about BP continuously to the central nervous system (CNS), where this information is used to maintain homeostasis of BP (Inagaki et al., 2018). Given the task baroreceptors are responsible for, it is likely that dysfunction in baroreceptor signaling could lead to complications in affective and pain processing as a result of a cascade of issues from said dysfunction. Continued dysfunction of the baroreceptors could lead to a baseline increase in resting BP, which could lead to the development of hypertension.

Additionally, sensory modalities in relation to emotion recognition have been explored with interesting findings. Shukla et al. (2019) observed reduced emotion recognition of visual and auditory emotional stimuli in those with elevated BP in comparison to those with low BP.

Further, Shukla and Pandey (2024) found that those who were hypertensive and prehypertensive have poorer accuracy compared to normotensives in emotion recognition related to implicit auditory information. These findings imply that those with higher resting BP are likely to experience a reduction in emotion recognition of both visual and auditory stimuli, including implicit emotional auditory information. This information further supports the emotional-dampening construct via promoting the reduction of affective responding.

Given the aforementioned evidence, there is evidence of a cascade in the emotional dampening construct that could lead to an increased risk of cardiovascular disease. This cascade begins with the initial stage of sustained elevation in resting BP that is associated with CED. This sustained elevation in resting BP is what leads this phenomenon, which is why previous research utilized resting BP as a measurement of CED (Loveless et al., 2023). Thus, there is an influence on the ability to consciously detect affective stressors. As such, if emotions are adaptive responses to stressors, and sustained elevated BP dampens emotional responsivity, a positive feedback loop forms (Loveless et al., 2023). This positive feedback loop is perpetuated by stressors leading to elevations in BP, leading to reductions in emotional responsivity. See Figure 1 for a visual representation of the cascade. The context in which the cascade is likely to occur is within interpersonal relationships, likely contributing to and possibly representing increased ambivalence in interpersonal relationships (Loveless et al., 2023). Therefore, the emotional-dampening cascade may contribute to the development of cardiovascular disease and interpersonal dysfunction, however, further study is needed on the cascade in order to determine its influence.

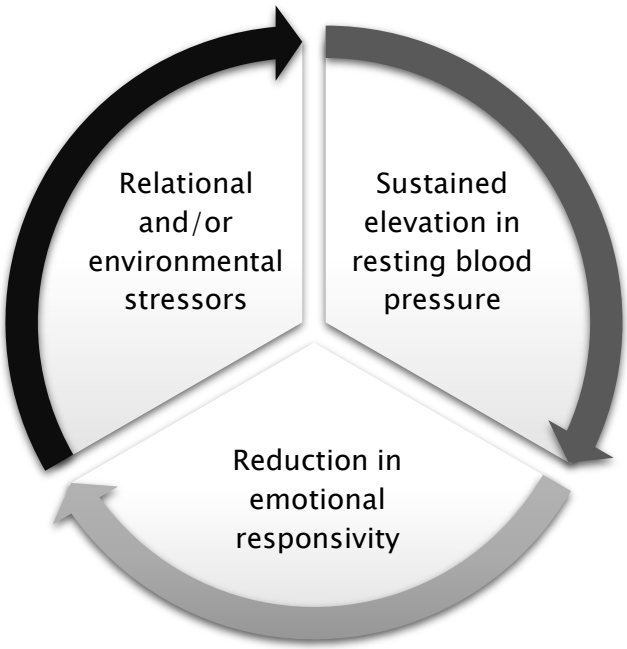

Figure 1

The Cardiovascular Emotional Dampening Cascade

In addition to the implicit interpersonal consequences, the aforementioned link between CED and risk-taking behavior has its consequences. McCubbin et al. (2018) found that those indicated to have signs of CED may have a reduced threat appraisal, thus leading to a diminished perception of potential harm. Combined with the CED cascade, risk-taking behavior may be a maladaptive coping strategy in order to cope with stressors due to the reduced emotional responsivity possibly interfering with adaptive emotion-focused coping (McCubbin et al., 2018). Further, Loveless et al. (2018) found that those with signs of CED had a higher likelihood of behavioral approach and reward-seeking behaviors. These facets combined with reduced emotional responsivity may lead emotional-dampeners to be more likely to engage in risk-taking behaviors (Loveless et al., 2018). Thus, increased risk-taking behavior associated

with CED may be a compensatory maladaptive coping strategy due to the reduced emotional responsivity in response to stressors.

Gender Differences in Cardiovascular Emotional Dampening

Gender differences in CED have yet to be explored. However, previous research has considered the potential influence of gender differences given the biological differences in men and women, especially in regard to hypertension rates. Bearing in mind the limited number of publications on CED, there is not yet a consensus on whether gender differences are present or not in those exhibiting characteristics of CED. Though, recent studies have found no gender differences in men and women in relation to CED characteristics (Loveless et al., 2023; Shukla & Pandey, 2024). Furthermore, older studies did not find any significant gender differences pertaining to the CED construct (McCubbin et al., 2011, 2018). However, these findings do not deny the possibility of gender differences as the current amount of research articles on the CED construct is limited. Thus, further research on gender differences in CED is needed.

Alexithymia versus Cardiovascular Emotional Dampening

As previously discussed, alexithymia and CED are similar in respect to their negative relation with emotion recognition and processing. Alexithymia's deficits are often defined as difficulties in identifying and describing emotions. Similarly, CED's deficits include reduced affective responding with elevated and sustained resting BP and reduced emotion recognition in auditory and visual sensual modalities. Both constructs are negatively correlated with emotion recognition and processing, but not exactly in the same manner, akin to how Social Anxiety Disorder and Agoraphobia are both anxiety disorders related to intense anxiety in social

situations but have differing cognitions, symptomology, and presentations (American Psychiatric Association, 2022). Further, both constructs exhibit dysfunction in relation to physiological experiences. Alexithymics have difficulty in differentiating between bodily sensations related to emotional arousal and feelings. While increased pain analgesia and decreased sensitivity to social pain have been associated with emotional-dampeners. Notably, while both constructs have dysfunctional physiological experiences, their experiences are significantly different from each other. Alexithymics are more likely to present with somatization while emotional-dampeners present with a decreased experience of physical and social pain.

Further, given the relationship between affective responding and BP in CED, it is important to distinguish its relationship from any correlations between alexithymia and BP. With respect to the current literature on alexithymia, there have been previous studies on the association of alexithymia and hypertension with findings correlating alexithymia to hypertensive individuals (Casagrande et al., 2019; Piotrowska-Półrolnik et al., 2019). However, CED is observed in normotensive and prehypertensive populations in addition to hypertensive populations (Loveless et al., 2023; Pury et al., 2004). Thus, CED can be observed outside of hypertensive individuals, further differentiating it from alexithymia. In addition, there are other defining variables to these two constructs. An externally-oriented cognitive style is a key part of alexithymia, demonstrating that alexithymics are more focused on external information rather than internal emotional cues (Luminet et al., 2021). Also unique to alexithymics is a restricted imagination or impoverished fantasy life, although not emphasized in recent studies

(Bernard, 2014). Regarding additional CED variables, increased risk-taking behavior has been found to be associated with CED along with reduced cognitive empathy, implying possible relational dysfunctions among those with symptoms of CED.

Furthermore, due to the variables associated with these constructs, there is the possibility of interpersonal dysfunction among both alexithymics and emotional-dampeners. For alexithymics, interpersonal issues could be the result of individuals ignoring emotional signals during communication (Lee, 2023). Similarly, emotional-dampeners may experience a deficit in cognitive empathy given that reduced emotion recognition would likely affect cognitive processes involved in cognitive empathy (Loveless et al., 2023). Moreover, both constructs are associated with medical conditions, namely hypertension for CED and alexithymia. As previously discussed, alexithymia has been found in individuals amongst a variety of chronic health conditions. Likewise, CED is hypothesized to lead to the development of other cardiovascular diseases given its relationship with hypertension. Regarding mental health, since both constructs negatively covary with emotion recognition and processing, it is possible that they interfere in psychotherapies and emotion-focused coping skills that involve emotion recognition and processing. Overall, alexithymia and CED may lead to similar dysfunctions in a general sense but differ in the specifics of the dysfunctions.

Importantly, the current state of the research literature on CED and alexithymia demonstrates a lack of solidified etiology in these constructs. While many previous studies have attempted to pinpoint the etiology of alexithymia, there is no consensus among researchers (López-Muñoz & Pérez-Fernández, 2020). However, it is possible that the etiology of

alexithymia is multifactorial, like many other mental disorders. Similarly, the etiology of CED has yet to be fully explored. In brief, further research on the etiology of both constructs is needed.

Coping in Alexithymia and CED

Coping in those with alexithymia has been studied in conjunction with psychological disorders and medical conditions. However, coping in those with alexithymia alone has rarely been studied. Nevertheless, previous studies have revealed substantial evidence in regard to the interaction between alexithymia and coping strategies. As such, prior research on alexithymia in individuals with chronic medical conditions and their coping skills have emerged with intriguing results. Taskin Yilmaz et al. (2023) found that Multiple Sclerosis (MS) patients were more alexithymic compared to healthy participants. Additionally, MS patients utilized emotion-focused strategies more than problem-focused strategies (Taskin Yilmaz et al., 2023). The specific strategies they used more than healthy participants included lack of self-confidence, a submissive approach, and seeking social support (Taskin Yilmaz et al., 2023). The authors postulated that these coping strategies would lead to further stress, thus exacerbating the symptoms of MS (Taskin Yilmaz et al., 2023). These findings imply that MS patients, who have a higher likelihood of having alexithymia, are likely to lean more toward coping strategies that are less effective for their situation. Another 2023 study observed a similar pattern in patients diagnosed with an Inflammatory Bowel Disease (IBD). Martino et al. (2023) found that two maladaptive coping strategies, turning against objects (externalization of aggressiveness) and avoidance were positively correlated with alexithymia in participants with an IBD. Further, they

also found three adaptive coping strategies, positive attitude, problem solving, and principalization were negatively correlated with alexithymia in the same cohort (Martino et al., 2023). These studies begin to demonstrate a pattern of the utilization of emotion-focused coping strategies that are typically maladaptive and are more common among those high in alexithymia; however, another study that looked at individuals with Fibromyalgia (FM) observed somewhat contrasting results.

A 2018 study on patients with FM had intriguing results regarding the relationship between alexithymia and coping strategies in individuals with chronic medical conditions. Di Tella et al. (2018) had three main findings, of which two were related to coping strategies. First, the TAS-20 subscale External Oriented Thinking was a significant predictor in explaining emotion-focused and problem-focused coping strategies (Di Tella et al., 2018). Second, the authors found that FM patients reported higher scores on problem-focused coping compared to emotion-focused and dysfunctional coping strategies (Di Tella et al., 2018). Thus, MS and IBD patients were found to use emotion-focused strategies more while FM patients were found to use problem-focused strategies more. All three conditions are considered chronic, yet there is a difference in the coping strategies most utilized in each group with alexithymic traits. Given there are differences in treatment for each of these chronic illnesses, it is possible that patients with alexithymia or alexithymic traits are likely to use strategies that are maladaptive to their chronic illness.

Interestingly, the findings from a 2016 study are consistent with the positive relationship between alexithymia and emotion-focused strategies found in the aforementioned studies. Bilotta et al. (2016) conducted two studies across different Western populations. Their first study, within an Italian population, found a significant positive correlation between alexithymia and avoidance coping (emotion-focused coping described as maladaptive in nature; Bilotta et al., 2016). Their second study, within a U.S. population, also found a significant positive correlation between alexithymia and avoidance coping, effectively replicating their first study results in a different population (Bilotta et al., 2016). Further, their conclusion based on their results and other variables studied led to them proposing two pathways leading to the development of alexithymia: 1) it is a reaction to the concept of negative emotionality, and 2) it is an acquired trait resulting from habitual avoidant coping (Bilotta et al., 2016). If the second pathway is further researched and discovered to be an etiological factor leading to the development of alexithymia, it is likely that the aforementioned relationship observed between alexithymia and emotion-focused strategies is more common than the reverse found in the Di Tella et al. (2018) study.

Overall, the utilization of emotion-focused strategies has been found to be more common amongst those high in alexithymia versus the utilization of problem-focused strategies with noted exceptions. At the time of writing, there have been no formal studies on CED and coping strategies published. To our knowledge, this thesis is the first study of its kind to observe coping strategies in individuals who exhibit characteristics of CED.

Purpose of Study and Hypotheses

Previous research has highlighted the importance of studying both alexithymia and CED as both are posited to contribute to complications in mental and social functioning. Likewise, coping strategies are noted to play a significant role in the processing and management of stressors. Despite a plethora of research on coping and alexithymia as separate topics, there is a considerable lack of evidence correlating the two and a significant lack of understanding regarding their relationship. Further, as previously mentioned, there have been no prior studies on coping strategies and CED to our knowledge. Thus, there is a need to study both constructs in relation to coping strategies to determine if they influence one's ability to utilize appropriate coping strategies, and in the context of CED, potentially increase an individual's risk of developing a cardiovascular disease. Given the current literature available, it is possible that coping styles are influenced by alexithymia and potentially CED given their negative relationships with emotion recognition and emotion processing. Aforementioned research on alexithymia and coping styles suggests that there is a trend in those with alexithymia utilizing emotion-avoidant and problem-focused coping strategies more than emotion-approach coping strategies. In contrast, there is no previous research on CED and coping styles, so this study will be to first to explore potential relationships, whether positive or negative, between CED and problem-focused, emotion-approach, and emotion-avoidant coping strategies. Additionally, while alexithymia and CED have corroborating evidence of leading to deficits in emotion recognition and emotion processing, their symptomologies differ. Thus, it is possible that alexithymia and CED have differing correlations in relation to the three coping strategies.

Therefore, the present study aims to answer these questions and will explore multiple hypotheses. First, I hypothesize that alexithymia symptoms, as measured by the TAS-20, will be positively correlated with emotion-avoidant coping and problem-focused coping and will be negatively correlated with emotion-approach coping. Second, I hypothesize that resting blood pressure, utilized for measuring CED, will be related to emotion-approach coping, emotion-avoidant coping, and problem-focused coping. Third, I hypothesize that alexithymia and resting blood pressure will differ when compared in their relations to each coping strategy.

CHAPTER II: METHODS

Participants

A sample of 27 undergraduate student participants (M_{age} = 20.76, SD_{age} = 4.46, MIN_{age} = 18, MAX_{age} = 37) were recruited from the Middle Tennessee State University (MTSU) Department of Psychology's research participant pool and from MTSU psychology courses per course instructors' approval via word of mouth and email. An a priori power analysis conducted using G*Power (Faul et al., 2009) indicated that a sample size of 92 participants would be sufficient to observe medium effects within the study's most sophisticated planned model, given an alpha level of 0.05 and 80% power. However, the sample size was limited despite extensive recruitment efforts.

An eligibility screening for prospective students took place prior to signing consent documentation. Eligible participants met the following requirements: (1) be age 18 or older, (2) be enrolled at MTSU, (3) be able to meet in person in order to participate in the study, and (4) not meet any health exclusionary criteria. The health exclusion criteria includes (1) no individual history of cardiovascular disease (i.e., hypertension, hypotension, postural orthostatic tachycardia syndrome (POTS), vasovagal syncope, or coronary artery disease), (2) no individual history of autoimmune disorders, (3) no individual history of endocrine disorders (i.e., type I and type II diabetes, hypothyroidism, hyperthyroidism, or Addison's disease), (4) no active psychopathological diagnosis, (5) no usage of nicotine or tobacco products in the past 30 days prior to participation, (6) no alcohol consumption 24 hours prior to participation, (7) no recreational or illicit drug usage in the past 30 days prior to participation, and (8) not actively

taking any prescribed pain medications (i.e., codeine, oxycontin, hydrocodone, morphine), antihypertensives (propranolol, clonidine, metoprolol, diuretics), anti-anxiety medications (Ativan, Xanax, Klonopin, Valium), mood stabilizers (Paxil, Zoloft, Celexa, Lithium), ADHD medications (Adderall, Ritalin, Amphetamine Salts), sleep aid medications (Lunesta, Ambien, Trazodone), and anti-psychotic medications (Thorazine, Haldol, Risperdal, Geodon). Participants recruited from research participant pool received six credits for their participation. Participants recruited from a psychology course were not compensated by the researchers but may have been given extra class credit at the discretion of their course instructors.

Of the 27 participants recruited, one was discovered to have been diagnosed with ADHD and was excluded from the final data set. Additionally, one participant was determined to be a significant outlier with respect to their resting blood pressure and was subsequently excluded from the final data set. The final sample included 25 healthy participants. They were all at least age 18 years or older ($M = 20.76$, $SD = 4.456$), primarily assigned female at birth ($N = 17$, 68%), primarily identified race as Caucasian/white ($N = 13$, 52%), and primarily identified ethnicity as not Hispanic or Latino/Latina *(*$N = 16$, 64%). The descriptive frequencies are detailed in Table 1. For the bivariate analyses which were able to be completed, the present usable sample has a power of .99 to detect large effects, .75 to detect medium effects, and .16 to detect small effects.

Table 1

Descriptive Frequencies of Final Sample

Variable	*N*	*% of Total*
Sex at Birth		
Male	8	32%
Female	17	68%
Race		
African American/Black	5	20%
Asian American/Asian	5	20%
Caucasian/White	13	52%
Multiracial	1	4%
Prefer not to say	1	4%
Ethnicity		
Latino/Latina	2	8%
Not Hispanic or Latino/Latina	16	72%
Other/Unknown	6	24%
Prefer not to say	1	4%

Measures

SunTech Oscar 2 Monitor (SunTech Medical Inc, Morrisville, NC)

A SunTech Oscar 2 Monitor was calibrated and utilized for the collection of blood pressure data as a measurement of CED. A total of six measurements of systolic and diastolic blood pressure were collected from participants with 2-minute intervals in between each measurement. An average of the last three measurements was used to calculate participants' average resting systolic and diastolic blood pressure.

Coping Strategy Indicator (CSI; Amirkhan, 1990)

The CSI is used to measure coping in a specific, stress-inducing situation. It is a 33-item self-report questionnaire that utilizes a Likert-scale ranging from 1 (*Not at all*) to 3 (*A lot*). There are three scales included in the measure: Problem-Solving, Seeking Social Support, and Avoidance. Each scale is scored separately by summing the ratings of the items in their respective scales. Higher scores on a scale indicate more usage of the coping style described by the scale. Among a community sample, internal consistency for the CSI scales was found to be high with an alpha of .93 for Seeking Social Support, .89 for Problem Solving, and .84 for Avoidance (Amirkhan, 1990). Test-retest reliability was measured with a student sample, and the alpha coefficients for the CSI scales were .83 and .77 for Problem-Solving, .80 and .86 for Seeking Social Support, and .82 and .79 for Avoidance, all indicating adequate test-retest reliability (Amirkhan, 1990).

Validity was investigated across multiple samples. Construct validity was found to be reliable as the scales aligned with the problem-focused, emotion-approach, and emotion-avoidant coping strategies and were empirically-derived from the data as opposed to imposing a theoretical approach onto them (Amirkhan, 1990). Furthermore, the scales were shown to be highly independent (orthogonality) of each other, further supporting construct validity (Amirkhan, 1990; Clark et al., 1995). Additionally, given the orthogonality of the CSI, high scores on multiple scales may indicate higher degrees of flexibility in coping (Amirkhan, 1990). Regarding convergent validity, CSI's scales were significantly correlated to similarly constructed scales on the Ways of Coping Checklist and the COPE (Amirkhan, 1990; Clark et al., 1995).

Criterion validity was studied following the original 1990 publication in which the CSI was found to have strong criterion validity within laboratory, educational, and therapeutic settings (Amirkhan, 1994). Moreover, Amirkhan designed this measure as a means to measure coping in a specific scenario wherein the examinee is to think of a recent stress-inducing scenario and complete the measure in the context of how they coped with said scenario (Amirkhan, 1990), which is similar to the Ways of Coping Scale-Revised by Folkman and Lazarus (1985). In order to control variability, the CSI was utilized to measure coping styles within a single scenario presented to participants (see Appendix C). The scenario given to participants included the participants in the scenario and detailed them in a college course that became increasingly demanding of their time and effort with the participants having a habit of procrastination, leading to them having a significant project due in two days that was only half complete and was a significant portion of their grade. Participants completed the CSI in response to the given scenario with how they would cope in the given scenario.

Toronto Alexithymia Scale-20 (TAS-20; Bagby, Parker, & Taylor, 1994)

The TAS-20 is the most commonly used measurement of alexithymia within the research literature. It is a 20 item self-report measure that utilizes a Likert-scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores on the scale indicate the possible presence of alexithymia within the examinee. The measurement includes a total score and three subscales scores: Difficulty Identifying Feelings, Difficulty Describing Feelings, and Externally-Oriented Thinking (Bagby et al., 1994). Only the total score was used in this study due to the aim of focusing on the total of alexithymia symptoms. Internal consistency was acceptable with

a Cronbach's alpha of .81 for the total score (Bagby et al., 1994). This value was replicated in a student sample with an alpha coefficient of .80 for the total score (Bagby et al., 1994). Test-retest reliability was also acceptable with an alpha coefficient of .77 over a three-week period (Bagby et al., 1994). This has been supported over the past few decades with evidence shown in an article by Bagby et al. (2020) around 25 years following the original articles on the TAS-20. Bagby et al. (2020) noted that the research literature had demonstrated the internal reliability to be adequate-to-excellent, citing an example of a large Canadian sample to have an alpha coefficient of .86 for the total score. Bagby et al. (2020) noted the test-retest reliability across the literature to average to a Pearson correlation of .74, with studies test-retest time periods ranging from two weeks to eleven years.

Regarding validity, factorial validity was evaluated with a confirmatory factor analysis (CFA) in the original study which found that the three-factor model was the best fit (Bagby et al., 1994). Furthermore, Bagby et al. (2020) found that multiple studies among the alexithymia research literature, including translated versions of the TAS-20, supported the three-factor model. In regard to convergent validity, the TAS-20 was significantly negatively correlated with constructs such as emotional self-awareness, the Openness to Experience (O) domain of the Five-Factor Model (FFM) of personality, (cognitive) empathy, the receptivity to Feelings facet scale of the NEO Personality Inventory (NEO-PI), and perspective taking (Bagby et al., 2020). It was also found to have significant negative correlations with the Perception of Affect Task (PAT; Bagby et al., 2020). Discriminant validity of the TAS-20 has rarely been studied but previous research has found low magnitude or non-significant correlations between the TAS-20 and the

Agreeableness (A) and Conscientiousness (C) domains of the FFM (Bagby et al., 2020). Lastly, the TAS-20 has shown its clinical utility, as such, high scores on the TAS-20 are more likely to be found in patients with eating disorders or functional gastrointestinal disorders (FIGDs) and that said scores were likely to be a strong predictor of recovery status and overall reduction in gastrointestinal symptoms compared to depression (Bagby et al., 2020). Additionally, alexithymia as measured by the TAS-20 has been found to be an independent risk factor for subclinical atherosclerosis (carotid plaques) and hypertension among a large population sample in Germany (Bagby et al., 2020). Thus, the TAS-20 has been found to be a reliable and valid measure of alexithymia since its inception in 1994. Effectively, this scale was utilized to measure levels of alexithymia within participants.

Marlowe-Crowne Social Desirability Scale Short Form C (M-C C; Reynolds, 1982)

The M-C C is used to measure social desirability independent of psychopathology. It is a 13 item self-report measure that utilizes a dichotomous scale wherein examinees are asked to answer “True” or “False” to each question. Answers are assigned a point value of 1 or 2, and the points are summed. Higher scores indicate higher levels of a response tendency towards social desirability. Internal consistency for the Short Form C was found to have an alpha coefficient of .76, indicating acceptable reliability (Reynolds, 1982). Concurrent validity between the M-C C and the 33-item Marlowe-Crowne Social Desirability Scale was found to have an alpha coefficient of .93 (Reynolds, 1982). Thus, this short form scale has shown to have good reliability and validity for measuring social desirability. This scale was utilized to measure social

desirability within participants in order to control for social desirability as a confounding variable.

Demographic Questionnaire

Demographic information was collected via a constructed self-report questionnaire that asked participants for their sex, age, race, and ethnicity.

Procedure

Prior to conducting data collection, approval from the MTSU's Institutional Review Board was obtained (See Appendix A). Prospective participants were screened to determine eligibility to participate in the study. Following the screening process, research assistants reviewed the informed consent document with eligible participants, and both parties signed the informed consent document (See Appendix B). Then, resting BP was measured in a two-person testing room wherein participants were instructed to sit in an upright, relaxed position with their feet resting on the floor and instructed to not move. Resting BP was taken with a blood pressure cuff, positioned on the upper arm of the nondominant arm of each participant. Six measurements of resting BP were taken with 2-minute intervals in between each measurement. Following the completion of the six measurements of blood pressure, participants completed the psychometric measurements via a Qualtrics survey, beginning with the CSI. The TAS-20 and M-C C were randomly organized to control for order effects. Demographic information was asked at the end of the survey. After the completion of the psychometric measurements, participants were debriefed and dismissed. Participants recruited via departmental pool were

assigned credit via the SONA system following their participation. All participants were given a physical copy of the informed consent.

Data Analysis Plan

Specific statistical methods were proposed prior to data collection with anticipation of obtaining a sample size at or near 92 as suggested by the a priori power analysis. The data were to be inspected for missing values, with invalid data being removed from the data set. The data were then to be analyzed utilizing univariate procedures in order to inspect normality and determine the descriptive statistics. Transformations were to be performed as needed in order to reduce skewness and kurtosis. Then, bivariate comparisons of the hypothesized variables were to be conducted. Multiple regression analyses were to be utilized to predict coping styles from blood pressure, alexithymia, sex, and the interaction between sex and blood pressure while controlling for social desirability.

The limited sample size necessitated a change to the data analysis plan. As planned, the data were examined for missing values and descriptive procedures were used to explore normality. Two variables, TAS-20 Total Score and CSI Problem Solving Score, were found to be non-normal, with normality unable to be established through variable transformations. Given these non-normal data, the Spearman's rank correlation procedure was used in lieu of the Pearson correlation procedure to explore bivariate relationships. Further, given the stability issues introduced by the low sample size, the planned moderated multiple regression analyses were not performed.

CHAPTER III: RESULTS

The statistical software Jamovi (The jamovi project, 2025) was utilized to perform all statistical analyses. The data were inspected for missing values, and no missing values were found. The aforementioned outlier was detected in the initial analysis for descriptive statistics and was removed from the data set. Normality was inspected via univariate procedures, and two variables were found to be significant for the Shapiro-Wilk's test of normality, CSI Problem-Solving ($W = 0.90$, $p = 0.02$) and TAS-2- Total ($W = 0.89$, $p = 0.01$). As previously mentioned, transformations were performed on each variable. CSI Problem-Solving was squared, and TAS-20 Total was transformed using a common logarithm transformation (LOG10) and a natural logarithm transformation (LN). However, these transformations did not change the non-normality of the variables thus leading to the decision to use Spearman's correlation coefficient for the bivariate analyses. Means and standard deviations of the study variables are reported in Table 2.

Table 2

Descriptives Statistics for Variables

Variable	*M*	*SD*
Sex at Birth	1.68	0.48
Resting BP		
Average Systolic Resting BP	120.5	9.63
Average Diastolic Resting BP	69.6	5.98
CSI		
CSI Problem-Solving	28.3	3.92
CSI Seeking Social Support	23.4	5.42
CSI Avoidance	21.0	4.04
TAS-20 Total	49.9	15.43
M-C C	18.8	3.10

Note. $N = 25$. CSI subscale scores range from 11 – 33, TAS-20 Total scores range from 20 – 100, and M-C C scores range from 13 – 26.

Bivariate Analyses

Bivariate analyses of the study variables were conducted utilizing Spearman's correlation coefficient. The first analysis was a two-tailed test, testing for any type of correlation, and included all variables. Two negative correlations were found. The first negative correlation was found between Average Systolic BP and Sex at Birth ($\rho = -0.44$, $p = 0.03$). It is important to note that male is coded as '1' and female is coded as '2' for statistical analysis. Given that the correlation is negative, this indicates that lower Systolic Resting BP is correlated to individuals

assigned female at birth, which has been found in previous CED studies (Loveless et al., 2023; McCubbin et al., 2018). The other negative correlation was found between CSI Problem-Solving and TAS-20 Total ($\rho = -0.51$, $p = 0.01$) indicating that there is a possibility for problem-focused coping strategies, as measured by the CSI Problem-Solving, may be utilized less by those with higher alexithymic symptoms as measured by the TAS-20. Additionally, hypothesis one was tested in this analysis as all CSI subscales were predicted to be related to resting BP, but no correlations were found. The two-tailed bivariate analyses for all variables are listed in Table 3.

The second analysis was a one-tailed test, examining potential positive correlations between the TAS-20 Total variable and the CSI Problem-Solving and CSI Avoidance variables as predicted by hypothesis two. No positive correlations were detected between TAS-20 and CSI Avoidance ($\rho = 0.31$, $p = 0.06$) or between TAS-20 Total and CSI Problem-Solving ($\rho = -0.51$, $p = 0.99$), which aligns with the previous analysis. The third analysis was also a one-tailed test, examining a potential negative correlation between the TAS-20 Total variable and the CSI Seeking Social Support variable as predicted by hypothesis two. No correlation was found with this analysis ($\rho = -0.05$, $p = 0.40$). Finally, the third hypothesis cannot be analyzed as it requires moderate multiple regression for analysis, and the aforementioned small sample size introduces too much instability to produce a reliable model.

Table 3

Spearman Correlations

	1	2	3	4	5	6	7	8
1. Sex at Birth	—							
2. Average Systolic Resting BP	-0.44*	—						
3. Average Diastolic Resting BP	0.38	0.10	—					
4. CSI Problem-Solving	0.07	-0.04	0.33	—				
5. CSI Seeking Social Support	0.11	0.20	-0.00	0.04	—			
6. CSI Avoidance	0.17	-0.20	-0.28	-0.05	0.32	—		
7. TAS-20 Total	0.15	-0.07	-0.14	-0.51**	-0.05	0.31	—	
8. M-C C	0.38	0.02	0.37	0.13	-0.36	-0.08	-0.09	—

Note. * $p < .05$, ** $p < .01$

CHAPTER IV: DISCUSSION

Given the increase in usage of psychotherapeutic services across the past few years (Olfson et al., 2025), focusing on factors that influence one's coping strategies is crucial for interventional purposes as coping is a key part of the psychotherapeutic process (Beutler et al., 2018). Likewise, emotion recognition and emotion processing are principal functions of emotion-focused coping strategies, especially emotion-approach coping (Juth et al., 2015). Dysfunction in either of these may lead to increased stress in the individual, and increased stress could potentially lead to dysfunction in one's health. Additionally, some evidence for dysfunction in coping strategies has been revealed in individuals with physical and/or mental health conditions (Algorani & Gupta, 2023) and in those with alexithymic symptoms (Martino et al., 2023; Taskin Yilmaz et al., 2023). Thus, this study aimed to investigate potential relationships between three types of coping strategies and the multidimensional personality construct known as alexithymia as well as investigate potential relationships between the three types of coping strategies and the psychophysiological phenomenon known as cardiovascular emotional dampening. As previously stated, both of these psychological phenomena lead to deficits in emotion recognition and emotion processing. Based on the current literature, this study hypothesized that (1) alexithymia symptoms would be positively correlated with problem-focused coping and emotion-avoidant coping and would be negatively correlated with emotion-approach coping, (2) resting blood pressure, used for measuring CED, would be related to all three coping strategies, and (3) alexithymia and resting blood pressure would differ when

compared in their relations to the three coping strategies. Overall, the study's findings did not support the hypotheses.

While hypothesis one was not supported, a negative correlation was found between two of the variables, problem-focused coping style and alexithymia. The descriptive statistics show the sample tended to score high in CSI Problem-Solving with a limited variability in scores, but slightly below the "elevated" range of for the TAS-20 Total with a high variability in scores; thus, participants in this sample largely endorsed a problem-focused coping style but were quite variable with respect to alexithymia. As the small sample was high in problem-focused coping and just within the non-alexithymic range, this may explain why a significant Spearman's correlation was found between the variables despite the low sample size. Those who were higher in alexithymia symptoms and lower on problem-focused coping would stand out statistically as they are contrary to the majority of the sample. However, replication of this relationship should be attempted in a more robust sample with additional measurements of problem-focused coping.

Further, the observed relationship between alexithymia and problem-focused coping style was not in the predicted direction, making the finding inconsistent with what was found by found by Di Tella et al. (2018) in FM patients. The patient sample in the Di Tella et al. (2018) study utilized problem-focused strategies more than emotion-focused and dysfunctional coping strategies. However, Martino et al. (2023) found that problem-solving coping strategies (labeled as "adaptive coping" in their study) were negatively correlated with alexithymia in participants diagnosed with an IBD. These conflicting results made predicting a relationship

between problem-focused coping and alexithymia difficult. However, the results for this current study seem to support the relationship Martino et al. (2023) found between alexithymia and problem-focused coping within a small cohort of healthy undergraduate college students. This raises the question of why Di Tella et al. (2018) and Martino et al. (2023) found contrasting results. It is apparent further research is needed on this relationship for clarification. Additionally, it is important to note that all bivariate analyses conducted in this study are underpowered due to the small sample size. Thus, the correlation between CSI Problem-Solving and TAS-20 Total should be viewed with this caveat in mind in conjunction with the non-normality of the variables as it is possible that a false discovery has occurred. Additionally, Type II errors may have occurred due to the study being underpowered.

In contrast to hypothesis one, no correlations between the variables of hypothesis two were found. However, there was a correlation between Average Systolic BP and Sex at Birth, which was expected based on previous studies (Loveless et al., 2023; McCubbin et al., 2018) and would have been accounted for in the following hypothesis. However, once again, the bivariate analyses conducted in this study are underpowered, and it is possible a false discovery occurred. Subsequently, hypothesis three was not tested due to the instability of the moderate multiple regression model as a result of the aforementioned small sample size. The instability of the model would decrease the accuracy and interpretability of the relationships. Therefore, testing hypothesis three would be impossible due to the low sample size. Thus, due to the inaccuracy and decreased interpretability of the results of the moderate multiple regression, hypothesis three was not tested.

Yet, if hypothesis three could have been tested, the outcomes would be informative. Prior to conducting the hypothetical analyses, the correlation between Average Systolic BP and Sex at Birth would be accounted for as an interaction to control for any effects on BP when predicting its relationship to the other variables. Since these variables are correlated, they could cause multicollinearity in the model. Controlling these variables could lessen the influence of their correlation on the results of the multiple regression analyses. Then, if hypothesis three was supported by the results, this would further differentiate alexithymia and cardiovascular emotional dampening from each other and inform us of what coping styles are correlated with each construct and the direction of their relationships. If hypothesis three was not supported by the results, three possibilities could have occurred. First, if alexithymia and cardiovascular emotional dampening were not correlated to any coping styles following the multiple regression analyses, then it would indicate no relationship between the coping styles and the two constructs. Second, if the constructs were correlated to one or more coping styles and they were similar in their relationships, then it would indicate the possibility of deficits in emotion recognition and processing influencing one's utilization of coping styles. Third, if hypothesis three was partially supported by the results, then it would reveal which coping style(s) differ between the constructs and which coping style(s) are similar or have no correlations between the constructs. This outcome could be a mix between the previous scenarios' implications. One coping style relationship may differ between the two constructs and would further differentiate them, another relationship may be similar between the two constructs and could indicate the possibility of the utilization of that coping style being influenced by deficits in emotion

recognition and processing, and another coping style may have no relationship with the constructs. Overall, there are multiple possible outcomes of hypothesis three if the moderate multiple regression could have been performed.

Limitations and Future Directions

Accordingly, there are several limitations to the present study that must be taken into consideration. First, this study is underpowered due to the small sample size collected from the target population. Participation in this study by the target population was significantly below expectations. Multiple attempts at recruitment were executed in order to encourage participation. These attempts included advertising the study to ten in person psychology courses, eight psychology course professors sharing the recruitment email with their courses via email and on their virtual classroom pages in MTSU's D2L system, the study being listed on the MTSU Department of Psychology's SONA website for recruitment from the departmental research pool, and sending recruitment emails to eligible participants from the departmental research pool through the SONA website. Despite these efforts, there was a significant lack of participation from the eligible pool, of which includes approximately 100 known participants from the departmental research pool who had not already participated in the study. While it is expected that research participation recruitment varies between Fall and Spring semesters, this does not explain the significant discrepancy between the sample size and the eligible participant pool. This is by far the most significant limitation of this study, but unfortunately, it cannot be entirely controlled for. Ultimately, this limitation contributed to the study being underpowered and the inability to conduct moderate multiple regression analyses for the third

hypothesis due to potential stability issues. However, additional efforts could have been made to encourage participation. Future studies may investigate adding additional incentives to encourage participation from eligible participants and increase the cost-benefit ratio, design the title and description of the study to be more appealing to the target audience, introduce more types of recruitment materials and strategies, such as flyers, posters, and aiming for a wider audience, and possibly alter eligibility criteria to include more individuals.

Second, the measurements used for measuring coping strategies and alexithymia were self-report measures, making the reporting on these constructs subjective in nature. While self-report measures are widely used in human-subjects research, it is possible there may be some individuals who are limited in their self-knowledge of their coping strategies, thus leading to a lack of accurate data. Furthermore, for those higher in alexithymia or CED, it is possible they may not cognitively recognize the extent to which they have deficits in emotion recognition and/or emotion processing. This limitation must be taken into consideration for future research on these constructs. Future studies should address this issue by adding objective measurements of alexithymia and coping styles and investigating potential objective measurements of CED beyond blood pressure measurements. Potential objective measures could include structured or semi-structured interviews for assessing alexithymia symptoms, visual and/or auditory tasks that necessitate emotion recognition and processing, and role-play assessments in which participants engage in various stress-inducing interpersonal scenarios with one or more researchers/lab assistants. Third, the study design is cross-sectional, which allows for correlative relationships to be considered, but is not experimental, thus causal

relationships cannot be determined. Future studies may investigate these variables within an experimental study design for determining any causal relationship between variables. The experimental design may include teaching participants a set of particular coping strategies and having them act out said strategies, then the researcher "grades" their performances on acting out each strategy.

Fourth, this study was not fully representative of the population, which is attributed to the small sample size. Given that the data was primarily represented by individuals assigned female at birth, individuals who identify racially as Caucasian/White, and individuals who identify ethnically as not Hispanic or Latino/Latina, future studies should aim to gather data from a larger sample that is more representative of the general population or from select groups such as racial minority populations, ethnic minority populations, or biological men. Fifth, there is a considerable lack of agreement on distinctions of coping styles within the research literature and in the field of coping overall. A noticeable issue during the literature review for this study was the lack of agreed upon distinctions of coping styles following Lazarus and Folkman's 1984 publication. Lazarus and Folkman (1984) established the transactional model of stress and coping, which details two distinctions of coping: problem-focused coping and emotion-focused coping. Since this model was established, many other theoretical models of coping have been developed, along with various labels for coping strategies (Carver & Connor-Smith, 2010; Guadalupe & DeShong, 2025). This led to difficulty regarding what distinction or grouping of coping styles to use for this study. Ultimately, three styles were chosen (problem-focused, emotion-approach, and emotion-avoidant) but not without

difficulty. While this limitation is a wider issue for the field of coping, future studies should be aware of the various distinctions for coping styles and clearly define their distinctions.

Conclusion

Healthy coping and good cardiovascular health are essential to one's survival. Without one or the other, one's health will continually decline due to various stressors, negatively impacting their mental health, their cardiovascular system, and/or other systems within their body. Likewise, emotion recognition and emotion processing are crucial parts of emotion-focused coping, and any factors that lead to deficits in them must be identified and, if possible, treated. Alexithymia and CED are factors that are negatively associated with one's psychological well-being by increasing deficits in emotion recognition and emotion processing. Furthermore, CED may lead to an increased risk of developing cardiovascular disease. While this study's results did not present solid evidence of relationships between coping styles, alexithymia, and CED, it is a novel study and provides more information on these constructs, especially on the potential relationship between problem-focused coping and alexithymia. Finally, it is important to note that further research must be conducted to come to a consensus on whether or not alexithymia and/or CED influence one's utilization of the three types of coping styles.

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APPENDICES

APPENDIX A

IRB Approval Letter

INSTITUTIONAL REVIEW BOARD
FWA 00005331 | IRB #00003571
Office of Research Compliance
010A Sam Ingram Building
2269 Middle Tennessee Blvd.
Murfreesboro, TN 37129

Date: October 9, 2025
PI: Hailey Hall
Department: Middle Tennessee State University, Psychology
Co-PI: James Loveless
Department: Middle Tennessee State University, Psychology
Re: Initial - IRB-FY2026-51
Exploring Relationships between Coping Styles, Alexithymia, and Cardiovascular Emotional Dampening

The Middle Tennessee State University Institutional Review Board has reviewed and approved by Expedited Review the above referenced research study. The approval is effective starting October 9, 2025.

Decision: Approved

Research Category:
4. Collection of data through noninvasive procedures (not involving general anesthesia or sedation) routinely employed in clinical practice, excluding procedures involving x-rays or microwaves. Where medical devices are employed, they must be cleared/approved for marketing. (Studies intended to evaluate the safety and effectiveness of the medical device are not generally eligible for expedited review, including studies of cleared medical devices for new indications.)
7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. (NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(2) and (b)(3). This listing refers only to research that is not exempt.)

The following apply to your approved study:

1. In accordance with 45 CFR 46.110 and the regulations for Expedited Review (Common Rule), this project does not expire and continuing review is not required by the IRB.
2. Any unanticipated harm to participants or adverse events must be reported to the Office of Compliance.
3. All modifications to the approved study must be submitted for review through Cayuse IRB for approval before their implementation. Adding new researchers constitutes a modification to the protocol. Per MTSU Policy, a researcher is defined as anyone who handles the data or interacts with participants. Everyone meeting this definition for this project must have completed the required CITI training and received IRB approval prior to becoming actively involved in the project.
4. Closure of the study must be submitted within Cayuse when the study ends or when personal identifiers are removed from the data and all codes and keys are destroyed.
5. Federal regulations require human subjects records be retained for at least 3 years after completion of the research. Once de-identified, the data can be kept longer for further analysis.
6. If your research is funded by a sponsor, they may have specific data retention policies that supersede the standard IRB guidelines.
7. If your study involves protected health information (PHI), you must adhere to HIPAA regulations when storing and destroying data.
8. Data should be destroyed using a secure method that permanently erases information. Keep a record of when and how research data were destroyed.

Sincerely,

Middle Tennessee State University Institutional Review Board

IRB Modification Approval Letter

INSTITUTIONAL REVIEW BOARD
FWA 00005331 | IRB #00003571
Office of Research Compliance
010A Sam Ingram Building
2269 Middle Tennessee Blvd.
Murfreesboro, TN 37129

Date: February 6, 2026
PI: Hailey Hall
Department: Middle Tennessee State University, Psychology
Co-PI: James Loveless
Department: Middle Tennessee State University, Psychology
Re: Modification - IRB-FY2026-51
Exploring Relationships between Coping Styles, Alexithymia, and Cardiovascular Emotional Dampening

The Middle Tennessee State University Institutional Review Board has reviewed the modification request to the above referenced study and rendered the decision below.

Decision: Approved
Findings:

Research Notes:

Sincerely,

Middle Tennessee State University Institutional Review Board

APPENDIX B

Informed Consent document

Office of Research Compliance
2269 Middle Tennessee Blvd.
Sam H. Ingram Bldg., Room 010A
Murfreesboro, TN 37132
(615) 898-2400 compliance@mtsu.edu

INFORMED CONSENT

Study Title:	*Exploring Relationships between Coping Styles, Alexithymia, and Cardiovascular Emotional Dampening*
Protocol Number:	IRB-FY2026-51
Approval Date:	10-09-2025
Principal Investigator:	Hailey Hall, B.S.
Institution:	Middle Tennessee State University

Name of participant: _____ **Age:** _____

You are being asked to participate in a research project. The following information is provided to inform you about the research project and your participation in it. Please read this form carefully. You will be given an opportunity to ask questions, and your questions will be answered. Also, you will be given a copy of this consent form.

Your participation in this research study is voluntary. You are free to withdraw from this study at any time with no penalty and no loss of benefits already earned. In the event new information becomes available that may affect the risks or benefits associated with this research study or your willingness to participate in it, you will be notified so that you can make an informed decision about whether or not to continue your participation.

1. Purpose of the study:

This study will explore potential relationships between coping styles and two similar psychological constructs, alexithymia and emotional-dampening.

2. Description of procedures to be followed and approximate duration of the study:

We are looking for 120 adult college students who desire to participate in a study exploring potential relationships between coping styles and two psychological constructs, alexithymia and emotional-dampening. This study should take approximately 60 minutes to complete in full. It will begin with screening for exclusionary criteria. Once screening is completed and informed consent has been reviewed with the participant, the study will begin by measuring resting blood pressure six times using a SunTech Oscar 2 Monitor. Following blood pressure measurement, seven surveys related to the study's focus will be conducted on a laboratory computer. The study will conclude with a concise debriefing which will involve a review of the aims of the study.

3. Expected costs:

Beyond time and effort, no other costs are expected of you for your participation.

4. Description of the discomforts, inconveniences, and/or risks that can be reasonably expected as a result of participation in this study:

Participating in this study will not include any risks greater than those expected in daily life. Therefore, the risk of participating in this study is minimal. In the context of research, minimal risk is defined as the likelihood and magnitude of discomfort or harm expected in research is equivalent to that which is experienced or encountered in everyday life or during routine physical or psychological examinations or tests.

It is noted that the collection of blood pressure measurements may cause discomfort, but it is within the expected risks of routine physical examinations.

5. Compensation in case of study-related injury:

No compensation will be provided for any injuries that occur during the completion of this study as the risk of injury associated with this type of study is no greater than would be expected in daily life.

6. Anticipated benefits from this study:
a) The potential benefits to science and humankind that may result from this study include:

This study will help us discover the potential relationships between coping styles and two psychological constructs, alexithymia and emotional-dampening, and how they may influence psychological well-being and cardiovascular disease risk.

b) The potential benefits to you from this study include:

There are no personal potential benefits from participating in this study outside of helping in the advancement of scientific knowledge and the experience of participating in scientific research.

7. Alternative treatments available:

This study is not designed to diagnose or treat any condition or aliment. While we are using a measurement in this study that you may encounter in routine health care visits, the procedures used in this study will in no way diagnose or treat any medical, psychiatric, and/or other health issues.

Office of Research Compliance
2269 Middle Tennessee Blvd.
Sam H. Ingram Bldg., Room 010A
Murfreesboro, TN 37132
(615) 898-2400 compliance@mtsu.edu

Additionally, potential participants that need to participate in a study for class credit may choose to register for a different study or complete an alternative activity at the discretion of their course instructor(s) if he or she is not interested in participating in this study.

8. Compensation for participation:

Participants recruited via SONA who complete this study will be compensated with 6 SONA credits.

Participants recruited via a MTSU psychology course who complete this study will not be compensated by the researchers for their participation. However, they may receive extra class credit from their course instructor. Any extra class credit awarded will be between the participant and their course instructor.

All participants are provided with a copy of the informed consent document, which is physical evidence of participation in the study.

9. Circumstances under which the Principal Investigator may withdraw you from study participation:

The researcher may withdraw your data from the study, at your request, at any point during or up to three years after the study.

10. What happens if you choose to withdraw from study participation:

If you decide you no longer want to be in this research after it has already started, you may withdraw your consent without penalty at any time. SONA credit compensation will then be prorated based on the amount of time spent in the study at a rate of 1 credit per every 15 minutes of participation, multiplied by 1.5.

11. Contact Information: If you should have any questions about this research study or possible injury, please contact:

Principal Investigator:	*Hailey Hall, B.S.*
Contact Information:	*hrh3e@mtmail.mtsu.edu*
Faculty Advisor:	*James Loveless, Ph.D.*
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For additional information about giving consent or your rights as a participant in this study, please contact the Middle Tennessee State University (MTSU) Office of Compliance at 615-494-8918 or via email at irb_information@mtsu.edu. (http://www.mtsu.edu/irb)

Office of Research Compliance
2269 Middle Tennessee Blvd.
Sam H. Ingram Bldg., Room 010A
Murfreesboro, TN 37132
(615) 898-2400 compliance@mtsu.edu

12. Confidentiality: All efforts, within reason, will be made to keep the personal information in your research record private, but total privacy cannot be promised. Your information may be shared with people at MTSU (such as the MTSU Institutional Review Board) or other agencies (such as the Federal Government Office for Human Research Protection) if you or someone else is in danger or if we are required to do so by law.

13. STATEMENT BY PERSON AGREEING TO PARTICIPATE IN THIS STUDY

I have read this informed consent document and the material contained in it has been explained to me. I understand each part of the document, my questions have been answered, and I freely and voluntarily choose to participate in this study.

_____ _____

Date **Signature of participant**

Consent obtained by:

_____ _____

Date **Signature of researcher**

_____

Printed name and title of researcher

APPENDIX C

Coping Strategy Indicator (CSI) scenario

You are in a Junior level college course that has been increasingly demanding of your time and effort as the semester progresses. Additionally, you have a habit of procrastinating on big assignments. As a result, you have a large project for the class due in two days that is only half completed. The stakes are somewhat high as the project is 30% of your grade in the class.

Keeping <u>that</u> stressful event in mind, indicate to what extent you would. . .

APPENDIX D

Demographics Questionnaire

1. What is your age? (Please enter a numerical answer, i.e., 18). _____
2. What is your assigned sex at birth?
    a. Male
    b. Female
    c. Intersex
3. What is your race?
    a. African American/Black
    b. Asian American/Asian
    c. Caucasian/White
    d. Native American/American Indian
    e. Pacific Islander/Alaskan Native
    f. Multiracial
    g. Other (specify) _____
    h. Prefer not to say
4. What is your ethnicity?
    a. Hispanic
    b. Latino/Latina
    c. Not Hispanic or Latino/Latina
    d. Other/Unknown

e. Prefer not to say